Inclusive Design Guidelines

City of New York
Office of the Mayor

Bill de Blasio
Mayor

Richard Buery
Deputy Mayor

Victor Calise
Commissioner

NYC

Mayor's Office for
People with Disabilities

New York City *Second Edition*

Mayor's Office for People with Disabilities

Inclusive Design Guidelines

New York City *Second Edition*

Robert Piccolo, AIA, NCARB Editor in Chief

ICC
INTERNATIONAL
CODE COUNCIL

Inclusive Design Guidelines

New York City, *Second Edition*

City of New York
Mayor's Office for People with Disabilities
100 Gold Street, 2nd Floor
New York, New York 10038

www.nyc.gov/mopd

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Second Edition

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THE CITY OF NEW YORK
OFFICE OF THE MAYOR
NEW YORK, NY 10007

Dear Friends:

In a just city, all people are treated fairly regardless of their physical and mental abilities. Our built environment represents our way of life and is a means to measure equality by its level of access and usability.

Building codes establish minimum legal requirements but they do not necessarily ensure the best possible design solutions. The *Inclusive Design Guidelines, New York City, Second Edition,* provides designers with tools to refine their projects and address the needs and preferences of the widest range of our population.

More than a quarter century after the passage of the American with Disabilities Act, it is important to evaluate its effect and establish long-term goals for the next 25 years and beyond. The *IDG* is an explicitly detailed, viable and visionary blueprint that allows us to plan for our city's future.

As a beacon of equality, New York is a city of opportunity for our more than 8.5 million residents and 60 million yearly visitors. The *IDG* is helping us improve quality of life for everyone, especially children, seniors and people with disabilities. Together we will continue to build a stronger and more just city for all.

Sincerely,

Bill de Blasio
Mayor

THE CITY OF NEW YORK
OFFICE OF THE MAYOR
NEW YORK, NY 10007

Greetings,

Since 1973, the Mayor's Office for People with Disabilities (MOPD) has worked to ensure that New York City is a place that works for all New Yorkers. The City has made many strides in increasing equity for people with disabilities over the decades. But we still have more work to do to make the City fully inclusive.

Under the progressive leadership of Mayor Bill de Blasio, we have a unique opportunity to accelerate that progress. The release of the second edition of the *Inclusive Design Guidelines (IDG)* will be an invaluable tool for architects and businesses across the country.

The physical environment in which people live has a profound impact on the quality of their lives, all the more for New Yorkers with disabilities. This publication provides clear and concise solutions to complex design questions that promote inclusion. The *IDG* offers guidance to help those responsible for creating physical environments build with the needs of all people in mind. It provides architects and builders with best practices, explains the parameters within which they must work; shows how they can avoid conflict with legal requirements; and demonstrates how they can accommodate the needs and preferences of people with varying abilities.

The *IDG* allows builders and architects to focus on the creative aspects of their projects and achieve their design goals while simultaneously considering the needs of people with disabilities. It provides a solid foundation for the further evolution of design and will help to influence future legal requirements. It creates innovative and, in some cases, unprecedented ideas that have the potential to bring lasting improvements to the lives of people with disabilities.

When design becomes more equitable and inclusive, we all benefit.

Sincerely,

Richard Buery,
Deputy Mayor for Strategic Policy Initiatives

The City of New York
Office of the Mayor

Bill de Blasio
Mayor

Anthony Shorris
First Deputy Mayor

Richard Buery
Deputy Mayor for Strategic Policy Initiatives

Victor Calise
Commissioner
Mayor's Office for People with Disabilities

Robert Piccolo, AIA, NCARB
First Deputy Commissioner
Mayor's Office for People with Disabilities

Kleo King, Esq.
General Counsel, Deputy Commissioner
Mayor's Office for People with Disabilities

Inclusive Design Guidelines, New York City
Second Edition

Robert Piccolo, AIA, NCARB
Editor in Chief
1st Deputy Commissioner, MOPD

Christian Valle, DAFN Accessible Communication Coordinator, MOPD
Kleo King, Esq., General Counsel / Deputy Commissioner, MOPD
Nicholas Kaminski, Director, *ADA* Compliance, SCA / MOPD

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James P. Colgate, AIA, CFN, Counsel, Bryan Cave LLP.; Chair, *2014 NYC Building Code*
Xenia Diente, Deputy Director, NYC Department of Design and Construction
Erica Dumas, Public Information Officer, Port Authority of New York and New Jersey
Jorge Fanjul, Senior Policy Advisor, Mayor's Office
Eli Fresquez III, Assistant General Counsel, DAFN Coordinator, MOPD
Emilie Gossioux, Alumni, Cooper Union
Thomas Heyer, Architecture, Cooper Union
Wai-Jee Ho, Alumni, Cooper Union
Stephen A. Johnson, Team Leader, Manhattan, NYC Department of City Planning
Ramakrishna Kadukuntla, Civil Engineer, *ADA* Compliance, POH Coordinator, MOPD
Nicholas Katsarelis, Disability Services Facilitator, NYC Department of Buildings
Teddy Kofman, Instructor, School of Architecture, Cooper Union
Steven Landau, President, Touch Graphics, Inc.
Bill Main, President, Landscape Forms, Inc.
Jerry Maltz, AIA, Founder, Design for Aging Committee, AIA New York
Hassan Mamum, Shelter Architect, Mayor's Office for People with Disabilities
Dominic Marinelli, Vice President, Accessibility Services, United Spinal Association
Jason R. Mischel, Esq., Accessible Transportation Specialist
Rita Montauredes, Advocate
Dino Y.P. Ng, P.E., ENV SP, Associate Commissioner, NYC Department of Design & Construction
Andrea Nunez, PE, Engineer-in-Charge, NYC Department of Design & Construction
Elizabeth O'Donnel, Dean, School of Architecture, Cooper Union
Peter H. G. Phillipps, Principal, Phillipps Architects; Professor, Brooklyn College
Zoe Piccolo, Project Manager, NYC Department of Parks and Recreation, Pratt Institute
Matthew Puvogel, DAFN, NYC Emergency Management
Walei Sabry, Housing Coordinator, Mayor's Office for People with Disabilities
Stanley Shor, Assistant Commissioner, NYC Dept. of Information, Technology & Telecommunications
William Stein, FAIA, Principal, Dattner Architects
Ratan Sur, Civil Engineering, Cooper Union
Chris Taleff, Architecture, Cooper Union
Angel Valle, Entrepreneur
Harry Vyas, Director of Elevators, NYC Department of Buildings
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Thank you

FOREWORD

As Commissioner of the New York City's Mayor's Office for People with Disabilities (MOPD), thank you for using the *Inclusive Design Guidelines, New York City, 2nd Edition (IDG)*. I would like to acknowledge my staff and their dedication that makes it possible for MOPD to help improve New York City. Thank you to our publisher, the International Code Council, for their continuous support and for granting us permission to use their copyrighted material. Thank you to our diverse team of participants and supporters and to the American Institute of Architects.

Since the launch of the first edition of the *IDG* in 2010 we have met with representatives of over 25 countries from the European Union, the Middle East and Asia. Many international cities are enthusiastically embracing Inclusive Design. One of the primary reasons that it is gaining traction is tourism. Most countries are trying to increase the number of revenue producing visitors, especially by attracting the aging who have the time and the disposable income. People with Disabilities and those with diminished abilities are often leary about traveling. Inclusive Design alleviates some of that anxiety. The *IDG* is proving to be an important tool for designers to create welcoming, comfortable, and usable environments. Locally, the *IDG* is helping to make New York City the most accessible city in the world.

We have a progressive agenda under Mayor de Blasio; the first quarter century of the Americans with Disabilities Act has been reached; and the goal of an inclusive environment in which no segment of society is segregated or stigmatized is advancing. We are living through one of the most innovative periods in the City's history. As a person with a disability, I am personally affected and welcome the positive transformations occurring all around me. The *IDG 2nd Edition* plays an important role in all this and is contributing to the legacy of this administration which is about equality, social change, and optimism.

Victor Calise
Commissioner
Mayor's Office for People with Disabilities

PREFACE

This second edition of the *IDG* confirms that it is a living document and that Inclusive Design is dynamic. The premise of the book holds true: "The *IDG* is voluntary technical guidance helping designers produce multisensory enhanced environments that accommodate a wide range of physical and mental abilities for people of all ages." Adoption of the *ICC A117.1* standard has proven to be correct because of its relevant content, structure, numbering system and harmonization with the *2014 New York City Building Code*, the *2010 ADA Accessibility Standards*, and other governing legal requirements.

Expansion and refinements of this edition comprise 25% new content, 15% updates, and two hundred forty additional figures. The following are some examples: Chapter 1, marginal markings; Chapter 2, various laws governing accessibility; Chapter 3, a three-tiered spatial envelope, gesture recognition, eye levels; Chapter 4, Accessible Pedestrian Signals, Sensory Pedestrian System refinements, convertible walkways, embedded LED's; Chapter 5, bicycle/scooter/tricycle/handcycle/tandem parking; Chapter 6, multipurpose bathing compartment components and examples; Chapter 7, Assistive Listening Systems categorizations, mobile navigation, tactile guideways; Chapter 8, adjustable height platforms, type "a" and "b" temporary workspaces; Chapter 9, detailed bench criteria, automatic receptacles; and Chapter 10, closet lift conversion, beds, and home automation

Automation is emphasized for many reasons: usability; hygiene; access to more features; accommodation of individual needs and preferences; and it allows left or right hand use. It also increases the number of user operational scenarios by interfacing multiple devices, varying the sequence, and the optional use of preset individual customization. Automated remote home and health monitoring systems are becoming more sophisticated. It is now practical for many people to remain in their homes and safely age-in-place.

Scooter usage is increasing as the baby boomer generation ages (those born between 1946 and 1964). The *IDG* helps you craft environments that accommodate these and other mobility devices with greater user error tolerance as one's physical and mental abilities diminish. It takes into account cognitive and sensory variations, size, posture, body movement, and dexterity. The results are improved safety, better access and increased independence.

Active Design is cited throughout the book. It is an approach to the development of buildings, streets, and neighborhoods that uses architecture and urban planning to make daily physical activity more usable and inviting. Inclusive Design and Active Design have a symbiotic relationship. Active Design amplifies the role of architecture and urban planning by improving public health and well-being; Inclusive Design helps to make it feasible.

Many countries are trying to determine ways to make their built environment more accommodating. Inclusive Design is a means to improve conditions for their own citizens while making their country more inviting to visitors. Providing better access and usability enhances experiences that encourage more travel, resulting in revenue increases.

Six years have passed since the launch of the first edition. Because of all that has happened during this period, the positive feedback, technological advancements, social and environmental change, persistent inequality, and to establish a revision cycle, it seems to be the appropriate time for the release of this second edition.

Robert Piccolo, AIA, NCARB
Editor in Chief
1st Deputy Commissioner
Mayor's Office for People with Disabilities

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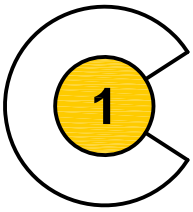

Application and Administration

100 Introduction. This document is known as the *Inclusive Design Guidelines, New York City, Second Edition*, referred to as the "*IDG*."

Chapter 1 includes: human factor provisions; compliance alternatives; conventions; referenced standards, resources and definitions.

The purpose of the *IDG* is to provide design recommendations to accessibly accommodate the entire population and describe applications to new and existing environments. Human factor provisions address adults, children, and people of short stature. Compliance alternatives do not limit designs, products or technology contained in the *IDG*. Conventions explain how to round percentages. The term "industry tolerances" is a complex and constantly evolving subject that does not use a single definitive source to establish these limits. Tolerances may change so only the most current information should be applied. Figures illustrate the text and are not intended to graphically introduce additional material. They are on hand to enhance comprehension of the text. The use of the abbreviation "aff" for "above finished floor" is meant to simplify and shorten sentences. Cross-referencing allows application of one section to applicable subsections. The vertical margin markings outside of columns indicate changes from the prior edition.

The cited standards are typically the editions referenced in the *2014 NYC Building Code* (*2014 NYCBC*) rather than the most current editions of those standards. This should maintain coordination and help to avoid a conflict with the *2014 NYCBC*. Resources and other relevant publications are referenced.

Definitions are limited to avoid redundancy with the book's content. The *IDG* contains many terms that are delineated by the provisions and do not need to be repeatedly explained. Defined terms in resources, refers to the various cited publications containing the applicable definition. The *2014 NYCBC* has been referenced because it contains an expanded list of terms that are used in the code and may be relevant to the *IDG*.

101 Purpose. The criteria in Chapters 3 through 10 of these guidelines should help make sites, facilities, buildings and elements inclusive. These guidelines are recommendations, intended to be used by professionals for projects in New York City. They are not part of the NYC laws. The *IDG* is harmonized with the *2014 NYC Building Code*, the *A117.1 - 2009* and other reference standards. The *IDG* is a tool for the design and construction industries to help them accommodate the entire population to the greatest extent possible, to help make the City more user friendly for people who work and live here and a more accommodating destination for visitors.

101.1 Applicability. Sites, facilities, buildings, and elements should comply with the applicable provisions of Chapters 3 through 10 for new construction. In existing environments, due to physical and legal constraints, full compliance may not be feasible.

102 Human Factor Provisions. The technical criteria in this book include adult, children, and people of short stature dimensions and anthropometries as applicable.

103 Compliance Alternatives. Nothing in this book is intended to prevent the use of designs, products, or technologies as alternatives to those recommended or suggested, provided they result in equivalent or greater inclusiveness, and such equivalency is approved by the administrative authority adopting these guidelines and complies with all applicable laws.

104 Conventions

104.1 General. Where specific criteria of these guidelines differ from the general criteria, the specific criteria should apply.

104.2 Calculation of percentages. Where the determination of the recommended size or dimension of an element or facility involves ratios or percentages, rounding down for values less than one half should be permitted.

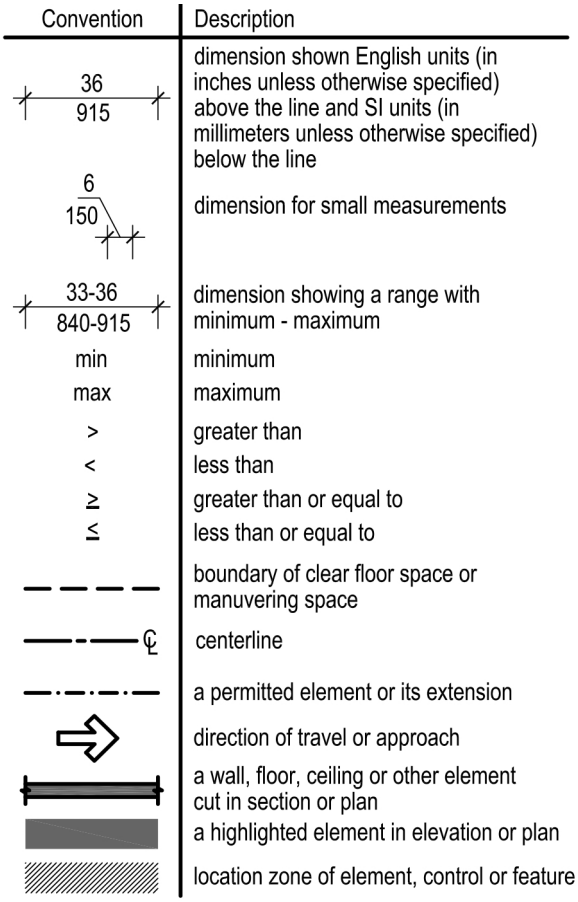

Fig. 104.2
Graphic Convention for Figures

104.3 Dimension tolerances. All dimensions are subject to conventional industry tolerances except where the recommendation is a range with stated minimum and maximum end points.

104.4 Figures. Figures included herein are provided for informational purposes only. In some instances graphics were intentionally excluded to avoid narrow interpretations or a figure becoming a typical condition; and unintentionally restricting the designer and limiting creativity.

104.5 Floor or Floor Surface. The terms floor or floor surface refer to the finish floor surface or ground surface, as applicable. In some instances the “above finished floor” (aff) is used to avoid confusion with “grade.”

104.6 Referenced Sections. Unless specifically stated otherwise, a reference to another section or subsection within these guidelines may include all subsections of the referenced section or subsection.

104.7 Marginal Markings. Solid vertical lines in the margins indicate a change from the recommendations of the prior edition.

> "The vertical marginal markers located to the right or left of the columns identifies updates to the prior edition or the introduction of new material….."

Fig. 104.7
Marginal Markings

105 Referenced Standards and Resources

105.1 General. The standards listed in Section 105.2 should be considered part of the *IDG* to the prescribed extent of each such reference. Where criteria in the *IDG* differ from those of these referenced standards, the criteria of the standard should apply.

105.2 Standards

105.2.1 ***Hearing Aids- Magnetic Field Strength in Audio-Frequency Induction Loops for Hearing Aids Operating with an Induction Pickup Coil*** *IEC 60118.4* ***Edition 3.0, 2014-12*** (International Electrotechnical Commission, 3 rue de Varenbe, PO Box 131, 1211 Geneva 20, Switzerland).

105.2.2 ***Manual on Uniform Traffic Control Devices:*** *MUTCD - 2009* (The Federal High-way Administration, Office of Transportation Operations, Room 3408, 400 7th Street, S.W., Washington, DC 20590).

105.2.3 ***National Fire Alarm and Signaling Code:*** *NFPA 72-2010* (National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269-9101).

105.2.4 ***Performance Criteria for Accessible Communications Entry Systems.*** *DASMA 303-2006* (Door and Access Systems Manufacturers Association, 1300 Sumner Avenue, Cleveland OH 44115-2851).

105.2.5 ***Power Assist and Low Energy Power Operated Doors:*** *ANSI/BHMA A156.19-2002* (Builders Hardware Manufacturers' Association, 355 Lexington Avenue, 17th Floor, New York, NY 10017).

105.2.6 ***Power Operated Pedestrian Doors:*** *ANSI/BHMA A156.10-2006* (Builders Hardware Manufacturers' Association, 355 Lexington Avenue, 17th Floor, New York, NY 10017).

105.2.7 Safety Code for Elevators and Escalators: *ASME/ANSI A17.1-2010* (American Society of Mechanical Engineers International, Three Park Avenue, New York, NY 10016-5990).

105.2.8 Safety Standard for Platform Lifts and Stairway Chairlifts: *ASME/ANSI A18.1-2005,* (American Society of Mechanical Engineers International, Three Park Avenue, New York, NY 10016-5990).

105.2.9 ***Standard Laboratory Test Method for Determination of Forces and Motions Required to Activate Operable Parts of Operable Windows, and Doors in Accessible Spaces,*** *AAMA 513-14* (AAMA, 1827 Walden Office Square, Suite 550, Schaumburg, IL 60173-4268).

105.2.10 NYC Accessibility Standard: *ICC/ANSI A117.1-2009* (International Code Council, Chicago District Office, 4051 W. Flossmoor Road, Country Club Hills, IL 60478-5795).

105.2.11 Federal Accessibility Standard: *2010 ADA Standards for Accessible Design* (United States Access Board, 1331 F Street, NW, Suite 1000,Washington,DC 20004-1111).

105.3 Resources

Accredited Standards Committee A117, American National Standards institute (1986), *American National Standard for Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People, ANSI A117.1-1986.* New York: American National Standards Institute, Appendices 4.4, 4.6.

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Hoke, John Ray, Jr., editor. (1994) *Architectural Graphic Standards, 9th ed.* New York: John Wiley & Sons, pp.2-5, 10, 159-167.

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Pressman, Andrew, editor. (2007) *Architectural Graphic Standards, 11th ed*. New York: John Wiley & Sons, p.348, Table 13.103.

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Public Rights-of-Way Access Advisory Committee, (2007). *Special Report: Accessible Public Rights-of-Way Planning and Design Alterations.* http://www.access-board.gov/prowac/alterations/guide.htm pp.41, 55, 56.

Queen's University at Kingston, (1997). *Accessibility Guidelines.* http://www.queensu.ca/camplan/reports/aguide/index.html pp.5.2, 5.3, 5.4.

U.S Architectural and Transportation Barriers Compliance Board (2011). *Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way.* US Government Printing Office.

U.S Architectural and Transportation Barriers Compliance Board (1998). *ADAAG Manual, A Guide to the American with Disabilities Act Accessibility Guidelines.* US Government Printing Office, pp.33-34.

US Department of Justice (1994). *ADA Standards for Accessible Design* (28 CFR Part 36, revised July 1, 1994) §A.4.30.5.

105.3.1 Other Publications

Accredited Standards Committee A117, International Code Council (2004). American National Standard, *Accessible and Usable Buildings and Facilities, ICC/ANSI A117.1-2003.* Illinois: International Code Council. Inc.

Accredited Standards Committee A117, International Code Council (2010). American National Standard, *Accessible and Usable Buildings and Facilities, ICC/ANSI A117.1-2009.* Illinois: International Code Council. Inc.

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The Cooper Union, Irwin S. Chanin School of Architecture (2015), *Tactile City, Navigation Strategies for Visually Impaired New Yorkers,* New York. http://www.tactilecity.org/.

U.S. Consumer Products Safety Commission. *Childproofing Your Home, 12 Safety Devices to Protect Your Children.* http://www.cpsc.gov/cpscpub/pubs/252.pdf or http://www.cpsc.gov/.

106 Definitions

106.1 General. For the purpose of this book, the terms listed in Section 106.5 have the indicated meaning.

106.2 Terms Defined in Resources. Terms specifically defined in a resource, and not defined in this section, shall have the specified meaning from the resource. See the *2014 NYC Building Code*, Chapter 2, Definitions, Section BC 201 General, and Section BC 202 Definitions.

106.3 Undefined Terms. The meaning of terms not specifically defined in this book or in a resource shall be as defined by collegiate dictionaries in the sense that the context implies.

106.4 Interchangeability. Words, terms, and phrases used in the singular include the plural, and those used in the plural include the singular.

106.5 Defined Terms.

Accessible Pedestrian Signals (APS). As per the *MUTCD 2009 Edition*, accessible pedestrian signals and detectors provide information in non-visual formats, such as audible tones, speech messages, and/or vibrating surfaces.

Active Design: Active Design is an approach to the development of buildings, streets, and neighborhoods that uses architecture and urban planning to make daily physical activity and healthy foods more accessible and inviting.

Administrative authority: A jurisdictional body that adopts or enforces regulations and standards for the design, construction, or operation of buildings and facilities.

Aligned closet platform lift. Vertically aligned closets with a removable ceiling/floor for conversion to a 2 story shaft to accommodate a platform lift.

Ambulatory: A person that is not bedridden and can walk or move from place to place.

Anthropometric: The study of human body measurements

Amenity: Something that contributes to physical or material comfort.

Assembly area. As per *2014 NYCBC*, Section BC 303 Assembly "Group A" occupancy includes, among others, the use of a building or structure or a portion therefore, excluding a dwelling unit, for the gathering of any number of persons for purposes such as civic, social or religious functions, recreation, food or drink consumption, awaiting transportation, or similar group activities; or when occupied by 75 persons or more for educational or instructional purposes. "Group B" are exceptions for occupancy loads less than 75 comprising buildings, nonaccessory tenant spaces, rooms or spaces.

Assistive Listening Systems. As per the *2014 NYCBC*, Section 1108.2.7, each assembly area where audible communications are integral to the use of the space shall have an assistive listening system in accordance with *ICC A117.1*, including Section 706 (Assistive Listening Systems) and Appendix N. Appendix N comprises wireless systems: Induction Loops, Infra-Red, and FM systems. In addition, there are hard-wired systems and AM systems. ALS comprise microphones, transmitters, receiver, amplifiers, loops and arrays. Receivers comprise: hearing aid t-coils, headphones or ear buds, hard-wired jacks and neck loops. Each system has optimum type usage: FM for large facilities; Infra-red for privacy; and induction loops for all general applications where background magnetic noise is not too high.

Audio-Haptic: a tool for people who are blind to explore graphics through sound and touch.

Blended transition: A raised pedestrian street crossing , depressed corner, or similar connection between the pedestrian access route at the level of the sidewalk and the level of the pedestrian street crossing that has a grade of 1:20 or less.

Braille: A system devised by Louis Braille in 1821 comprised of characters or cells made up of six dot positions within a rectangle. Grade 2 Braille referenced in this book, uses contractions to reduce space and increase reading speed.

Center for Active Design: The Center for Active Design grew out of an interdisciplinary partnership among multiple New York City agencies, the American Institute of Architects New York City Chapter, private sector architects and developers, and academic partners. The Center was established to foster continued implementation of Active Design strategies among public and private sector design, planning, policy and real estate professional nationally and internationally. This innovative partnership has reframed the notion of urban stainability to incorporate a social responsibility for human health and well-being.

Characters: Letters, numbers, punctuation marks, and typographic symbols.

Children's use: Spaces and elements specifically designed for use primarily by people 12 years old and younger.

Circulation path: An exterior or interior way of passage from one place to another for pedestrians.

Cognitive: relating to or involving the processes of thinking and reasoning.

Convertible walkways. A device that allows conversion from a sidewalk or other surface or stairs into a sloped walkway.

Counter slope: Any slope opposing the running slope of a curb ramp.

Cross slope: The slope that is perpendicular to the direction of travel (see running slope).

Curb line: a line at the face of the curb that marks the transition between curb and the gutter, street or highway.

Curb ramp: A short ramp cutting through a curb or built up to it.

Destination-oriented elevator system: An elevator system that provides lobby controls for the selection of destination floors, lobby indicators designating which elevator to board, and a car indicator designating the floors at which the car will stop.

Detectable warning: A standardized surface feature built in or applied to floor surfaces to warn of hazards on a circulation path.

Dwelling unit: A single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation. A dwelling unit may be an apartment within a two family or multifamily building or a one family house. The dwelling unit may occupy one or more stories.

Element: An architectural or mechanical component of a building, facility, space, or site.

Elevator car call sequential step scanning: A technology used to enter a car call by means of an up or down floor selection button.

Emergency assistance alarm: Strategically placed electronic devices to be used in case of a life threatening situation or accident requiring assistance, comprised of an upper and lower button, two-way communications, with visual and tactile identification.

Facility: All or any portion of a building, structure, or area, including the site on which such building, structure, or area is located, wherein specific services are provided or activities are performed.

Fully manual lockset: A lockset that does not contain an automatic spring loaded handle return.

Gesture recognition: is the ability of hardware and relevant software to identify and interpret hand and body gestures by an individual.

Grade break: the line where two surface planes with different grades meet.

Habitable: A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

*IDG***:** *Inclusive Design Guidelines, New York City*, first, second edition and future editions also referred to as “the book” or “the guidelines.”

Inclined hallway. Hallways with an inclined floor that converts the hallway floor to a ramp(s) to save space.

Inclusive: broad in orientation or scope, addressing the entire population regardless of age, size, physical or mental abilities without segregating or stigmatizing any group of people.

Inclusive environment: a multisensory enhanced environment that accommodates a wide range of physical and mental abilities for people of all ages.

Information transaction machine (ITM): Any interactive terminal in which the primary purpose is to accept input from a user, display information, and or dispense media. Such machines include automatic teller machines (ATM) or cash machines, postage stamp dispensers, fare machines, automated airport check-in machines, and information kiosks.

Key surface: The surface or plane of any key or button that must be touched to activate or deactivate an operable part or a machine function or enter data.

Leading pedestrian interval (LPI). LPI’s show a walk sign for pedestrians before showing a green light to car traffic to give pedestrians additional time to cross before traffic proceeds.

LinkNYC: it is a communications network, bringing the fastest free public Wi-Fi to millions of New Yorkers and visitors. It is replacing pay phones with state-of-the-art kiosks that offers civic services and a platform for innovation. Up to 10,000 Link structures will provide free public gigabit Wi-Fi, access to 911 and 311, free calls to anywhere in the US, USB charging, a tablet interface that supports third-party apps and access to all the social and economic opportunities that the Internet affords.

Lippage. The difference in surface elevation between adjacent tiles, bricks and other units and pavers.

Marked crossing: A crosswalk or other identified path intended for pedestrian use in crossing a vehicular way.

Multi-purpose bathing compartment. A multi-use alcove that accommodates various components and configurations comprising: bathtub, walk-in bathtub, shower, transfer shower, dressing area, cabinet with desktop, storage closet, lavatory, transfer steam room, transfer sauna, and other options.

Non-positive shut-off. This refers to both plumbing and user criteria. It does not stop the flow of water completely at a hand-shower to prevent using the hand-shower as the primary water shutoff. This prevents contamination of hot and cold water supplies at the shower body or faucet shut-off(s) that remain open even if the hand-held shower is off. It also refers to the hand-shower manual on/off button that does not require constant pressure to maintain a flow of water from the shower head.

Operable part: A component of an element used to insert or withdraw objects, or to activate, deactivate, or adjust the element.

PDA: Personal digital assistant. An electronic device that can include the features of a computer, cell phone, music player, camera, global positioning system (GPS) and other functions with a wide variety of software applications, that accommodates the user's needs and preferences in visual, auditory and tactile formats.

People of Short Stature. A person of short stature is an adult that has a height of 4 feet 10 inches (147 cm) or less. Some people of short stature prefer the only other appropriate term "little people."

Photo luminescent material: A substance that absorbs light energy from a light source and glows when the source is removed. The material should be washable, non-toxic, non-radioactive and if subjected to fire must be self extinguishing when the fire is removed.

Pictogram: A pictorial symbol that represents activities, facilities, or concepts.

Ramp: A walking surface that has a running slope steeper than 1:20.

Ramp assembly: Complete set of components of a ramp that may include: entry landing, intermediate landing(s), ramp run(s), rest area(s), exit landing, handrails, edge protection, weather protection, illumination, graphics, communications, etc.

Ramp run: A single length of ramp between landings.

Running slope: The slope that is parallel to the direction of travel (see cross slope).

Sensory Pedestrian System. Exceeds APS in both scoping and safety that comprises enhanced visual, auditory and tactile/vibration overlapping formats that is a dynamic, upgradable, fully interfaced system.

Sign: An architectural element composed of displayed textual, symbolic, tactile, or pictorial information.

Sign language: as per the National Association of the Deaf, "American Sign Language (ASL) is a visual language. With signing, the brain processes linguistic information through the eyes. The shape, placement, and movement of the hands, as well as facial expressions and body movements, all play important parts in conveying information.

Sign language interpreter: a person trained in translating the spoken word into sign language that uses manual communication and body language to convey meaning and emotions for people with a hearing disability primarily needed by people who are deaf but also by those with a hearing loss.

Site: A parcel of land bounded by a property line or a designated portion of a public right-of-way.

Sleeping unit: A room or space in which people sleep that can also include permanent provisions for living, sleeping, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

Tactile: Describes an object that can be perceived using the sense of touch.

Tactile guideways. A form of wayfinding for pedestrians with low vision or who are blind comprising surface, embedded, saw cut and other types of guideways for cane use for the individual to navigate the environment independently.

TDD: Telecommunication device for the deaf. See TTY below.

Temporary work space. These are small enclosed work spaces intended for short term usage primarily for public areas to provide privacy, desk, seating, task lighting, power and other amenities.

Tiered spatial envelope system. Comprises a three-tiered, three dimensional, spatial envelopes for adults, children and institutional environments.

Transfer device: equipment designed to facilitate the transfer of a person from a wheelchair, mobility device or bed.

Transfer board: a platform/landing that allows horizontal sliding to facilitate transfer from a wheelchair or other mobility device.

Transition plate: A sloping pedestrian walking surface located at the ends of a gangway.

TTY: An abbreviation for teletypewriter. Equipment that employs interactive, text-based communications through the transmission of coded signals across the standard telephone network. The term TTY also refers to devices known as text telephones and TDDs.

Unified English Braille: Starting in 2016, the Literary Braille Code will change to Unified English Braille (UEB) to enhance transcription between Braille and print, eliminate confusion when capitalizing letter within words, to write an e-mail or website address, and for contractions and punctuations.

Variable height: Includes a range of usable heights and also referred to as adjustable height.

Variable Message Signs (VMS): Variable message signs, also known as dynamic or changeable message signs, are signs capable of displaying more than one message that can be modified manually or automatically.

Vehicle black box. A device that provides inputs and outputs for vehicle interfacing with other devices and sensors for safety that records operation and provides vehicle identification among other information.

Vehicular way: A route provided for vehicular traffic.

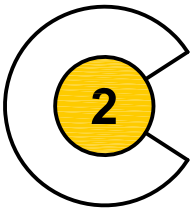
Walk: An exterior pathway with a prepared surface for pedestrian use.

Wet room. A bathroom that contains an area within the room or the entire room designated for shower bathing containing accessible components, a waterproof floor and floor drain.

Wheelchair charging area: A clear floor area where people with a disability can recharge their powered wheelchair batteries.

Wheelchair space: A space for a single wheelchair and its occupant.

Wheelchair space locations: A space for a minimum of a single wheelchair and the associated companion space locations can contain multiple wheelchair spaces and associated companion seating.



Scoping

200 Introduction. Chapter 2 includes material explaining the relationship of the various laws governing accessibility and how these provisions relate to technical criteria; General; Dwelling and Sleeping Units; and Administration/Disclaimer.

Several federal laws apply to buildings and facilities. A short description of each is provided to facilitate an understanding of each law. Regardless of which laws apply to a project, the *IDG* does not fall below any of these existing building code standards and laws and thus is a viable inclusive alternative that is at least harmonized with existing codes and laws and in some respects exceeds the minimum requirements set forth in the various laws and standards.

The *Architectural Barriers Act (ABA)* is one of the first laws to address access to the built environment. The law applies to federal buildings and facilities, including post offices, social security offices, federal courthouses and prisons, and national parks. It also covers non-federal facilities, such as public housing units and mass transit systems, built or altered with federal grants or loans. Four agencies - the General Services Administration (GSA), the Department of Defense (DOD), the Department of Housing and Urban Development (HUD), and the United States Postal Service (USPS) - established the *Uniform Federal Accessibility Standards (UFAS)* in 1984 providing accessible design standards for buildings and facilities subject to the *ABA*. The latest *ABA Standards* issued by GSA, DOD, and USPS replace the *UFAS*. HUD however, has not updated its standards and continues to apply *UFAS* to facilities under its jurisdiction.

In addition to the *ABA*, *Section 504 of the Rehabilitation Act of 1973* made it illegal for the federal government, federal contractors, and any entity receiving federal financial assistance to discriminate on the basis of disability. *UFAS* was used by agencies to satisfy compliance in new or altered construction under *Section 504* and is still the standard referenced by HUD for projects receiving federal funding.

In 1990, the *Americans with Disabilities Act (ADA)* was enacted. The *ADA* covers all state and local governments, public accommodations (such as restaurants, hotels, movie theaters, and doctors' offices), as well as commercial facilities (including office buildings and factories). The Access Board was required to develop and maintain accessible guidelines for construction and alteration of facilities governed by the *ADA*.

ADA Accessibility Guidelines (*ADAAG*) provided the accessible design guidelines for new construction and alteration of facilities covered by the *ADA*. *ADAAG* applied to any state or local government facility newly constructed or altered after January, 26, 1992, and any public accommodation or commercial facility built or altered after January 26, 1993. In 2004, when the Access Board began updating the *ADAAG*, it coordinated its update to include the *ABA Guidelines* so as to reconcile the difference between them and to establish a more consistent level of accessibility between facilities covered by the *ADA* and the *ABA*. The updated standards were adopted by the US Department of Justice (DOJ) in 2010, and referred to as the *2010 ADA Accessibility Standards*. Replacing the *UFAS*, they were also adopted by the US Department of Transportation (DOT) in 2006, as well as by GSA, DOD and UPD. DOT's *ADA Standards* apply to facilities used by state and local governments to provide designated public transportation services, including bus stops and stations, along with rail and subway stations. Places of worship and other facilities controlled by a religious organization, such as a school or day care center, are not subject to the *ADA Standards*. Private clubs may also be exempt, depending on their level of exclusiveness and other operational factors.

Although private residential housing is not covered by the *ADA,* state and local government-owned or operated housing and certain privately-owned facilities that provide housing are subject to the *ADA* and its accessibility requirements. State and local government-owned or operated facilities may include public housing, student and faculty housing, employee housing, nursing homes, temporary housing provided in emergencies, and social service facilities such as homeless shelters and halfway houses.

In the private sector, the *ADA's* coverage of housing is limited to places of public accommodation, such as social service establishments and housing provided at or on behalf of a place of education. The *ADA* does not apply to individually-owned or leased housing in the private sector not used as a public accommodation, including single-family homes, condominiums or apartments.

The *Fair Housing Act (FHAct)* requires a new construction project with four or more dwelling units built for first occupancy after March 13,1991, to be accessible and adaptable per its requirements, regardless of whether or not it receives federal financial assistance. Under the *FHAct's* new construction requirements, if the building has an elevator, all of the dwelling units must meet the *FHAct's* design and construction requirements. If there is no elevator, all of the ground floor dwelling units must meet the *FHAct's* requirements. The *FHAct* does not apply to alterations of existing housing.

Most states and many local jurisdictions have laws or ordinances that address building design and construction, including accessibility. New York City enacts and enforces its own building code. The current version is the *2014 NYC Building Code* (*2014 NYCBC*) which references the *ICC/ANSI A117.1-2009*. While the *ADA* does not intrude upon the authority these governmental entities have traditionally exercised over the built environment, the *ADA Accessibility Standards* apply nationally. Thus, when a conflict occurs between the state or local building code and the federal *ADA Accessibility Standards* the most stringent applies.

Alterations to historic properties must comply with the applicable building code requirements and the *ADA Accessibility Standards* unless following the usual standards would threaten or destroy the historic significance of a feature of the building, alternative standards may be used. The decision to use alternative standards for a feature must be made in consultation with the appropriate historic advisory board such as local preservation commissions (the NYC Landmarks Preservation Commission) and State Historic Preservation Offices (New York's State Historic Preservation Office).

201 General. *Inclusive Design Guidelines, New York City, Second Edition* comprises recommendations for making sites, facilities, buildings, and elements inclusive. The administrative authority may consider providing scoping provisions to specify the extent to which the technical criteria may apply to each classification, occupancy and building type, new construction, existing buildings, additions, temporary facilities, specific site and building elements; and to multiple elements or spaces within a site or building.

202 Dwelling and Sleeping Units. Chapter 10 of these guidelines, as well as cross-referenced sections throughout the *IDG* contain criteria to make dwelling units and sleeping units inclusive. The administrative authority may consider specifying in separate scoping provisions the extent to which the technical criteria may apply. These scoping provisions may define the type and number of units to comply.

203 Administration/Disclaimer. All content in this publication is intended to meet or exceed existing law. The authority having jurisdiction should provide an appropriate review and approval process to ensure that application of these guidelines meets all applicable local, state, and federal codes, rules and regulations. The information in this book has been interpreted from numerous sources, including building codes, industry standards, manufacturers' literature, and personal contacts. It is presented in good faith, but although the authors, contributors, and the publisher have made every effort to make the book accurate, they assume no liability for its accuracy or completeness. It is the responsibility of the user to apply their professional knowledge in the use of information contained in this book, to consult original sources for more information and to seek expert advice as needed. The City of New York and its employees, the editor in chief, the MOPD team, contributors, those acknowledged, anyone who created, refined or worked on this book in any way as an employee of the city or individually, privately or personally, the International Code Council, Inc. and the American National Standards Institute, Inc., are not responsible for the application of the contents of this book, and if applied, is totally at the discretion of the user and entirely at the user's own risk.

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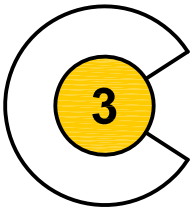


Building Blocks

300 Introduction. Chapter 3 includes floor surfaces, changes in level, turning space, clear floor space, knee and toe clearances, protruding objects, reach ranges, operable parts and eye levels.

Floor surfaces should be non-slip without obstruction or hazards. They should not contain unintentional irregularities or overly aggressive textures. Where applicable they should prevent water accumulation. The coefficient of friction is discussed. Materials, sensory characteristics, detectable surfaces, detectable warnings, lippage and surface distortion, edges, visual contrast, color and drainage are similarly presented. Multi-sensory edge treatment provides boundary definition, increases safety and enhances wayfinding. Tactile, auditory and visual characteristics help define and differentiate parts of a facility.

Changes in level for floor surfaces are defined. Guard height and opening limitations are also provided, as are sight obstructions and their relationship to eye levels.

A three-tiered system is introduced that applies systemically to the guidelines because one size does not fit all. It covers adults, children and institutional applications. People of short stature are also included under Tier II. Turning space, clear floor space, knees and toehold accommodate a wide range of occupant configurations, body sizes, postures, clearance for hand/arm/foot movement, and manual or automatic devices. Adult standing reach ranges are provided. The recommended route width is part of a modular concept. Unusually restricted conditions created by reducing maneuvering spaces down to the absolute code minimums are avoided.

Operable parts also apply systemically to the guidelines affecting doors, elevators, windows, drinking fountains (and bottle-filling stations), toilet and bathing rooms, appliances, alarms, signage, two-way communications and many dwelling unit components (e.g. entrances, controls, kitchen cabinetry, landscape elements, and communication elements). Multisensory components and operations comprise visual, tactile and auditory characteristics. Within reach ranges are standing and seated comfort zones that enhance usability. Standard and alternate actuation and operation cover a wide range of user needs and preferences that go far beyond typical hand operation from robust verbal commands to gesture recognition using wireless signals. Automatic operation should increase, especially in locations such as restrooms where sanitary conditions are of concern. Automation should be provided with manual back-up in case of power failure. Operable parts intended for young children should be scaled appropriately and simplified. “Any safety device should be strong enough to prevent injury to young children, yet easy for adults to use,” according to the U.S. Consumer Product Safety Commission. Childproofing identifies twelve safety device examples. Multisensory alarms are also included because they important for a wide range of safety applications. Multisensory functionality includes audio-haptic interactivity.

Eye levels are provided for standing/sitting positions for adults, children and those who use a mobility device. Dimensions for adults range from the lowest female height to the maximum male height for standing and sitting positions. Dimensions for children cover those from age five to 12 years. A number of factors may affect sitting position eye levels, such as seat height and posture. Care should be taken regarding visual obstructions, sight lines and field of view. A sitting position is a requirement that is not limited to people with disabilities. It is a necessity for many with diminished dexterity and stamina and others who simply need a place to rest.

301 General

301.1 Scope. The provisions of Chapter 3 should apply where recommended by the scoping provisions adopted by the administrative authority.

301.2 Overlap. Unless otherwise specified, clear floor spaces, clearances at fixtures, maneuvering clearances at doors, and turning spaces should be permitted to overlap.

302 Floor Surfaces

302.1 General. Floor surfaces should comply with Section 302.

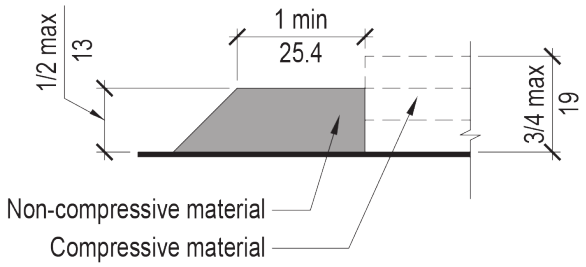
302.1.1 Surfaces. Surfaces should be safe and usable by everyone. They should not contain irregularities, aggressive textures and should be consistent. Surfaces comprise non-compressible and compressible materials that include the following: openings complying with Section 302.3, joints complying with Section 302.4, exterior surfaces complying with Section 302.5, tactile and auditory characteristics complying with Section 302.6, detectable surfaces and warnings complying with Section 302.7, lippage and surface distortion complying with Section 302.8, edges complying with Section 302.9, visual contrast complying with Section 302.10 and color complying with Section 302.11. Also, refer to Section 403 for walking surfaces.

302.1.1 Advisory. Natural surfaces, including soft, irregular conditions found on natural paths, present challenges for some. Refer to 302.5 Advisory for additional information.

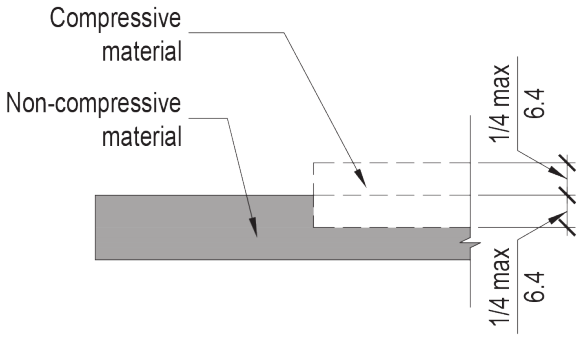
302.2 Materials. Surfaces comprise non-compressible and compressible materials. Transition between materials may be problematic, especially due to the differences in elevation resulting from material compression.

302.2.1 Non-Compressible Material. Non-compressible materials should be stable, firm, and slip resistant. Slip resistance is always a concern, especially for unprotected exterior locations and interior areas subject to water exposure. Traction should be increased where safety is critical with the use of an appropriate finish (e.g., thermal and matt surfaces). Non-compressible materials should comply with all the provisions of Section 302.3 through Section 302.11 and changes in level complying with Section 303.

302.2.2 Compressible Materials. Compressible materials (e.g., rubber and vinyl) should be securely anchored and slip resistant. Maximum compression is critical for ease of mobility and transition to other materials. Compression should not exceed 1/4 inch (6.4 mm). Materials under compression should comply with applicable provisions of Sections 302 and Section 303.



(a)
Beveled and / or Sloped w/ Compressive Material



(b)
Recessed w/ Compressive Material

Fig. 302.2.2
Examples of Material Transitions

302.2.2.1 Carpet. Carpet or carpet tile should be securely attached and should not have a cushion or pad. Carpet or carpet tile should have a loop, textured loop, level cut pile, or level cut/uncut pile texture. The pile should be 1/2 inch (13 mm) maximum height. Exposed edges of carpet should be fastened to the floor and should have trim along the entire length of the exposed edge. Carpet edge trim should comply with Section 303. Carpet recessed into the floor surface should be flush with the adjacent floor or 1/4 inch (6.4 mm) maximum above the adjacent floor.

302.2.2.1 Advisory. Avoid carpet and underlayment combinations that are susceptible to blocking. They can cause tripping and impede the use of mobility devices.

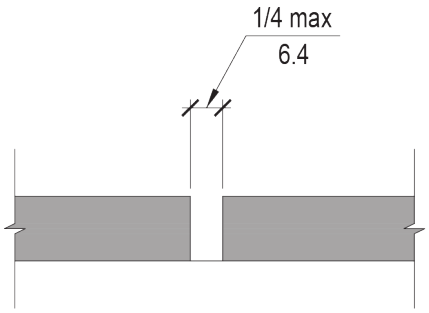
302.2.2.2 Coefficient of Friction. Provide a static coefficient of friction 0.6 minimum for level walking surfaces and 0.8 minimum for maximum slopes of 1:12.

302.2.2.2 Advisory. Unlike the *2010 ADA Standards, ADAAG,* Appendix 4.5.1 discusses the Coefficient of Friction: "The Occupational Safety and Health Administration recommends that walking surfaces have a static coefficient of friction 0.5. A research project sponsored by the Architectural and Transportation Barriers Compliance Board (Access Board) conducted tests with people with disabilities and concluded that a higher coefficient of friction was needed by such persons. A static coefficient of 0.6 is recommended for accessible routes and 0.8 for ramps."

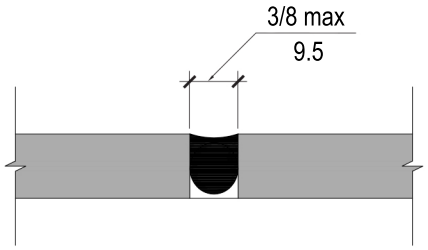
A good example overview of the Coefficient of Friction measurement and factors can be obtained in the *ANSI A137.1 American National Standard Specifications for Ceramic Tile - 2012,* Section 6.2.2.1.10 Coefficient of Friction Specifications. This section addresses among other factors: various shoe sole surfaces and level of wear; floor finishes, contaminants, slope, floor condition, wet and dry conditions. It also contains the means of measuring slip resistance using the BOT 3000, and the *ASTM C1028* test method. Due to the variables above it becomes clearer why a single COF cannot be established.

302.3 Openings. Openings in floor surfaces should be of a size that does not permit the passage of a 1/2 inch (13 mm) diameter sphere, except as allowed in Sections 407.4.3, 408.4.3, 409.4.3, 410.4 and Section 805.10. Elongated openings should be placed so that the long dimension is perpendicular to the dominant direction of travel. Openings running parallel with the direction of travel should be 1/4 inch (6.4 mm) maximum. Whenever possible leave grates out of the path of travel.

302.4 Joints. Joints are recommended to be a maximum of 1/4 inch (6.4 mm) in width. Expansion joints are recommended to be a maximum of 3/8 inch (9.5 mm) in width. Joints should run perpendicular or diagonal to the direction of travel to the maximum extent possible. Compressible joint filler should not exceed 1/8 inch (3.2 mm) above or below the mean surface plane of the adjacent material. Any joints wider than 3/8 should contain filler that does not exceed 1/16 inch (1.6 mm) maximum above or below the mean surface plane of the adjacent material. Regardless of the size and quantity of joints, the overall floor surface should comply with Section 302.8 for lippage and surface distortion



(a)
Typical Open Joint



(b)
Typical Expansion Joint

Fig. 302.4
Joints

302.5 Exterior Surfaces. Exterior surfaces should comply with Section 302 and Section 303. Exterior surfaces should be weather protected at key locations (e.g., entrances) where possible. Provide proper drainage to avoid water accumulation and potential freezing. Consider an ice melt system at critical locations to reduce hazards and to make usage easier (e.g. path to entry, landings, shelters, etc). Natural exterior surfaces that include walks, paths, trails, sections and areas should be properly drained to avoid water pooling and freezing.

302.5 Advisory. Changes and irregularities in walking surfaces are unsafe for many people traveling by foot or with mobility devices. Irregular surfaces, such as rough paving blocks and large or uneven joints may be problematic, especially with smaller units since this may increase the number of joints. Properly designed subsurfaces reduce uneven settlement and surface distortion. Natural paths and areas such as park trails and beaches should be experienced by all to the maximum extent possible. Some environments and conditions will obviously present a difficult design challenge. The USDA's *Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG)* and the USDA's *Forest Service Trail Accessibility Guidelines (FSTAG)* provide many answers. Difficult situations, such as access to water over sand, may be resolved with a geotextile path or bonded materials(e.g., sand mixed with adhesives). See the final A*rchitectural Barriers Act (ABA) Accessibility Guidelines for Outdoor Developed Areas, 36CFR Part1191.* This document can be viewed through thè Access Board's website: http://www.access-board.gov/ Textures and firmness help to establish edges to guide people across undefined open areas. Redundant multiple solutions may be necessary to address the widest range of users. Provide path or route information regarding general difficulty, type of surface, slope, length, etc., so that visitors may determine if they can and want to take a particular route. Consider a route and trail rating system based on the Universal Trail Assessment Program provided by American Trails at: http://www.americantrails.org/ It is a comprehensive source for planning, building, designing, funding, managing, enhancing and supporting trails and greenways. See also Section 402.4.3 Recreational Routes and the 402.4.3 Advisory.

302.6 Sensory Characteristics. Sensory characteristics comprising tactile, auditory and visual attributes should be intentionally and carefully composed to help produce a multisensory enhanced environment. Sensory characteristics applied to exterior and interior floor surfaces identify and differentiate routes, levels, rooms, spaces and indicate transition, directionality and hierarchy. They are important for effective wayfinding complying with Section 714.

302.6.1 Tactile Characteristics. Tactile characteristics comprise material properties, texture, pattern, finish and other features that are perceptible underfoot. Tactile characteristics can be a composition of strips, shapes, designated areas or entire surfaces. Tactile contrast (e.g., rough vs. smooth) helps emphasize the difference between surfaces, similar to visual contrast. Surfaces comprising material units and joints should be carefully designed because they can create another layer of patterns and textures.

302.6.2 Auditory Characteristics. Auditory characteristics comprise acoustic properties (e.g., sound level and reverberation) that are important, especially for people with sight disabilities. Sound helps to establish location and direction. As a person's sight diminishes this becomes more critical. Overlapping sounds, ambient noise, frequency, amplitude and tone are some of the characteristics of sound that should be controlled to reduce confusion. Be conscious of the orchestration of sounds at various times under varying conditions.

302.6.3 Visual Characteristics. Visual characteristics should include but are not limited to contrast complying with Section 302.10, color complying with Section 302.11, texture, pattern, finish and material properties.

302.7 Detectable Warning and Tactile Indicators. Detectable warning and tactile indicators can be used for sections, strips, areas or entire floor surfaces and should comply with Section 302.6 and Section 705.

302.8 Lippage and Surface Distortion. The lippage or difference in surface elevation between adjacent tiles, bricks and other units and pavers should be a maximum of 1/8 inch (3.2 mm). Surface distortion in any unit of material should not exceed 1/16 inch (1.6 mm) maximum above or below the mean surface plane of the material (e.g., natural stone or textured tiles)

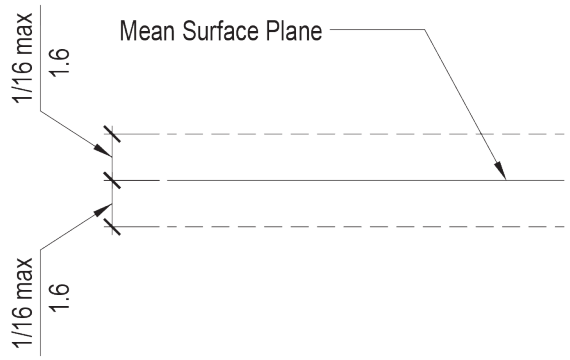
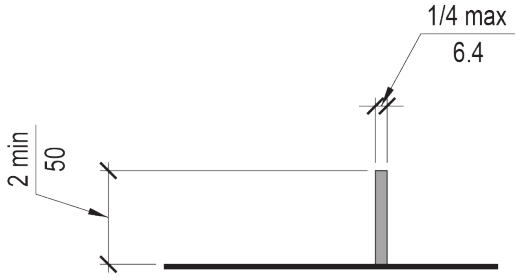
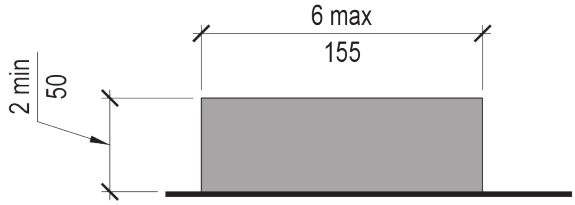


Fig. 302.8
Surface Distortion

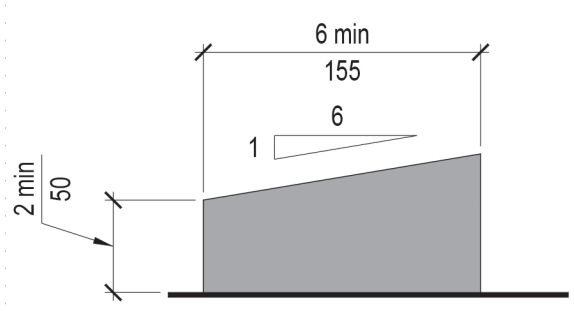
302.9 Edges. Edges should be visual, tactile and auditory. Edges define boundaries, are very important for effective wayfinding (refer to Section 714), and increase safety. Edges may be continuous, intermittent, raised, flush, dropped, angled, compressible and non-compressible. They may be as narrow as 1/4 inch (6.4 mm) for steel angles or 6 inches (155 mm) or wider. Wider edges should be provided with a top surface that is sloped 1:6 minimum or differentiated from a stair tread if it is low. Low edge height should be a minimum of 2 inches (51 mm) high. Please note that 4 inches (102 mm) is required for ramps and landings as per *2014 NYCBC*, Section 1010.9.1. Even a small drop-off of an inch can be a tripping or flipping hazard. It is recommended to provide edge protection complying with Section 302.9 where there is a drop-off of 6-inches or less (this relates to ramp handrail requirement for a rise greater than 6 inches) Drop-offs greater than 6 inches should be provided with a guard complying with Section 303.8. Edges may also be defined with texture, change in material, contrast and color. Edges may be defined with full or partial height walls, guards, parapets, railings or other architectural elements (refer to Section 714.4), outdoor furniture and natural landscape elements (refer to Section 714.3.) Edges may also be defined by sound as the result of material selected or by natural sounds such as moving water, wind, leaf/branch movement. (refer to Section 714.2.3) Consider enhancing edges with photoluminescent material, lighting, tactile strip, tactile warning, and electronic means such as an information/navigation reference point system complying with Section 708.7. Vibration tactile indication of spacial limits and dangerous conditions, should be provided for people with low vision or those who are blind. Emergency egress routes should provide multiple overlapping elements for tactile, visual and auditory edging. Edges may also be defined with the use of a low rail, rope, cable or other similar means, but should be substantial enough to stand out from the surrounding surfaces.



(a)
Narrow Edge



(b)
Wide Edge



(c)
Edges Greater Then 6 Inches Wide

Fig. 302.9
Edges

302.9 Advisory. Edges are a key component of an inclusive environment that help provide a multisensory means to establish the path width, direction, and spacial boundaries. Edges alone provide a strong element but when enhanced with visual, tactile, and auditory characteristics, their effectiveness is substantially increased. Drop-offs are not recommended and limited to Section 303 changes in level and 303.8 Guards. Flush edges adjacent to natural surfaces such as soil, organic ground cover, sand, etc. may be desirable but problematic due to the compressible characteristics of the material. The edge may be detectable by the transition from a solid stable surface to a natural compressible material, but other means should also be employed to enhance the edge.

302.10 Visual Contrast. Surfaces and edges may contrast visually, either light-on-dark or dark-on-light. Contrast should be at least 70% based on contrast calculation below, to provide the greatest level of effectiveness. Less contrast will be of limited use since it may not provide enough of a visual difference for people with diminished sight.

Contrast = [(B1 — B2)/B1] x 100

Where B1 = Light reflectance value (LRV) of the lighter area and B2 = Light reflectance value (LRV) of the darker area. Note that in any application both white and black are never absolute; thus, B1, never equals 100 and B2 is always greater than 0.

Fig. 302.10
Visual Contrast

302.11 Color. Color consists of three perceptual attributes: hue, lightness and saturation. Refer to the Lighthouse International's *Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, PhD. The greater the color contrast, the more effectively it can be used to differentiate a path, surface area, and to enhance wayfinding. Contrast may be more effective than the colors.

303 Changes in Level

303.1 General. Changes in level for floor surfaces should comply with Section 303.

303.1 Advisory. Use of different methods to signal a level change will address a greater variety of users (i.e. changes in texture, color, light, contrast, and audible warnings).

303.2 Vertical. Changes in level of ¼ inch (6.4 mm) maximum in height should be permitted to be vertical. Vertical changes should be avoided wherever possible.

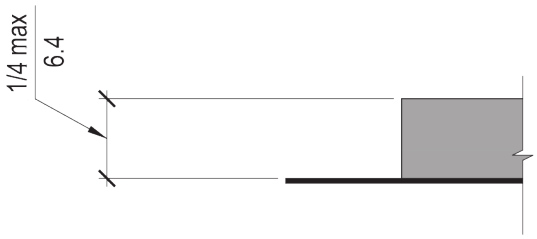
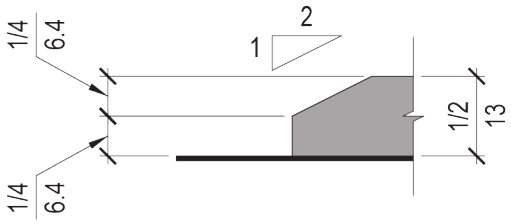
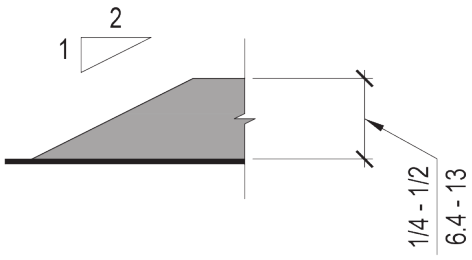


Fig.303.2
Vertical Changes in Level

303.3 Beveled. Changes in level greater than ¼ inch (6.4 mm) in height and not more than ½ inch (13 mm) maximum in height should be beveled with a slope not steeper than 1:2.



(a)
Vertical / Beveled



(b)
Beveled

Fig. 303.3
Beveled Changes in Level

303.4 Ramped. Changes in level greater than ½ inch (13 mm) in height should be ramped and should comply with Section 405 and 406.

303.5 Detectable Warning. Provide detectable warnings complying with Section 705 where level changes require such warnings.

303.6 Natural Surfaces. Level changes addressed by this section may not apply to some outdoor environments such as loose sand or soil, and irregular surfaces such as rough paving blocks. This may require providing an inclusive route through a portion of the larger surface area.

303.7 Multiple Changes in Level. Multiple changes in level should provide a 72 inch (1830 mm) minimum landing between each change in level.

303.8 Guards. Guards should be located along open sided walking surfaces which are more than 6 inches (150 mm) above the adjacent floor or grade.

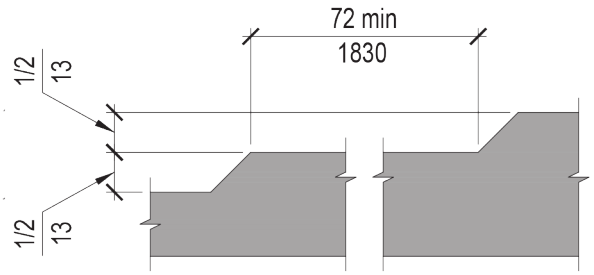


Fig. 303.7
Multiple Changes in Level

303.8 Advisory. Guards are part of the *2014 NYC Building Code*, Section BC 1013. The code requirement addresses drop-offs of 30 inches or more with exceptions, but even a small drop-off of an inch can be a tripping or device flipping hazard. It is recommended to provide edge protections complying with Section 302.9 where there is a drop-off of 6-inches or less. Drop-offs greater than 6-inches should be provided with a guard. Guards consist of a wide variety of configurations and material with and without openings that have restrictions. Opening sizes are important to restrict passage of young children's heads. See below, Section 303.8.2 and *2014 NYCBC*, Section 1013.3.

303.8.1 Height. Guards should form a protective barrier not less than 42 inches (1067 mm) high.

303.8.2 Opening Limitations. Open guards should not allow the passage of a 4-inch diameter (102 mm) sphere up to a height of 36 inches (914 mm) and should not allow the passage of an 4 3/8-inch diameter (111 mm) sphere from a height of 36 inches (914 mm) to 42 inches (1067 mm).

303.8.3 Sight Obstructions. Eye levels complying with Section 310 should not be obstructed where safety is a concern. Provide the widest feasible field of view, unless the field is purposely limited to frame and focus the view.

304 Turning Space

304.1 General. A turning space should comply with Section 304.

304.1 Advisory. The turning space and other building blocks, including clear floor space, knee and toe clearance and reach ranges, establish a realistic and very usable three dimensional space envelop that applies systemically to the guidelines. This accommodates various occupants size and posture, positions, movement of body parts especially the arms, hands and feet; and mobility devices. This directly affects routes, doors and doorways, ramps, elevators, parking, toilet and bathing rooms, assembly areas, kitchens, transportation facilities, detention facilities, courtrooms and dwelling units.

304.2 Floor Surface. Floor surface of a turning space should be an unobstructed plane with a slope not steeper than 1:48 and should comply with Section 302 and 304.3. Changes in level should not be permitted within the turning space.

304.2 Advisory. Floor surface recommendations contained in Section 302 apply to clear floor spaces including materials, opening, slip resistance, tactile surface characteristics, lippage and surface distortion. They may be used as part of the wayfinding system complying with Section 714. The clear floor space should contain a single plane without tripping or tipping hazards.

304.3 Circular Space Size. The size of circular turning spaces is based on a three-tiered system. Tier I is the typical or standard adult; Tier II is for children up to age 12, and Tier III is for institutional applications. The turning space should be permitted to include knee and toe clearance. Overlap depth should not exceed 10 inches (255 mm); and should not exceed knee and toe clearances.

304.3 Advisory. The *A117.1* and the *2010 ADA Standards* already use a two-tiered system because one size does not fit all; one for adults and the other for children, though they are not identified as tiers. The three-tiered system includes institutional applications. Even within a given facility, multiple tiers may be necessary. One size may simplify things but it does not guarantee accommodation of user needs and preferences.

304.3 Advisory Cont'd.
Mixed use buildings are common in NYC. Within a single facility there may be a dominant use but that does not mean that other uses are less important. Criteria for each tier includes a range of body positions, user configurations and mobility devices. Not all body positions are covered under each tier because there are always exceptions. There are also practical limits of turning space size due to the effect it has on other components and space configurations. The three tiers hypothetically could be broken down even farther into subcategories. Each project will have a different ratio of each. Other than institutional facilities tier III recommendations may not be typically used.

Tier I is intended for most adult applications. If in doubt use this tier. It meets the legal requirements, comfortably accommodate a large percentage of the population and most building classifications and use groups.

Tier II is intended for children up to the age of 12, primarily for *2014 NYCBC*, Section 305.1, Educational Group E (academies, day care facilities, libraries accessory to Group E occupancies and schools). Tier II accommodates People of Short Stature.

Tier III is intended for Institutional Group I-1 (e.g., adult homes, assisted living facilities, convalescent facilities) and Group I-2 (e.g., adult homes, hospitals and nursing homes). Often a person may use a mobility device in a prone or supine position with legs fully extended or may require the use of a variety of stretcher types. Tier III also addresses the elevator cab requirement of the *2014 NYCBC*, Section 3002.4.2 Elevator Car to Accommodate Ambulance Stretcher. 24x84 (610 mm x 2134 mm).

304.3.1 Tier I Adults. Tier I is the standard or typical turning space for adults and should be a clear circular space with a 72-inch (1800 mm) diameter. The turning space should be permitted to include knee and toe clearance.

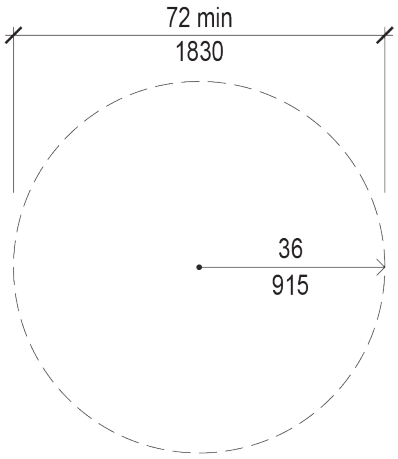


Fig. 304.3.1
Tier I Turning Space

304.3.2 Tier II Children and People of Short Stature. Tier II is the turning space for children up to age 12 and People of Short Stature and should be a clear circular space with a 60-inch (1525 mm) diameter. The turning space should be permitted to include knee and toe clearance.

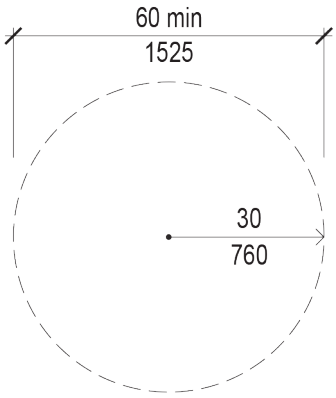


Fig. 304.3.2
Tier II Turning Space

304.3.3 Tier III Institutional. Tier III is the typical clear floor space for institutional applications and should be a clear circular space with a 96-inch (2440 mm) diameter. The turning space should be permitted to include knee and toe clearance.

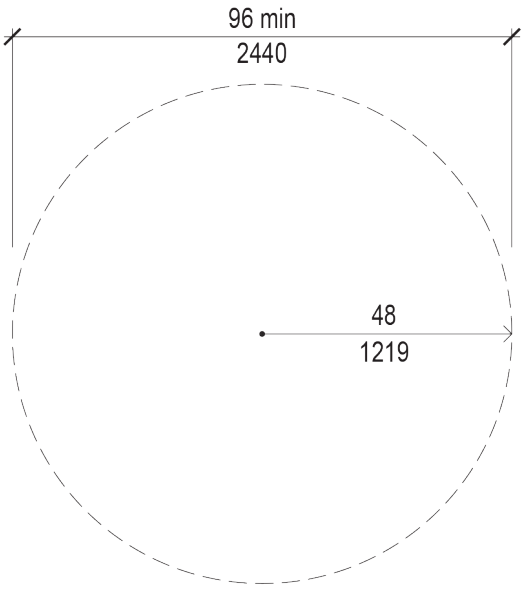


Fig. 304.3.3
Tier III Turning Space

304.4 Door Swing. Unless otherwise specified, doors should not be permitted to swing into turning spaces.

305 Clear Floor Space

305.1 General. A clear floor space should comply with Section 305.

305.1 Advisory. The 30 x 48 code space is often incorrectly used as a standard, rather than a minimum space. The recommended Tier I, 36 x 60 space addresses a wide variety of user configurations and accommodates most mobility devices. In some instances, a user will require less, but this allows that individual slightly more maneuvering clearance to be able to enter and exit and use the space. The clear floor space should not be thought of as how tightly a human being can be packed like freight, rather each tier should accommodate a range of body positions, various user configurations and most of the common mobility devices.

305.2 Floor Surface. Floor surface of a clear floor space should be an unobstructed plane with a slope not steeper than 1:48 and should comply with Section 302. Changes in level should not be permitted within the clear floor space.

305.2 Advisory. Floor surface recommendations contained in Section 302 apply to clear floor spaces including materials, opening, tactile surface characteristics, lippage and surface distortion. They may be used as part of the wayfinding system complying with Section 714. The clear floor space should contain a single plane without tripping or tipping hazards.

305.3 Size. The size of a clear floor space is based on a three-tiered system. Tier I is the typical or standard adult size; Tier II is sized for children up to age 12, and Tier III is sized for institutional applications.

305.3 Advisory. The *A117.1* and the *2010 ADA Standards* already use a two-tiered system because one size does not fit all; one for adults and the other for children, though they are not identified as tiers. The three-tiered system includes institutional applications. Even within a given facility, multiple tiers may be necessary. One size may simplify things but it does not guarantee accommodation of user needs and preferences. Mixed use buildings are common in NYC. Within a single facility there may be a dominant use but that does not mean that other uses are less important. Criteria for each tier includes a range of body positions, user configurations and mobility devices. Not all body positions are covered under each tier because there are always exceptions. There are also practical limits of turning space size due to the effect it has on other components and space configurations. The three tiers hypothetically could be broken down even farther into subcategories. Each project will have a different ratio of each. Other than institutional facilities tier III recommendations may not be typically used.

Tier I is intended for most adult applications. If in doubt use this tier. It meets the legal requirements, comfortably accommodate a large percentage of the population and most building classifications and use groups.

Tier II is intended for children up to the age of 12, primarily for *2014 NYCBC,* Section 305.1, Educational Group E (academies, day care facilities, libraries accessory to Group E occupancies and schools). Tier II accommodates People of Short Stature.

305.3 Advisory Cont'd. Tier III is intended for Institutional Group I-1 (e.g., adult homes, assisted living facilities, convalescent facilities) and Group I-2 (e.g., adult homes, hospitals and nursing homes). Often a person may use a mobility device in a prone or supine position with legs fully extended or may require the use of a variety of stretcher types. Tier III also addresses the elevator cab requirement of the *2014 NYCBC*, Section 3002.4.2 Elevator Car to Accommodate Ambulance Stretcher. 24x84 (610 mm x 2134 mm)

305.3.1 Tier I Size. Tier I size is the standard or typical clear floor space for adults and should be 60 inches (1525 mm) minimum in length and 36 inches (915 mm) minimum in width.

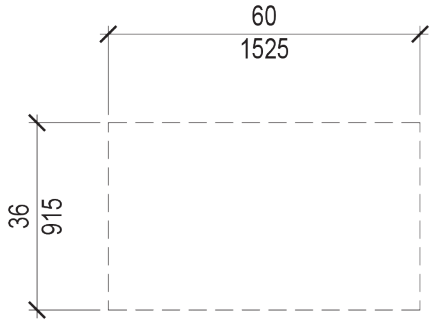


Fig. 305.3.1
Tier I Clear Floor Space

305.3.2 Tier II Size. Tier II size is the typical clear floor space for children up to age 12 and people of short stature and should be 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width.

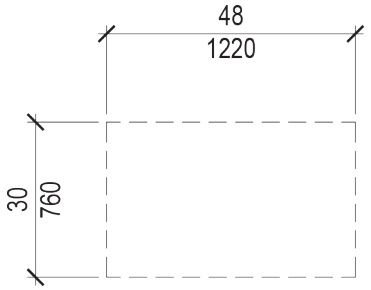


Fig. 305.3.2
Tier II Clear Floor Space

305.3.3 Tier III Size. Tier III size is the typical clear floor space for institutional applications and should be 96 inches (2440 mm) minimum in length and 36 inches (915 mm) minimum in width.

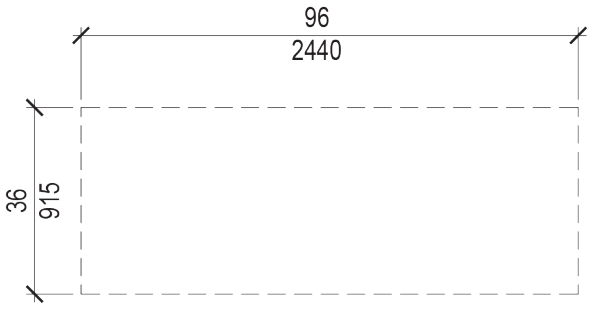


Fig. 305.3.3
Tier III Clear Floor Space

305.4 Knee and Toe Clearance. Unless otherwise specified, clear floor space should be permitted to include knee and toe clearance complying with Section 306.

305.5 Position. Unless otherwise specified, the clear floor space should be positioned for either forward or parallel approach to an element.

305.6. Approach. One full, unobstructed side of the clear floor space should adjoin a route or another clear floor space.

305.7 Alcoves. If a clear floor space is in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearances complying with Sections 305.7.1 and 305.7.2 should be provided, as applicable.

305.7.1 Parallel Approach

305.7.1.1 Tier I Parallel Approach. Where the clear floor space is positioned for a parallel approach, the alcove should be 72 inches (1830 mm) in width where the depth exceeds 15 inches (380 mm).

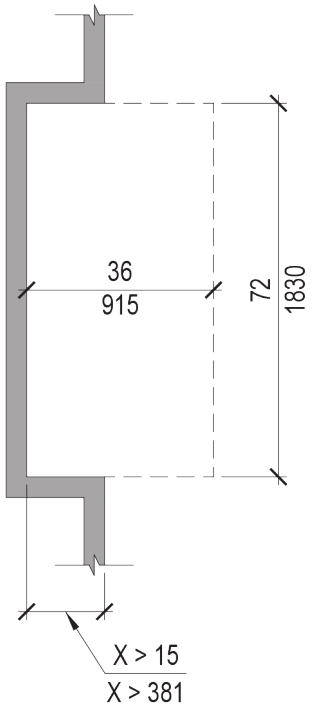


Fig. 305.7.1.1
Tier I Parallel Approach

305.7.1.2 Tier II Parallel Approach. Where the clear floor space is positioned for a parallel approach, the alcove should be 60 inches (1525 mm) in width where the depth exceeds 15 inches (380 mm).

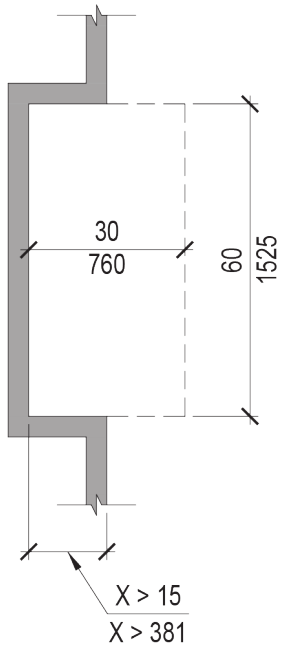


Fig. 305.7.1.2
Tier II Parallel Approach

305.7.1.3 Tier III Parallel Approach. Where the clear floor space is positioned for a parallel approach, the alcove should be 108 inches (2744 mm) in width where the depth exceeds 15 inches (380 mm).

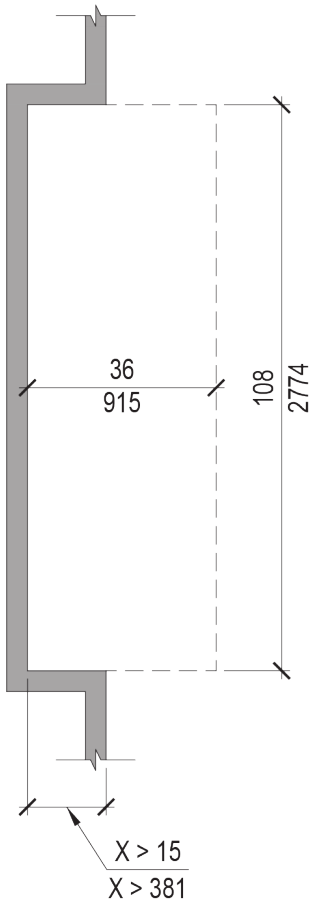


Fig. 305.7.1.3
Tier III Parallel Approach

305.7.2 Forward Approach

305.7.2.1 Tier I Forward Approach. Where the clear floor space is positioned for a forward approach, the alcove should be 42 inches (1067 mm) in width where the depth exceeds 24 inches (610 mm).

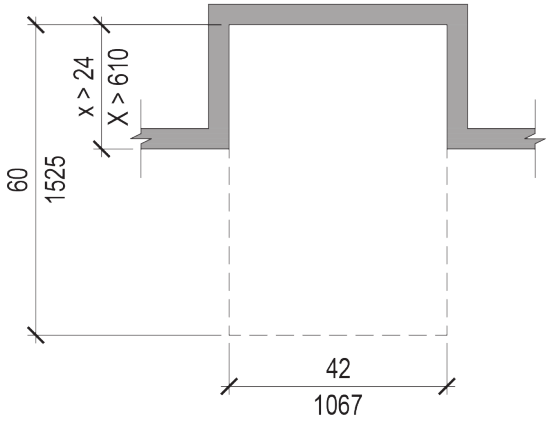


Fig. 305.7.2.1
Tier I Forward Approach

305.7.2.2 Tier II Forward Approach. Where the clear floor space is positioned for a forward approach, the alcove should be 36 inches (1067 mm) in width where the depth exceeds 24 inches (610 mm).

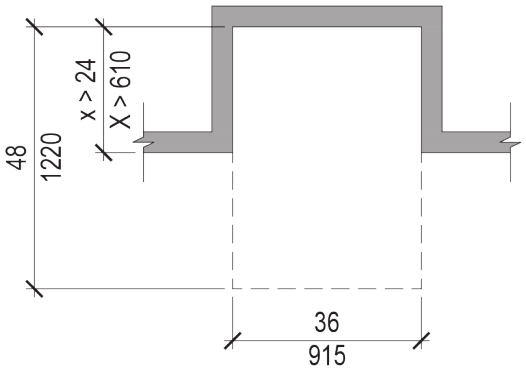


Fig. 305.7.2.2
Tier II Forward Approach

305.7.2.3 Tier III Forward Approach. Where the clear floor space is positioned for a forward approach, the alcove should be 42 inches (1067 mm) in width where the depth exceeds 24 inches (610 mm).

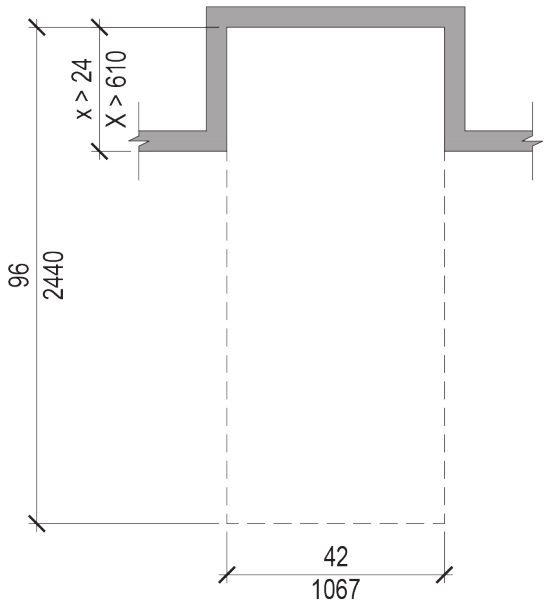


Fig. 305.7.2.3
Tier III Forward Approach

306 Knee and Toe Clearances

306.1 General. Where space beneath an element is included as part of clear floor space at an element, clearance at an element or turning space, the space should comply with Section 306. Additional space beyond knee and toe clearances should be permitted beneath elements.

306.1 Advisory. The *A117.1* and the *2010 ADA Standards* already use a two-tiered system because one size does not fit all: one for adults and the other for children, though they are not identified as such. The three-tiered system builds upon this. Even within a given facility, multiple tiers may be necessary depending upon the usage. One minimum size may simplify application but it does not guarantee that is addressing actual user needs and preferences. Mixed use buildings are common in NYC. Within a single facility there may be a dominant use but that does not mean that other uses are less important. Each tier should accommodate a range of body positions, various user configurations and most of the common mobility devices. Not all body positions are covered under each tier because there are always exceptions.

306.1 Advisory Cont'd. There are also practical limits of turning space size due to the effect it has on other components and space configurations. The three tiers hypothetically could be broken down even farther into subcategories, but there are limits to reasonable practical application.

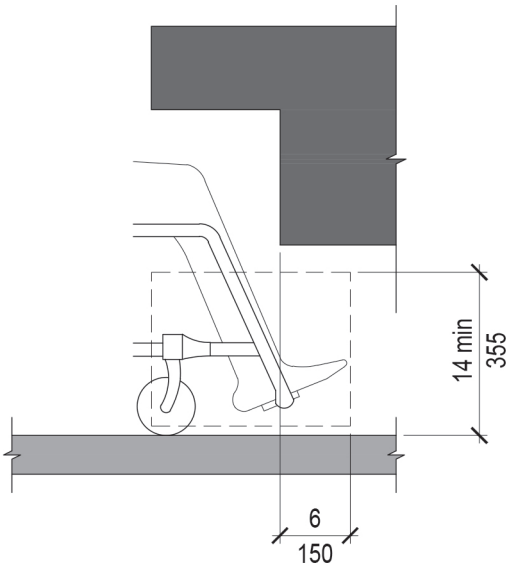
Tier I is intended for typical applications and will accommodate most adults and children. If in doubt use this tier. It not only meets the legal requirements but will comfortably accommodate a large percentage of the population.

Tier II is specific for children up to the age of 12, and intended for *2014 NYCBC,* Section 305.1, Educational Group E (academies, day care facilities, libraries accessory to Group E occupancies and schools). Tier II accommodates People of Short Stature.

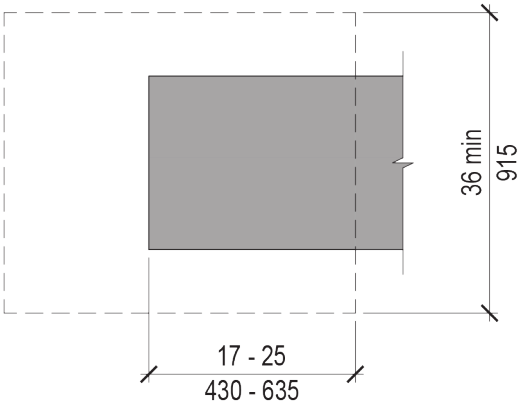
Tier III is intended primarily for Institutional Group I-1 (e.g., adult homes, assisted living facilities, convalescent facilities) and Group I-2 (e.g., adult homes, hospitals and nursing homes). Often a person may use a mobility device in a prone or supine position with legs fully extended or may need the use of a variety of stretcher types. Tier III also better addresses the elevator cab requirement of the *2014 NYCBC*, Section 3002.4.2 Elevator Car to Accommodate Ambulance Stretcher. 24x84 (610 mm x 2134 mm)

306.2 Toe Clearance

306.2.1 Tier 1 Adult General. Space beneath an element between the floor and 14 inches (355 mm) above the floor should be considered toe clearance and should comply with Section 306.2.



(a)
Elevation



(b)
Plan

Fig. 306.2.1
Tier 1 Adult Toe Clearance

306.2.1 Advisory. Adult toe heights have been increased above the minimum legal requirement. Although this addresses people who use mobility devices, the increased toe clearance applies to others that either require or prefer to slightly elevate their feet.

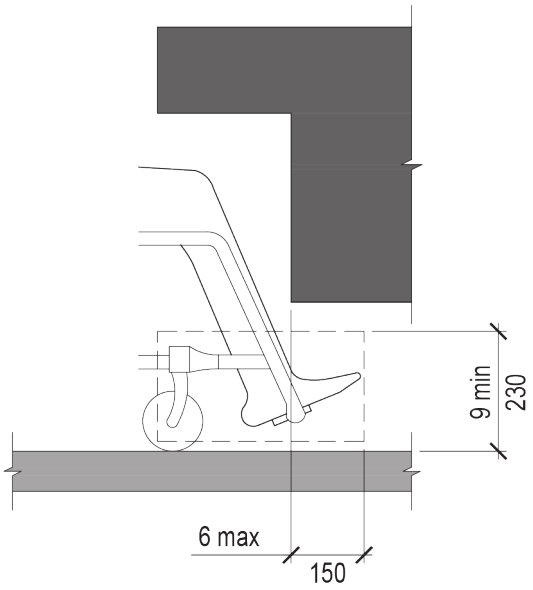
306.2.1.1 Maximum Depth. Toe clearance should be permitted to extend 25 inches (635 mm) maximum under an element.

306.2.1.2 Minimum Depth. Where toe clearance is required at an element as part of a clear floor space, the toe clearance should extend 17 inches (430 mm) minimum beneath the element.

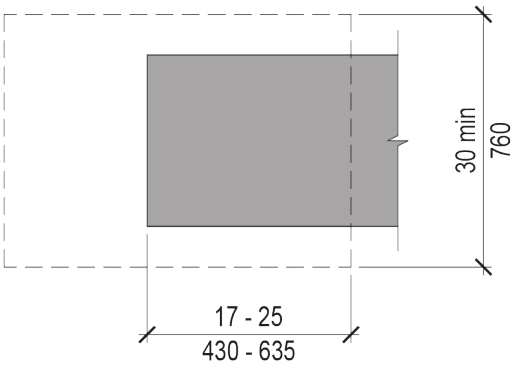
306.2.1.3 Additional Clearance. Space extending greater than 6 inches (150 mm) beyond the available knee clearance at 14 inches (355 mm) above the floor should not be considered toe clearance

306.2.1.4 Width. Toe clearance should be 36 inches (915 mm) minimum in width.

306.2.2 Tier II Children's and People of Short Stature General . Components meant for children ages 6 to 12 should provide a toe clearance of 9 inches (230 mm) above the floor.



(a)
Elevation



(b)
Plan

Fig. 306.2.2
Tier II Children's Toe Clearance

306.2.2.1 Maximum Depth. Toe clearance should be permitted to extend 25 inches (635 mm) maximum under an element.

306.2.2.2 Minimum Depth. Where toe clearance is required at an element as part of a clear floor space, the toe clearance should extend 17 inches (430 mm) minimum beneath the element.

306.2.2.3 Additional Clearance. Space extending greater than 6 inches (150 mm) beyond the available knee clearance at 9 inches (230 mm) above the floor should not be considered toe clearance.

306.2.2.4 Width. Toe clearance should be 30 inches (760 mm) minimum in width.

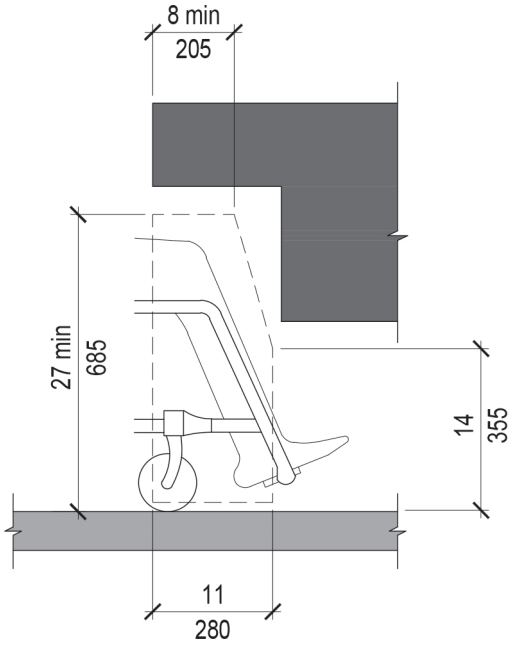
306.2.3 Tier III Institutional General. Components meant for institutional applications should eliminate toe clearance and provide unobstructed knee clearance the full depth of the surface.

306.2.3. Advisory. A person may use a mobility device in a prone or supine position with legs fully extended or may need the use of a variety of stretcher types. Side approach for Tier III is in many ways the most practical solution. A frontal approach to a dining or work surface such as a dining table, desktop, sink, and under counter accommodations requires excessive depth. A countertop would need to be very deep to accommodate reach ranges and may conflict with code requirements. Residential applications that are customized for the occupant are doable, but it is more practical to provide portable furniture solutions.

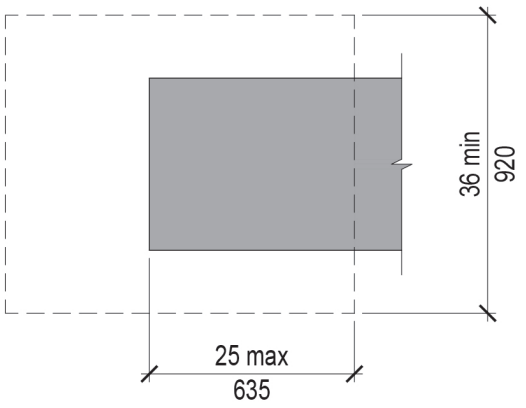
306.3 Knee Clearance.

306.3.1 Tier I Adult General. Space beneath an element between 14 inches (355 mm) and 27 inches (685 mm) above the floor should be considered knee clearance and should comply with Section 306.3. The minimum knee clearance height is 27 inches (685 mm) above the floor to the underside of the element.

306.3.1.1 Maximum Depth. Knee clearance should be permitted to extend 25 inches (635 mm) maximum under an element at 14 inches (350 mm) above the floor.



(a)
Elevation



(b)
Plan

Fig. 306.3.1.1
Tier I Adult Knee Clearance

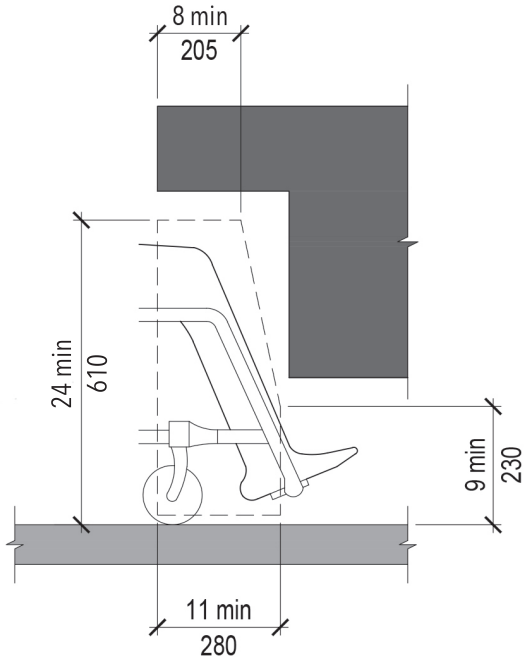
306.3.1.2 Minimum Depth. Where knee clearance is required beneath an element as part of a clear floor space, the knee clearance should be 11 inches (280 mm) minimum in depth at 14 inches (350 mm) above the floor, and 8 inches (205 mm) minimum in depth at 27 inches (685 mm) above the floor.

306.3.1.3 Clearance Reduction. Between 14 inches (350 mm) and 27 inches (685 mm) above the floor, the knee clearance should be permitted to be reduced at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

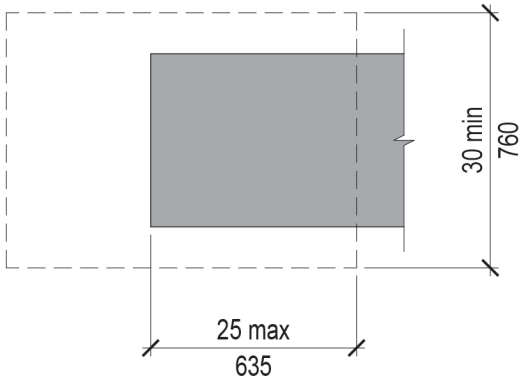
306.3.1.4 Width. Knee clearance should be 36 inches (915 mm) minimum in width.

306.3.2 Tier II Children's and People of Short Stature General. Space beneath an element for children ages 6 to 12 should provide a knee clearance between 9 inches and 24 inches (610 mm) above the floor.

306.3.2.1 Maximum Depth. Knee clearance should be permitted to extend 25 inches (635 mm) maximum under an element at 9 inches (230 mm) above the floor.



(a)
Elevation



(b)
Plan

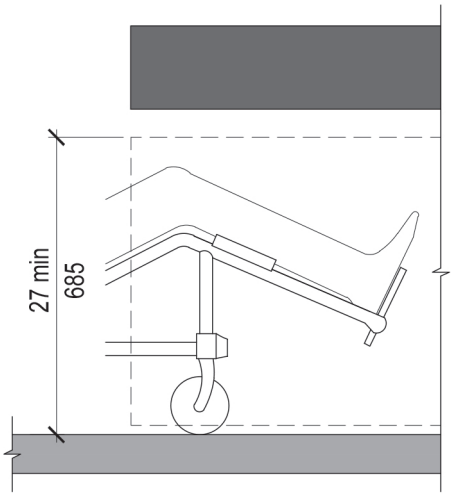
Fig. 306.3.2
Tier II Children's Knee Clearance

306.3.2.2 Minimum Depth. Where knee clearance is required beneath an element as part of a clear floor space, the knee clearance should be 11 inches (280 mm) minimum in depth at 9 inches (230 mm) above the floor, and 8 inches (205 mm) minimum in depth at 24 inches (610 mm) above the floor.

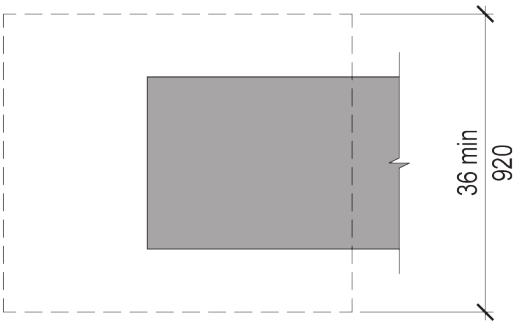
306.3.2.3 Clearance Reduction. Between 9 inches (230 mm) and 24 inches (610 mm) above the floor, the knee clearance should be permitted to be reduced at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

306.3.2.4 Width. Knee clearance should be 30-inches (760 mm) minimum in width.

306.3.3 Tier III Institutional General. Components meant for institutional applications should provide unobstructed full height and depth knee clearance. The minimum knee clearance height is 27 inches (685 mm) minimum above the floor to the underside of the element.



(a)
Elevation



(b)
Plan

Fig. 306.3
Tier III Institutional Knee Clearance

306.3.3. Advisory. A person may use a mobility device in a prone or supine position with legs fully extended or may need the use of a variety of stretcher types. Side approach for Tier III is in many ways the most practical solution. A frontal approach to a dining or work surface such a dining table, desktop, sink, and under counter accommodations requires excessive depth. A countertop would need to be very deep to accommodate reach ranges and may conflict with code requirements such as reach ranges for counters backsplashes. Custom residential applications are expensive; where it is more practical provide mobile adjustable furniture solutions.

306.3.3.1 Maximum Depth. Knee clearance should be permitted to extend the full depth of an element.

306.3.3.2 Minimum Depth. Forward approach is not practical for many applications and thus a parallel approach is recommended.

306.3.3.3 Clearance Reduction. Not applicable.

306.3.3.4 Width. Knee clearance should be 36 inches (915 mm) minimum in width.

307 Protruding Objects

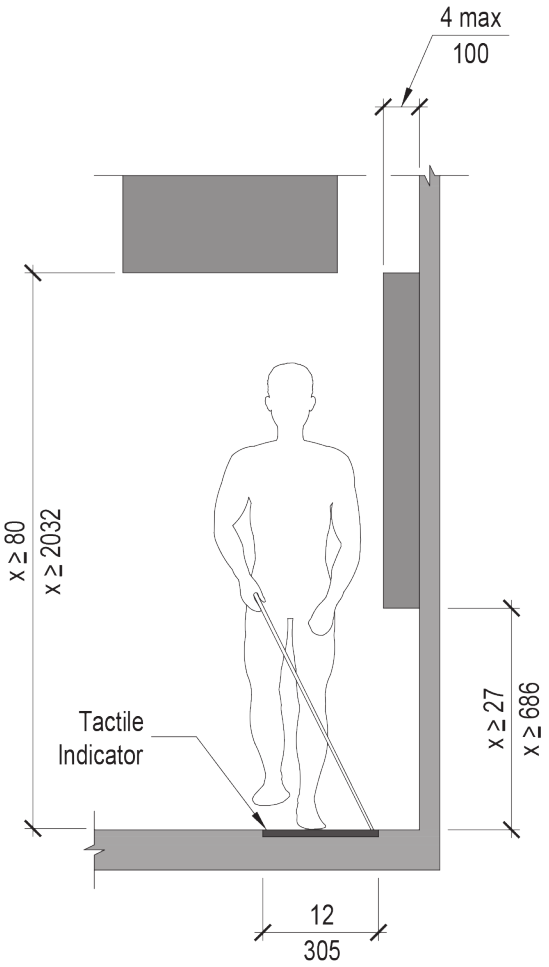
307.1 General. Protruding objects on circulation paths should comply with Section 307.

307.1 Advisory. Protruding objects are potentially a serious hazard to people with diminished vision. Potentially hazardous objects are noticed only if they fall within the detection range. Those people walking toward an object can detect an overhang if its lowest surface is no higher than 27 inches (685 mm). A 12 inch wide detectable warning strip on floor surface provides early warning. When walking alongside projecting objects, some people cannot detect overhangs. Since proper cane and guide dog techniques keep people away from the edge of a path or from walls, a slight overhang of no more than 4 inches (100 mm) is not considered a hazard.

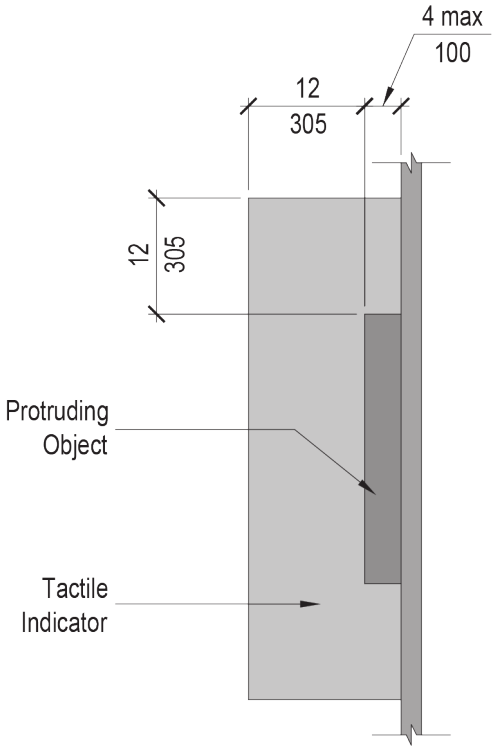
307.2 Protrusion Limits. Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the floor should protrude 4 inches (100 mm) maximum horizontally into the circulation path.

EXCEPTIONS:

1. Handrails should be permitted to protrude 4 1/2 inches (115 mm) maximum.
2. Door closers and doorstops should be permitted to be 78 inches (1980 mm) minimum above the floor.



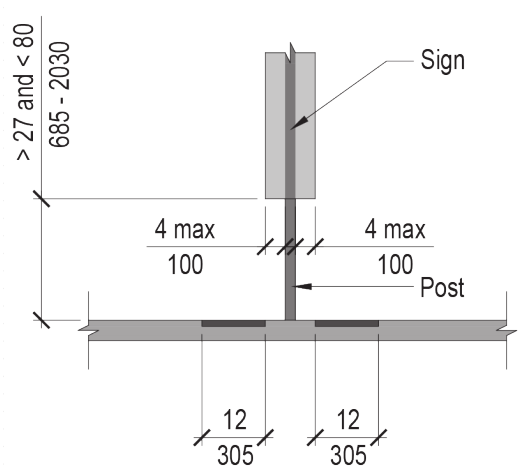
(a)
Elevation



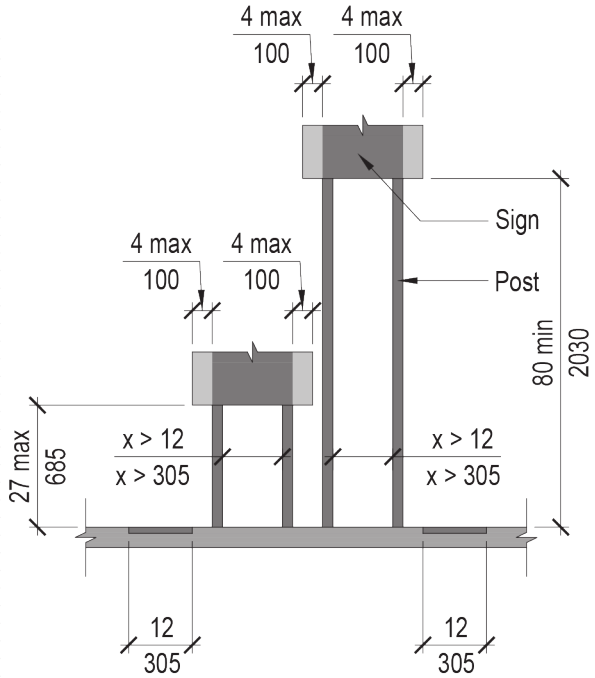
(b)
Plan

Fig. 307.2
Limits of Protruding Objects

307.3 Post Mounted Objects. Objects on posts or pylons should be permitted to overhang 4 inches (100 mm) maximum where more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the floor. Objects on multiple posts or pylons where the clear distance between the posts and pylons is greater than 12 inches (305 mm) should have the lowest edge of such object either 27 inches (685 mm) maximum or 80 inches (2030 mm) minimum above the floor.



(a)
Elevation



(b)
Plan

Fig. 307.3
Post - Mounted Protruding Objects

307.4 Reduced Vertical Clearance. Guardrails or other barriers should be provided where object protrusion is beyond the limits allowed by Section 307.2 and 307.3, and where the vertical clearance is less than 80 inches (2030 mm) above the floor. The leading edge of such guardrail or barrier should be 27 inches (685 mm) maximum above the floor.

EXCEPTION: Door closers and door stops should be permitted to be 78 inches (1980 mm) above the floor.

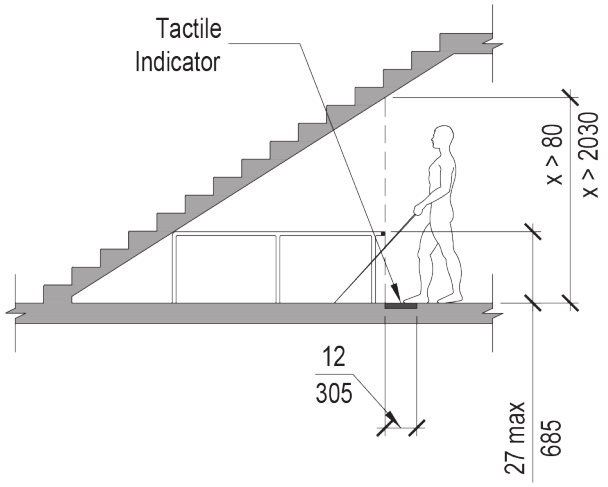


Fig. 307.4
Reduced Vertical Clearance

307.5 Required Clear Width. Protruding objects should not reduce the clear width required for routes.

307.6 Tactile Indicators. Tactile indicators should be provided on the floor complying with Section 302.6 or 302.7, and should run parallel to the leading edge of the protrusion and extending 12 inches (305 mm) outward from the protrusion. Post mounted objects should be provided with a tactile indicator that rings the object starting parallel to the leading edge of the protrusion and extending 12 inches (305 mm) outward from the protrusion.

307.6 Advisory. Detectable surfaces complying with Section 302.7 may raise concerns regarding materials. Introduction of a strip (e.g. plastic) in a carpeted floor may not be aesthetically desirable and may be a maintenance problem. Perhaps insertion of the same carpet but with a built-in texture should be considered. Other flooring (e.g., hardwood, vinyl, tile, concrete), detectable surface strips can be attached directly to the floor, but then too it may be desirable to integrate the texture into the material.

308 Reach Ranges

308.1 General. Reach ranges should comply with Section 308.

308.2 Forward Reach

308.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach should be 48 inches (1220 mm) maximum and the low forward reach should be 24 inches (610 mm) minimum above the floor.

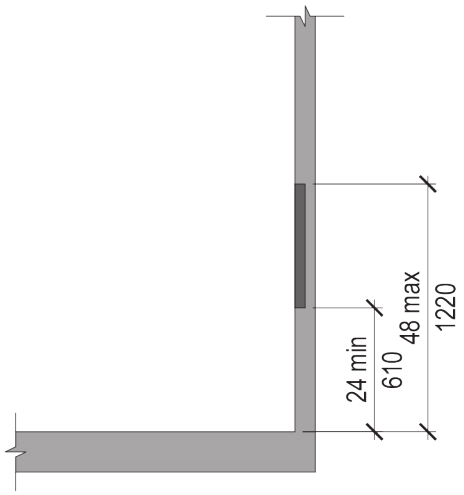
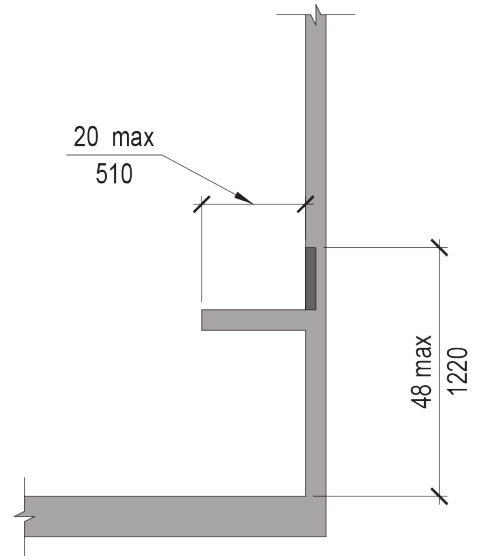


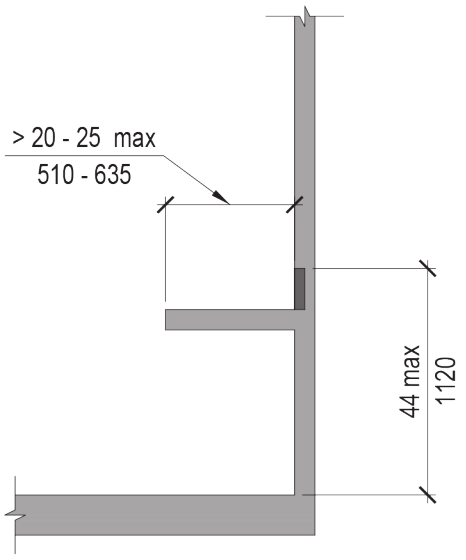
Fig. 308.2.1
Unobstructed Forward Reach

308.2.1.1 Tier III Unobstructed. Due to the configuration of a person in a prone or supine position the forward reach is not applicable.

308.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear floor space should extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach should be 48 inches (1220 mm) maximum where the reach depth is 20 inches 9510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach should be 44 inches (1120 mm) maximum, and the reach depth should be 24 inches (615 mm) maximum.



(a)



(b)

Fig. 308.2.2
Obstructed High Forward Reach

308.2.2.1 Tier III Obstructed. Due to the configuration of a person in a prone or supine position the forward reach is not applicable.

308.3 Side Reach

308.3.1 Unobstructed. Where a clear floor space allows a parallel approach to an element and the side reach is unobstructed, the high side reach should be 48 inches (1220 mm) maximum and the low side reach should be 19.5 inches (495 mm) minimum above the floor.

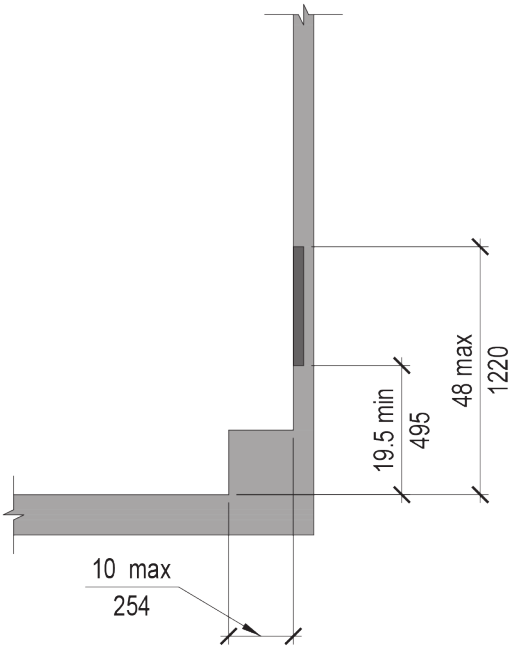


Fig. 308.3.1
Unobstructed Side Reach

308.3.2 Obstructed High Reach. Where a clear floor space allows a parallel approach to an object and the high side reach is over an obstruction, the height of the obstruction should be 34 inches (865 mm) maximum and the depth of the obstruction should be 24 inches (610 mm) maximum. The high side reach should be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach should be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

EXCEPTION:
Counter top depth may be increased to 25 inches (635 mm) maximum for residential kitchens.

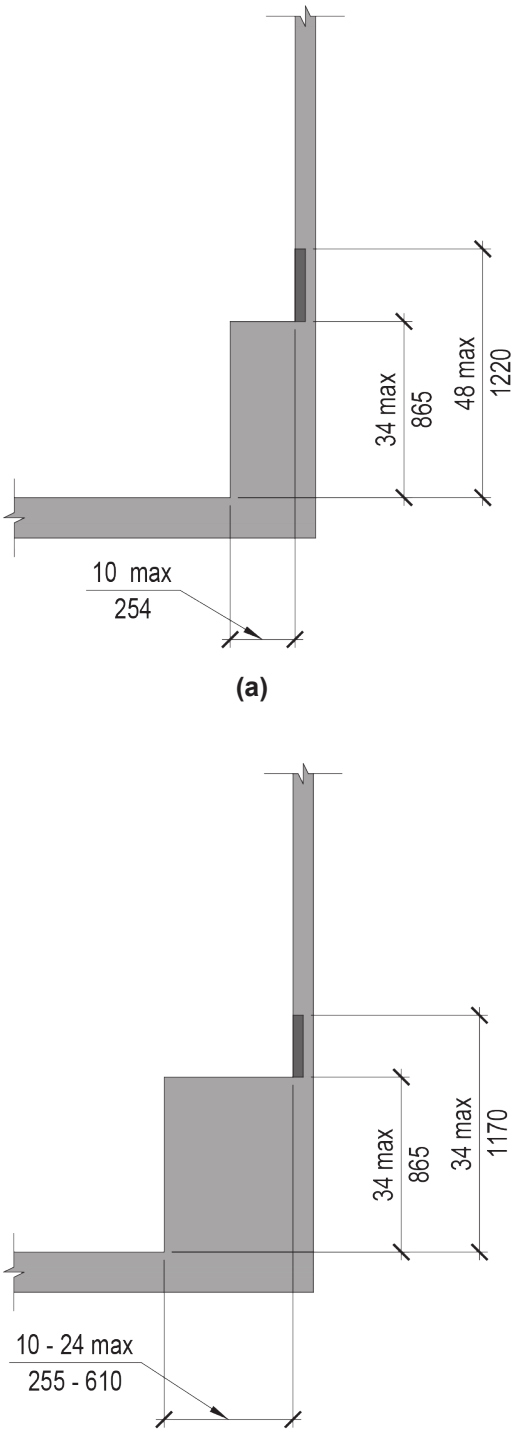


Fig. 308.3.2
Obstructed High Side Reach

308.3.2 Advisory. Exception 3. The typical depth of a counter top is 25 inches. The additional inch beyond the maximum code depth is a realistic compromise because it is usually the counter overhang beyond the front of the base cabinet. Technically this is not in compliance with the accessibility code maximum of 24 inches. The result of this may be to reduce the reach range slightly.

308.4 Children's Reach Ranges. Projects designed for children's use should follow the chart below, from *ADA Accessibility Guidelines for Building Elements Designed for Children's Use* (1998). Percentage of the project dedicated to children and percentage of age group to be determined by designer.

Forward or Side Reach	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
High (max)	36 inches (915 mm)	40 inches (1015 mm)	44 inches (1120 mm)
Low (min)	20 inches (510 mm)	18 inches (455 mm)	16 inches (405 mm)

Table 308.4
Children's Reach Ranges

308.4.1 People of Short Stature Reach Ranges. People of short stature are 4 feet 10 inches or less in height. Forward and side reach range provide a maximum height of 44 inches (1120 mm) and minimum height of 16 inches (405 mm).

308.5 Supplemental Adult Standing Reach Range. Supplemental adult standing reach ranges for both forward and side approach may be provided in addition to the other reach ranges in Section 308. The reach range should be 72 inches (1830 mm) maximum and the low reach range should be 30 inches (765 mm) minimum above the finished floor. Refer to Section 309.3.2 for supplemental standing reach range comfort zone for adults.

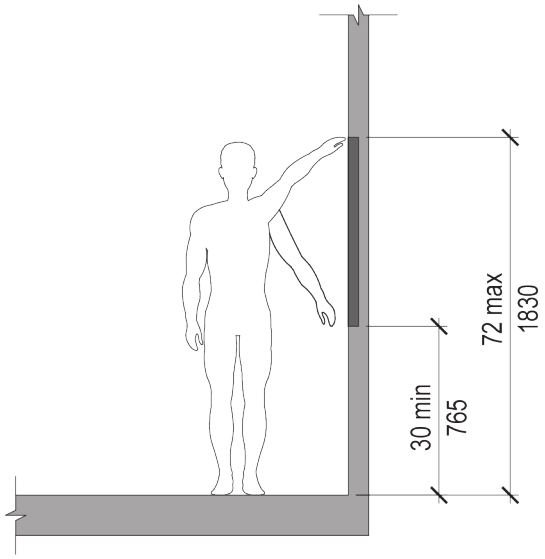


Fig. 308.5
Supplemental Adult Standing Reach Range

308.5 Advisory. These standing reach ranges were determined using anthropometric data from *Architectural Graphic Standards.* Male and female high forward reach heights at a 40 degree angle were averaged. The reach range is supplemental to provide additional preferences that exceed the code requirements. This may require dual controls or other elements since the code requirements must be maintained.

309 Operable Parts

309.1 General. Operable parts should comply with Section 309.

309.1 Advisory. Operable parts is a very important section since it applies systemically to the guidelines. It affects doors, elevators, windows, drinking fountains, toilet and bathing rooms, appliances, alarms, signage, telephones, two-way communications, and many dwelling unit components including entrances, controls, kitchen cabinetry, landscape elements, communication elements, etc. Visual, tactile and audible characteristics are basic design considerations that should be well thought out. Visual characteristics include contrast, color and illumination.

309.1 Advisory. Cont'd
Tactile characteristics include, shape, surface texture and vibration. Auditory characteristics include sounds and pre-recorded messages. There are many people with reduced vision, dexterity, hearing and mental abilities that need to be considered in the design of operable parts, especially for safety reasons.

309.2 Clear Floor Space. A clear floor space complying with Section 305 should be provided.

309.3 Height. Operable parts should be placed within one or more of the reach ranges specified in Section 308.

309.3.1 Comfort Seated Reach Zone. It is recommended to locate operable parts, especially controls within the most generally comfortable obstructed/unobstructed reach zone between 24 inches (610 mm) and 44-48 inches (1118-1220 mm) above the finished floor.

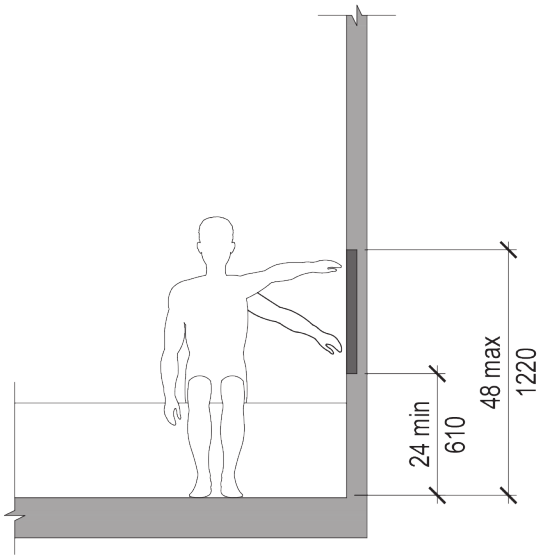


Fig. 309.3.1
Comfort Seated Reach Zone

309.3.2 Standing Comfort Reach Zone. A standing comfort reach zone may be provided to locate operable parts, especially controls within the most generally comfortable standing reach zone between 42 inches (1070 mm) and 60 inches (1525 mm) above the finished floor.

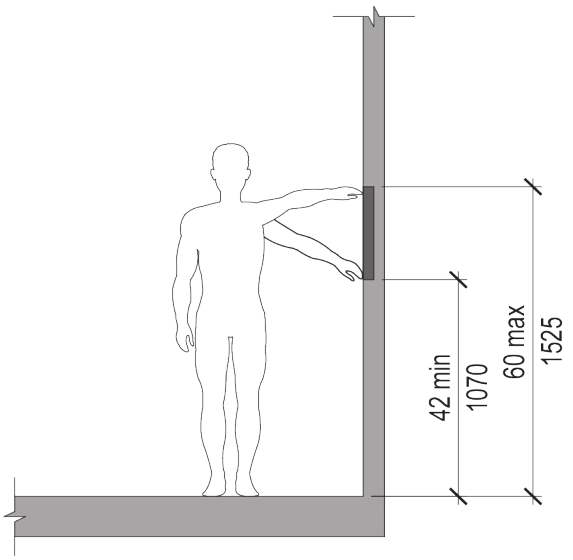


Fig. 309.3.2
Standing Comfort Reach Zone

309.3.2 Advisory. These reach ranges were determined using anthropometric data from *Architectural Graphic Standards*. Male and female high forward for optimal control reach heights where averaged. The reach range is supplemental to provide additional preferences that exceed the code requirements. This may require dual controls or other elements since the code requirements must be maintained.

309.3.3 Standing/Seated Comfort Zones Overlap. The overlap of zones complying with Section 309.3.1 and Section 309.3.2 results in a zone that provides comfortable reach for both seated and standing positions ranging from 42 inches (1066 mm) to 44-48 inches (1118-1220 mm) above finished floor. The overlap band is 2-6 inches (51-152 mm) wide.

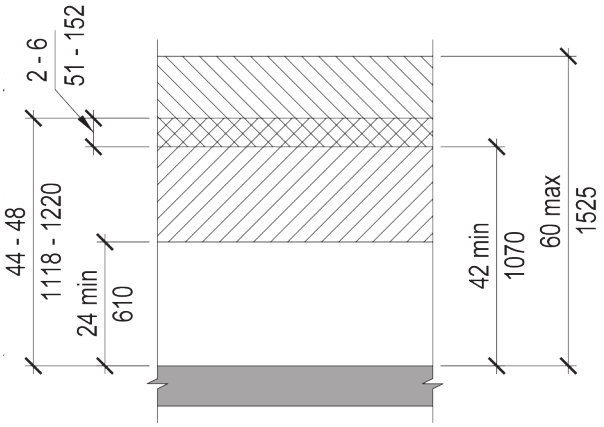


Fig. 309.3.3
Standing/Seated
Comfort Zones Overlap

309.4 Standard Operation. Operable parts should be multisensory and as simple and intuitive as possible to use. This is not only to avoid a learning curve, but to prevent incorrect operation, unintentional actuation, that could result in physical harm from fire, electrical and other potential hazards. Both right and left hand users and a range of hand sizes should be accommodated. Children's components should be properly scaled. Controls should be ergonomically designed to increase usability, safety, comfort and usable duration while reducing fatigue. Automatic operation should be provided with manual back-up. Operable parts should be usable with one hand and should not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts should be 5.0 pounds (22.2 N) maximum.

309.4 Advisory. If possible, simplify an operation by breaking down the sequence into distinct non-overlapping steps to avoid concurrent multiple tasks. Reduce the level of dexterity to operate a device. Avoid operations that require a learning curve which is important for many people especially the elderly and people with reduced dexterity and learning disabilities.

309.4.1 Alternate Operation. Actuation and operation can be accomplished for some with the use of their hands but for others this is not viable or preferred. Consider the use of robust verbal command software. Also consider other alternate means: elbow, arm, shoulder, thigh, knee, foot, voice/sound, motion, or even body temperature and weight. Actuator/controls may be a button, pad, foot pedal, designated wall or floor surface area, motion detector, weight trigger, remote control/actuator (see Section 708.7), automatic remote (continuous signal transmitter), card readers, PDA's and other means. Intuitive automatic operation resolves many operational concerns (e.g., sizing for both adult and children, sanitation and improper usage). Automatic operation should be provided with manual back-up. Standard and alternate operations should be redundant to provide a variety of options, preferences and address changing needs.

309.4.1 Advisory. A variety of choices should be provided for the user depending on their needs and preferences that may change, even on a day- to-day basis. Sanitary, safety and even security concerns may be different for each user. Limited contamination could be achieved by activation by elbow or other means. If buttons are used they should be sized accordingly (e.g., 3-inch or larger, round, square or rectangular button, for elbow or knee activation). In some instances, physical activation may be accomplished by walking on a surface, sitting on a device, closing a door, links to other controls, etc. Motion detectors are not viable for all applications and may not provide the level of control needed (e.g. faucet controls may turn water on and off but may not allow flow and temperature adjustment). General usage or individual preferences could be achieved using mobile application software (apps). Pre-programmed transmitters could activate personalized preferences, such as a tagging device. Robust verbal command software can also be an effective means of control. Facial recognition with presets another. Gesture recognition has the potential to be one of the most effective means of control.

309.4.1.1 Gesture Recognition Operation. A team of computer scientists from the University of Washington have developed WiSee, "that leverages wireless signals to enable whole-home sensing and recognition of human gestures." Gestures can be read through walls using a minimum of two wireless sources (wireless routers can be used to read changes in the WiFi signals). There are security and privacy issues but it has the potential for wide application. The system eliminates the need to wear a device; sensors or cameras.[1] It may be useful for wayfinding by creating three-dimensional mapping for apps that may potentially eliminate the use of reference beacons and other such devices.

1. Q. Pu, S. Gupta, S. Gollakota, S. Patel (2013), Whole-Home Gesture Recognition Using Wireless Signals, University of Washington.

309.4.1.1 Advisory. Gesture recognition, at the time of this publication, is cutting edge technology that was released in 2013. Again this confirms need for the *IDG* to be a living document. Hardware and software is evolving in a relatively short period of time that will increase the readability of gestures. This could include not only limb gestures but it has the potential to read lips and even interpret facial expressions and very subtle body language anywhere within your home, regardless of walls, floor plates and any obstructions. Privacy could be achieved by imposing strict limitations regarding distance, level of readability, blocked areas within the house, blocked gestures and blocked recognition such as lip reading. Gestures could be based on the Native American Indian Council's American Indian Universal Sign Language by William Tomkins: www.manataka.org For example, decreasing water temperature coming out of a bathroom faucet could be achieved by placing both hands in a closed position in front of your body, height of shoulder, body slightly bent and giving tremulous motion to hands and arms as though shivering from cold. Increasing the temperature could be achieved by holding your hands flat above your head, a few inches apart, then bringing your hands down towards head. This suggests the rays of the sun. American Indian sign language has been in existence for millennia because it is effective.

Accommodations could be made for people with limited dexterity and limb use or alternate gestures could be deployed such as finger, eye, lip, head, movement and other types of subtle gestures.

309.4.2 Children's Operation. Operation and parts intended for children should be scaled appropriately and simplified further to accommodate the age group. Reach ranges should comply with Table 308.4.

309.5 Childproofing. "Any safety device should be strong enough to prevent injury to young children, yet easy for adults to use," according to the U.S. Consumer Product Safety Commission. They identify twelve safety devices that can prevent injuries and save the lives of young children: safety latches and locks; safety gates; door knob covers and door locks; anti-scald devices; smoke detectors; window guards and safety netting; corner and edge bumpers; outlet covers and outlet plates; carbon monoxide (CO^2) alarms; tassel on each separate window blind cord and inner cord stops on blinds (consider cordless blinds); anchors to avoid furniture and appliance tip-overs; and layers of protection for pools and spas.

309.5 Advisory. Refer to the U.S. Consumer Product Safety Commission's *Childproofing Your Home, 12 Safety Devices to Protect Your Children.* Additional important safety information is contained in this booklet. Other publications can be obtained from: http://www.cpsc.gov/

309.6 Visual Characteristics. Consider visual characteristics that addresses contrast, color and illumination. High visual contrast should be provided to distinguish the operable parts from the background (e.g. switches, handles, cooking controls). Eye levels are important and should comply with Section 310. Consider large type for both printed and digital readouts. Color should also be carefully considered to avoid confusion with the background and distinguish sub-components. Illumination includes task lighting or increased light levels at controls. Consider complying with Section 311. Operable parts may be internally lit or backlit (e.g. lighted control knob on an electronic device). Visual characteristics are important for people with vision and hearing disabilities to locate components and to determine actuation and operation.

309.7 Tactile Characteristics. Consider tactile characteristics including symmetrical/asymmetrical shapes, compressible/non-compressible material, texture and vibration. Shape enhances operation with one hand, increasing ease & comfort. Texture contrast helps distinguish components and texture enhances grasping. Vibration is extremely useful for people with visual or hearing disabilities to locate components & determine actuation and operation.

309.8 Auditory Characteristics. Consider operable parts with auditory characteristics that include sounds and pre-recorded messages. Sounds are important for people with visual disabilities to help locate, actuation and operate components. Pre-recorded messages can identify components and provide operational instructions for function, actuation, shut-off and warnings. Consider utilizing T-coil to receive auditory information for people who use hearing aids.

309.9 Multisensory Alarms. Alarms recommended throughout the book, should be visual, auditory and tactile, complying with Section 309.6, Section 309.7 and Section 309.8. Where appropriate, connect to a central system or automated system (local or web based) to notify user and relevant responder. Alarms are important, even critical, for a wide range of applications: fire, smoke, carbon monoxide, gas, power outage, appliance overheating, water leakage, water temperature, personal emergency, entrapment, motion detection, security, appliance timers, open appliance, continuous water flow, HVAC equipment failure, protrusion, obstacle, drop-off, door swing, etc. Alarms are especially important in dwelling units: kitchens (e.g. appliance malfunction, open appliance, cooking accidents, water and gas leakage); bathrooms (e.g., water leakage, high water temperature, continuous wc water flow, and accidents caused by slippage); laundry rooms and utility equipment rooms. Where safety is critical, provide stepped up alarms and automatic shutoffs.

309.10 Multisensory Functionality. These products rely on multisensory display techniques and audio-haptic interactivity. Spatial concepts and figures are conveyed through visual or extra visual means.

309.10 Advisory. Touch Graphics, Inc. www.touchgraphics.com was established in 1997 to refine and commercialize methods for tactile graphics production that were first demonstrated by Karen Luxton Gourgey and the Computer Center for Visually Impaired People, Baruch College, City University of New York (CUNY). The products , exhibits and research have expanded since the initial release of the *IDG* in various categories.

309.10 Advisory Cont'd.
Education:US Interactive Map for Talking Tactile Pen; Talking Tactile Tag Reader; Talking Tactile Globe; Braille Cloud; DIAGRAM Center Initiative; TTT Math; TIP STEM Binder; SAL2; WiiCane; Talking Tactile Tablet 2; TTT Authoring Tool; Snakes and Ladders Game; Power Chord Braille Keyboard; Illustrated Talking DAISEY Books; Audio-Tactile Statistics Courseware; Talking Tactile Atlas of the World; Nimble Pad. Orientation: talking model; tactile maps; talking map kiosks; talking campus map; illuminated talking touch models; talking kiosks; TMAP; user-activated talking beacons; transit maps. Universal: pixelboard; universal exhibits; 3d talking head;SmartGrip & Universal Kinetic Furniture.

310 Eye Levels. Eye levels should comply with Section 310.

310 Advisory. Eye levels are based on the *Architectural Graphic Standards* anthropometric data (see Section 105.3). Eye levels are critical for some applications (e.g. instructions, warning labels, emergency signage, and controls). Dimensions range from the lowest female dimension to the maximum male dimensions for standing and sitting positions. A number of factors may affect the sitting position eye levels, especially seat height, body size and posture. This is true of people who use mobility devices. Other sight factors are not addressed here such as range of viewing angles and lines of sight (see Section 802.9). Many sections in the *IDG* are effected by eye levels: 506, 703, 709, 714, 802, 902 and 905.3. Care should be taken regarding visual obstructions, viewing positions and the field of view. A sitting position is a requirement that is not limited to people with a disability, but a necessity for many with diminished mobility and stamina.

310.1 Adult Standing Eye level. Eye levels for an adult standing should be 56.6 inches (1440 mm) minimum and 70.3 inches (1785 mm) maximum above the finished floor.

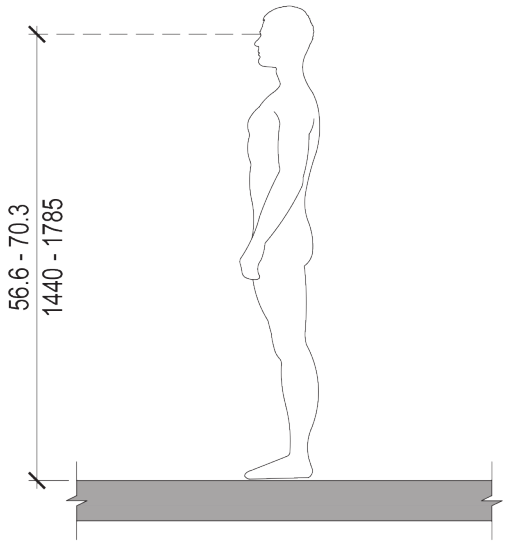


Fig 310.1
Adult Standing

310.2 Adult Sitting. Eye levels for an adult sitting should be 41.5 inches (1054 mm) minimum and 52.1 (1323 mm) maximum above the finished floor.

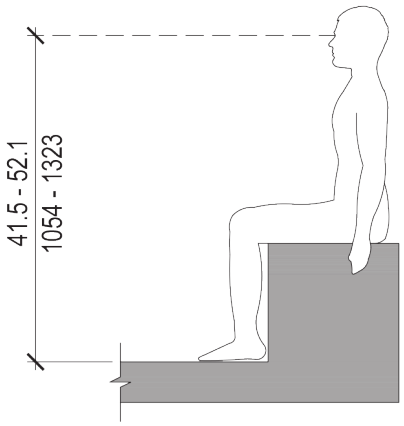


Fig. 310.2
Adult Sitting.

310.3 Child Standing, Ages 5 to 12. Eye levels for a child standing, ages 5 to 12 should be 35 inches (890 mm) minimum and 60 inches (1525 mm) maximum.

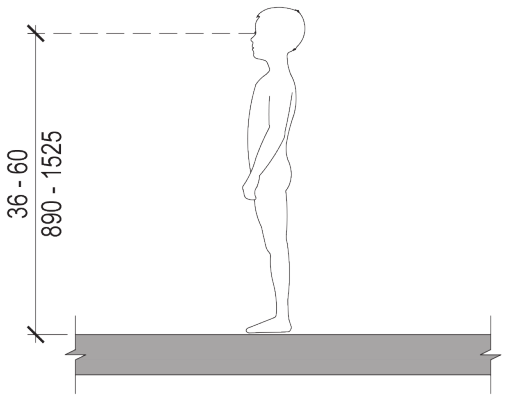


Fig. 310.3
Child Standing &
People of Short Stature Standing

310.3.1 People of Short Stature Standing. Eye levels for people of short stature should comply with Section 310.3.

310.4 Child Sitting, Ages 5 to 12. Eye levels for a child sitting, ages 5 to 12 should be 28.4 inches (720 mm) minimum and 43.3 inches (1100 mm) maximum.

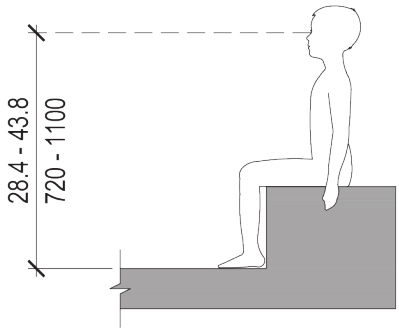


Fig. 310.4
Child Sitting &
People of Short Stature Standing

310.4.1 People of Short Stature Sitting Sitting. Eye levels for people of short stature should comply with Section 310.4.

310.5 Adult Sitting in Mobility Device. Eye levels for a person that uses a sitting mobility device should be 43 inches (1090 mm) minimum and 51 inches (1295 mm) maximum above the finished floor.

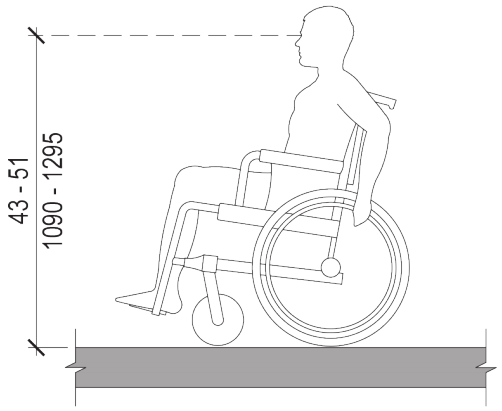


Fig. 310.5
Adult Sitting in
Mobility Device

310.6 Children Ages 5 to 12 Sitting in Mobility Devices. Eye levels for sitting mobility devices for children ages 5 to 12 should be 28.4 inches (720 mm) minimum and 43.3 inches (1100 mm) maximum.

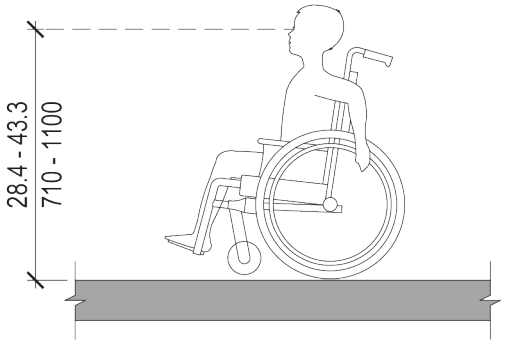


Fig. 310.6
Child Sitting in
Mobility Device

310.6.1 People of Short Stature Sitting in Mobility Devices. Eye levels for people of short stature who use seated mobility devices should comply with Section 310.6.

310.7 Horizontal Eye Position for a Forward Approach. Horizontal eye position for a forward approach should comply with Section 310.7

310.7.1 Tier I Adult Horizontal Eye Position for a Forward Approach. The position is the centerline for the Tier I clear floor space complying with Section 305.3.1 or 18 inches (460 mm) from the side of the space.

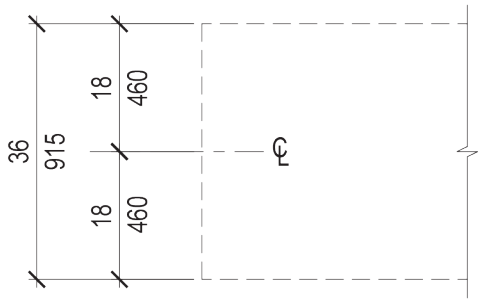


Fig. 310.7.1
Tier I Adult Horizontal Eye Position
for a Forward Approach

310.7.2 Tier II Children's Horizontal Eye Position for a Forward Approach. The eye position is the centerline for the Tier I clear floor space complying with Section 305.3.2 or 15 inches (460 mm) from the side of the space.

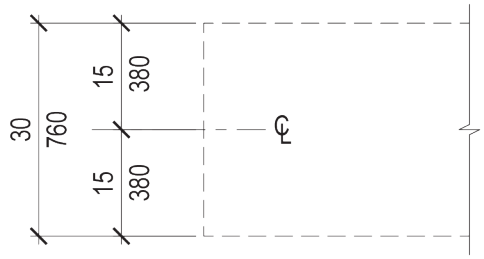


Fig. 310.7.2
Tier II Children's Horizontal Eye Position
for a Forward Approach

310.7.2.1 Tier II People of Short Stature Horizontal Eye Position for a Forward Approach. The eye position should comply with Section 310.7.2.

310.7.3 Tier III Institutional Horizontal Eye Position for a Forward Approach. The position is the centerline for the Tier III clear floor space complying with Section 305.3.3 or 18 inches (460 mm) from the side of the space.

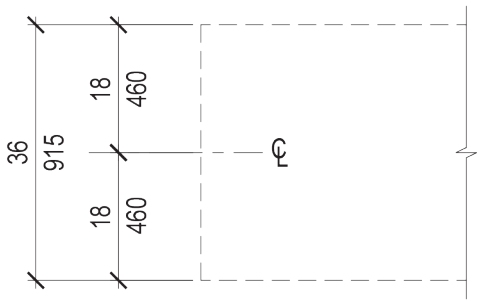


Fig. 310.7.3
Tier III Institutional Horizontal Eye Position for a Forward Approach

310.8 Horizontal Eye Position for a Parallel Approach. Horizontal eye position for a parallel approach should comply with Section 310.8.

310.8.1 Tier I Adult Horizontal Eye Position for a Parallel Approach. The eye position is 18 inches (460 mm) minimum from one end of the clear floor space complying with Section 305.3.1.

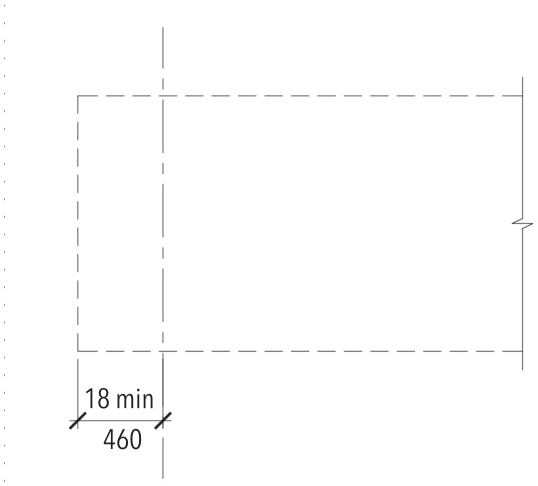


Fig. 310.8
Horizontal Eye Position for a Parallel Approach

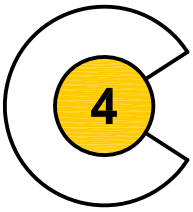
310.8.2 Tier II Children's Horizontal Eye Position for a Parallel Approach. The eye position is 18 inches (460 mm) minimum from one end of the clear floor space complying with Section 305.3.2.

310.8.2.1 Tier II People of Short Stature Horizontal Eye Position for a Parallel Approach. The eye position should comply with Section 310.8.2.

310.8.3 Tier III Institutional Horizontal Eye Position for a Parallel Approach. The eye position is 18 inches (460 mm) minimum from one of the clear floor space complying with Section 305.3.3.

311 Lighting.

311 Advisory. Lighting is included in many sections of the *IDG*, but detailed lighting guidelines are beyond the technical scope of this book. It is recommended to visit the Illuminating Engineering Society of North America's website: http://www.ies.org/ The site contains extensive material including: lighting handbooks; educational material; recommended practices and ANSI standards; lighting energy management; design guidelines; measurement testing and calculation guides; technical memoranda, lighting publication packages, other IESNA publications, *LD+A* the magazine of the Illuminating Engineering Society of North America and other lighting books. One of their strategic goals directly affects inclusive design by promoting the dynamic development of innovative lighting research and the rapid translation of discoveries to improve the lighted environment. The IES seeks to improve the lighted environment by bringing together those with lighting knowledge and by translating that knowledge into actions that benefit the public.



Routes

400 Introduction. Chapter 4 includes: interior, exterior, and route hierarchy; walking surfaces, doors and doorways, ramps, automatic ramps, curb ramps, elevators, limited-use/limited-application elevators (LULA's), private residency elevators, platform lifts and moving walkways.

Routes should be intuitive, directing people with the least amount of confusion. They should accommodate all ages, abilities and allow for use of all mobility devices. Recreational routes should be provided with separate bicycle and pedestrian lanes. Relevant information-sources are provided including the Center for Active Design and the eight publications. Embedded LED lighting and sensors increase safety. Pedestrian access points and the primary exterior route(s) use a three-tiered system. Exterior routes should link all facilities and features to at least one single continuous path and provide wayfinding complying with Section 714. Seating, weather protection (e.g. shelters, awnings and overhangs) and amenities should be provided for projects containing long routes. This includes, where possible, at least one continuous path that can be navigated without the use of stairs or mechanical vertical circulation. Consider a difficulty rating system, especially for large sites (e.g. campuses and parks). Walking surfaces should comply with Section 302 and Section 303. Slope should not be excessive, but, when this is not possible, choices should be provided. The recommended route width is part of a modular concept. It permits two-way pedestrian traffic and adequate maneuvering clearance for all door approaches. Moving walkways are also included.

Entrances and doorways should be reached by an inclusive route. Doors should be easy to use, large enough to accommodate the range of users with sufficient space on each side of the door to maneuver, reduce congestion and increase safety. Door and doorways include: entrances, types, configurations, maneuvering clearances, thresholds and hardware. Consider two-way swinging doors and fully automatic doors to reduce or eliminate operating hardware and allow alternate operation (see Section 309.4.1). Consider fully automatic sliding doors to avoid the conflict with the swing arc. The building entrance section covers door size, weather protection, vestibules, lobbies, communications, seating and signage.

Exterior and interior ramp provisions address slope, surfaces, rise, landings, change in direction, rest areas, doorways and temporary/portable installations. The recommended clear width relates to and is affected by the *2014 NYCBC* egress route requirements. Convertible walkways are introduced. Curb ramps are discussed. To increase safety on narrow sidewalks and to properly accommodate curb ramp slope, it may be necessary to extend the sidewalks at corners and other key points. Recommended reading is the *Public Right-of-Way Access Advisory Committee's Report* (see Section 105.3). Raised intersections are an option. The sensory pedestrian signal (SPS) system is refined with embedded LED, vehicle black boxes, smart vests, leading pedestrian intervals, Active Design, rumble strips and pedestrian billboards.

All levels and spaces should be linked to the primary route(s) at key points with stairs and amenities. Elements should be consistent, convenient and act as reference points for wayfinding. Mechanical vertical circulation choices are discussed: standard elevators, LULA's, residential elevators, unenclosed and enclosed vertical platform lists, inclined platform lists, stairlifts, portable platform lifts and moving walkways. A minimum of two elevators is strongly recommended to maintain continuous service during a breakdown and to allow phasing for routine maintenance, repairs and upgrades.

Car control panel locations are refined. Adaptable aligned closet enclosures in dwelling units can be converted into an inexpensive and unobtrusive enclosed platform lift in place of residential elevator or other options. Congestion, choke points, and intuitive circulation patterns are addressed. Confusion and disorientation is reduced. Lobbies are properly integrated, enhance the circulation system and are sized for peak occupancy.

401 General

401.1 Scope. The provisions of Chapter 4 should apply where recommended by the scoping provisions adopted by the administrative authority.

402 Routes

402.1 General. Routes should comply with 402.

402.2 Components. Routes should consist of one or more of the following components: walking surfaces with a slope not steeper than 1:20, doors and doorways, gates, ramps, curb ramps excluding the flared sides, blended transitions, elevators, and limited applications for lifts. All components of a route should comply with the applicable portions of these guidelines.

402.3 Revolving Doors, Revolving Gates, and Turnstiles. Revolving doors and gates, and turnstiles are not recommended for inclusive routes.

402.4 Exterior Routes

402.4.1 Configuration. Route configuration should be intuitive, consistent and not circuitous. Routes should direct people with the least amount of effort and confusion. Provide at least one primary meeting space as a reference point.

402.4.2 Route Hierarchy. Hierarchy may consist of primary, secondary, tertiary routes and general space circulation. Differentiate each to enhance wayfinding. A direct route should be provided to the building entrance(s) and important site features. Exterior routes may be defined by many elements. A route is more than just a walkway, it is a three dimensional environment. Landscape and fabricated elements should enhance wayfinding (see Sections 714.3 and 714.4).

402.4.3. Recreational Routes. Recreational routes should provide separate bicycle and pedestrian lanes. The *NYC Bicycle Master Plan,* provides comprehensive guidance for recreational routes: on-street network, br*idg*es, greenway system, access to mass transit (e.g., subways, commuter rail, ferries, buses, and bicycle parking locations), comprehensive bicycle program (e.g., engineering, enforcement, education), design guidelines, stress level methodology, implementation, policy, storage racks, in-line skating, and pedestrian safety. Lane widths and intersection designs are based on *AASHTO* guidelines. Bicycle parking should comply with Section 502.3. Consider a difficulty stress level rating system. Recreational lane surface should be differentiated from vehicle lanes (e.g., graphics, materials, tactile characteristics, visual contrast and color). Provide multisensory traffic signals for recreational routes at vehicle intersections complying with Section 406.16. Where bicycle/pedestrian lanes overlap (e.g., narrow br*idg*e), provide “No Bike Riding” signage.

402.4.3 Advisory. Active Design plays an important role in recreational routes. The Center for Active Design centerforactivedesign.org is a nonprofit resource for design professionals, policy makers, real estate developers and community advocates, committed to promoting and expanding the Active Design Guidelines. They maintain a multi-disciplinary perspective in the translation of health research into design solutions that amplify the role of architecture and urban planning in improving public health and well-being. Their mission is to reduce the risk of obesity and chronic diseases by promoting physical activity and healthy food access through the design of buildings, streets, and neighborhoods. The Active Design series comprises nine publications:

1. “Active Design Guidelines, Promoting Health Through Design ” provides architects and urban designers with a manual of strategies for creating healthier buildings, streets, and urban spaces, based on the latest academic research and best practices in the field.

2.“Guide for Community Groups,” outlines the benefits of Active Design, and connects readers to numerous resources offered by public agencies and non-profits throughout NYC.

402.4.3 Advisory cont'd.
3."Promoting Safety," helps reduce the risk of injury in neighborhoods, streets and outdoor spaces while increasing walking, cycling & access to public transit.

4."Affordable Designs for Affordable Housing," focuses on feasible, low cost ways to design affordable housing developments that supports active play and physical activity.

5."Shaping the Sidewalk Experience, Part 1," is theory, resources and tools: history, impacts, existing efforts, infrastructure & financial benefits.

6. "Shaping the Sidewalk Experience, Part 2," is methodology, initiatives and policies.

7."Building Healthy Places Toolkits," design recommendations in three parts: physical activity; healthy food/drinking; and healthy environment/ social well-being.

8."Toolkit for Schools," provides ideas and resources to incorporate Active Design into NYC schools.

See also the NYC Department of Transportation's *Street Design Manual*, a comprehensive resource promoting higher quality street designs and efficient project implementation. It covers process & affected agencies; geometry (e.g., roadways, lanes, sidewalks, medians, traffic calming, trees & plantings); materials (e.g., roadways, crosswalks, sidewalks, furnishing zones, curbs and plazas); lighting (e.g., street, pedestrian, & traffic signal poles); and furniture (e.g., bike racks, bus & bike shelters, newsstands, automatic public toilets, benches & waste receptacles). Visit the DOT website for updates, additional information and publications. Also, see Section 714.10.

402.4.3 Advisory cont'd.
See also the NYC bike share system, "Citi Bike." Examine the "Bicyclists" page comprising: maps, safety, parking, network and statistics. The original DOT "New York City Bicycle Master Plan" *(NYCBMP)* is an out-of-print early comprehensive bicycle master plan comprising: lane widths; signage, pavement markings; intersections; drainage grates (openings running perpendicular to travel direction); multiple paths (one and two-directional); buffers; vertical clearance; alignment; grades; pavement materials; vehicle access control; br*idg*e structures; maintenance and traffic protection; pigmented lanes; center median; share bus-bike and contra-flow lanes [two-way recreational lane adjacent to one way vehicle lane); signals; raised or separated lanes; traffic calming [e.g., speed bumps, traffic circles, chicanes (staggered curb extensions or serpentine roadway)]; bicycle blvd., slow street and other content.

Consider difficulty rating systems for pedestrians based on the Universal Trail Assessment Program by American Trails at: http://www.americantrails.org/.

The National Association of City Transportation Officials (NACTO) nacto.org, has produced two important publications for designing and constructing streets:

1. "Urban Street Design Guide," demonstrates how streets can be safe, sustainable public spaces for people walking, driving, biking, and taking transit that comprises: streets, intersections, design elements, interim design strategies, and design controls.

2."Urban Bikeway Design Guide," incorporates time-tested principles of bicycle facility design, offering a model for safe and comfortable bicycling that comprises: bike lanes, cycle tracks, intersections, signals, signs and markings, and bicycle boulevards.

402.4.3.1 Exercise Stations. Consider fitness equipment placed at locations (e.g., single or grouped stations) to encourage usage to help address sedentary lifestyles. Everyone can benefit because it will increase strength, dexterity and stamina.

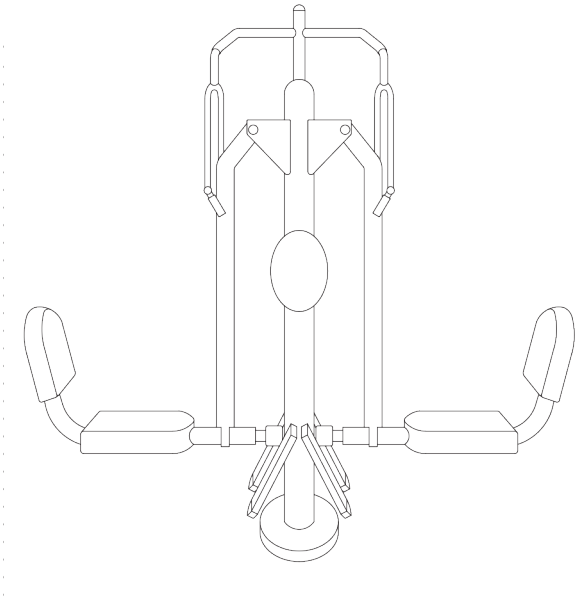


Fig. 402.4.3.1
Exercise Station Example Leg Press

402.4.4 Amenities. Provide amenities along routes. Routes that are relatively level should contain a widened rest area with a Type I turning circle and seating complying with Section 903, not to exceed intervals of 200 feet (60 m). Routes with a slope of 1:20 or greater should contain a rest area with seating not to exceed 100 feet (30 m). Provide 50% of seating with armrests to increase usability (see Section 903.3.3) . Provide drinking fountains complying with Section 602. Provide trash receptacle complying with Section 906. Consider shelters at key locations. Consider public pay toilets.

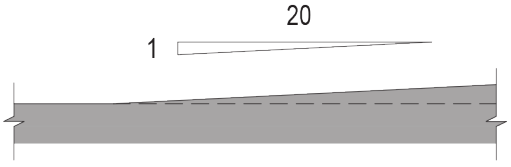


Fig. 402.4.4
Route Slope Affecting Rest Area

402.4.5 Signage/Wayfinding. Signage/ Wayfinding should comply with relevant sections of Chapter 7 including: emergency assistance, signs, detectable warnings and surfaces, assistive listening systems, two-way communications, signage system, public information display types, and emergency signage system(s), Wayfinding should comply with Section 714. Maps should identify routes, features (e.g., transit stops, parking and landmarks), amenities, distances, travel times, and difficulty levels. Provide emergency communications/ information with two-way communications complying with Section 708. Pedestrian signals should comply with Sections 406.16 and Section 703.8. See also Section 714.10.

402.4.5.1 Emergency Communications. Emergency communications may include but not limited to the following: alarms complying with Section 702, visual two-way communication complying with Section 708.5, information/navigation/alert reference point system complying with Section 708.7, information / emergency virtual terminal complying with Section 708.8, and multisensory information/ emergency kiosks complying with Section 710.4.

402.4.6 Bicycle/Scooter/Tricycle/Tandem/ Hand cycle Parking. Bicycle/scooter/ tricycle parking should comply with Section 502.3 provided at key locations (e.g. multiple dwelling, commercial areas, public facilities, bus and subway stations).

402.4.7 Carriage, Stroller and Cart Storage. Carriage, stroller and cart storage should comply with Section 502.4.

402.4.8 Conflicts/Obstructions. Any conflicts and obstructions (e.g., stairs, ramps, doors, lifts, trash receptacles and drinking fountains) should be kept out of the path of travel. But as per Active Design, stair placement should encourage usage to increase physical activity. Consider detectable warnings and surfaces complying with Section 705, and multisensory signage system. Refer to Section 714 Wayfinding for additional information. Avoid conflicts with pedestrian recreational and vehicle lanes by using physical barriers where feasible and separate street crossings for pedestrian and recreational lanes

(See Advisory 402.4.3 regarding NACTO). Care should be taken to avoid conflicts with natural landscape elements near routes where potential obstructions may occur. Growth patterns from initial installation to maturity should be taken into account. Ramps and stairs should run in the predominant direction of travel.

402.4.9 Shelters and Weather Protection. Provide shelters complying with Section 402.6 and Section 903.16 for shade and weather protection. Consider partial or continuous cover (e.g., roof, awning, overhangs) along short primary routes where appropriate. Also consider the use of an ice melt system along the primary route or area surrounding entrances that are prone to snow and ice accumulation.

402.4.10 Embedded LED Lighting / Sensors. Lighting and sensors should interface to create smart recreational routes containing surface embedded LED's and sensors to separate two-way bike lane traffic, bike lanes from pedestrian recreational routes and recreational routes from vehicle traffic. Sensors can monitor all aspects of vehicle, recreational and pedestrian routes that interface with lighting, signals, signage, mapping, safety and emergency usage.

402.4.10 Advisory. Cities throughout the world are making their environments smarter. A comprehensive system will eventually interface, monitor, control and prioritize usage: vehicle, recreational and pedestrian routes, services, sensory pedestrian signals, public smart phone, pedestrian billboards, emergencies, maintenance, and events. The system will be dynamic. For additional information see the New York Times article *Copenhagen Lighting the Way to Greener, More Efficient Cities* by Diane Cardwell, Dec. 8, 2014.

402.5 Interior Routes

402.5.1 Configuration. Route configuration should be intuitive, consistent and not circuitous. Routes should direct people with the least amount of effort and confusion. Provide at least one primary meeting space to act as a reference point.

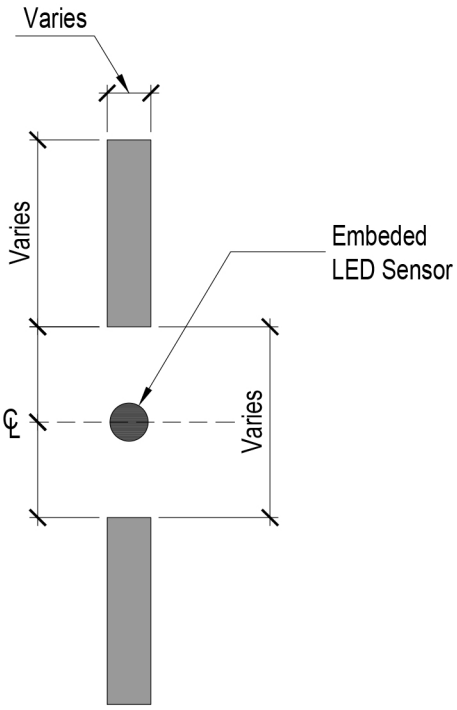
402.5.2 Route Hierarchy. Hierarchy may consist of primary, secondary, tertiary routes and general space circulation. Differentiate each to enhance wayfinding (e.g. width, height, shape, ceiling design, color, lighting, decorative elements, acoustics, texture, etc). A direct route should be provided from the building entrance(s) to important building features. Interior routes may be defined by many elements. A route is more than just a walkway, it is a three- dimensional environment that affects all the senses including proprioception and vestibular. Elements should enhance wayfinding (see Section 714.3 and Section 714.4).

402.5.2.1 Entrance. Upon entering a building the route should be obvious and continuous from the exterior. Consider the lobby as a primary reference point.

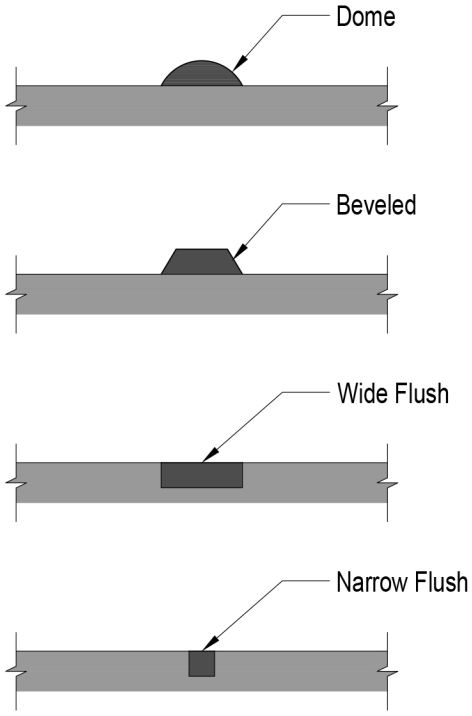
402.5.2.2 Primary Route. A primary interior route should be a well thought out three dimensional circulation system with direct links link provided to the building entrance(s) vertical circulation system & amenities.

402.5.2.2 Advisory. Refer to Section 403.5.1 for route widths. In locations such as airport terminals, arenas and other facilities accommodating large peak occupancy loading the route needs to accommodate multiple directions, groups, stationary occupants, erratic movement, etc.

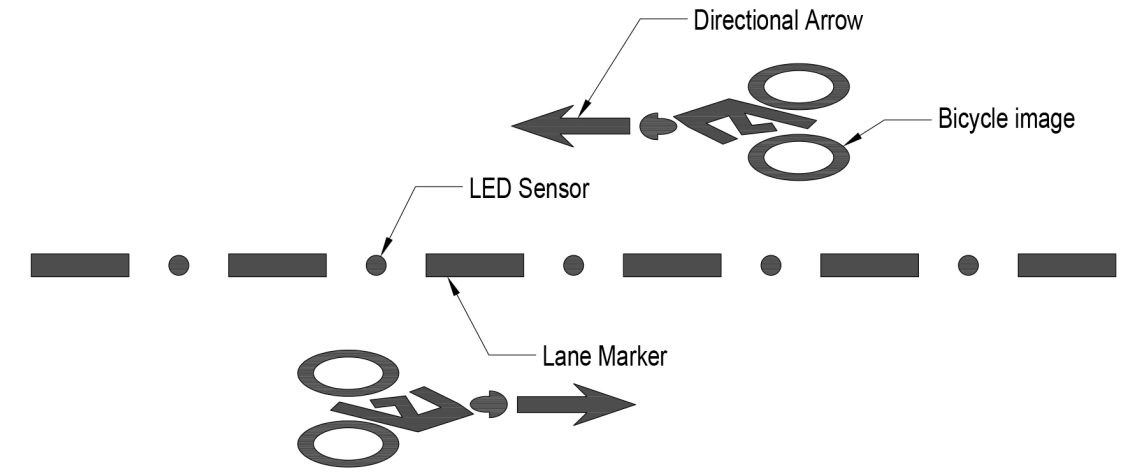
402.5.2.2.1 Reference Points. Reference points along the route include primary or main lobby, intersections, branching, open spaces, waiting areas, rest areas, floor lobbies, elevator lobbies, restrooms, drinking fountains, telephones, etc. Amenities should be stacked in multistory building for efficiency and to provide consistent reference points from floor to floor. Ramps and stairs should run in the predominant direction of travel.



(a)
Plan
LED / Sensor Location



(b)
Cross-Section LED / Sensor Examples



(c)
Plan
Recreational Lane Two-Way Traffic

Fig. 402.4.10
Embedded LED Lighting / Sensors

402.5.3 Amenities. Provide amenities along route and group consistently from floor to floor to act as reference points for wayfinding. Provide rest area with seating complying with Section 903, with intervals that do not to exceed 100 feet (30 m) of travel. Provide drinking fountains complying with Section 602. Provide toilet facilities complying with Chapter 6. Provide trash receptacle complying with Section 906. Provide telephones complying with Section 704.

402.5.4 Signage/Wayfinding. Signage/ Wayfinding should comply with relevant sections of Chapter 7 including: emergency assistance, signs, detectable warnings and surfaces, assistive listening systems, two-way communications, signage system, public information display types, directories, room identification system & emergency signage system(s), Wayfinding should comply with Section 714.

402.5.4.1 Emergency Communications. Emergency communications may include but not limited to the following: alarms complying with Section 702, visual two-way communication complying with Section 708.5, information/navigation/alert reference point system complying with Section 708.7, information / emergency virtual terminal complying with Section 708.8, and multisensory information/ emergency kiosks complying with Section 710.4.

402.5.5 Bicycle/Scooter/Tricycle/Hand cycle/ Tandem Bicycle Parking. Bicycle/scooter/ tricycle parking should comply with Section 502.3 and be provided at convenient locations.

402.5.6 Carriage, Stroller and Cart Storage. Carriage, stroller and cart storage should comply with Section 502.4.

402.5.7 Conflicts/Obstructions. Any conflicts and obstructions (e.g., stairs, ramps, doors, lifts, trash receptacles, and drinking fountains), should be kept out of the path of travel. Consider detectable warnings and surfaces complying with Section 705, and multisensory signage system. Refer to Section 714 Wayfinding for additional information.

402.6 Exterior Shelters.

402.6.1 General. Exterior shelters should be provided at rest areas, transportation stops, reference points, places of interest and other locations along exterior routes.

402.6.2 Sidewalk. Provide an unobstructed route around the shelter complying with Section 403.

402.6.3 Entry. Entering and exiting should comply with Section 404.

402.6.4 Seating. Seating should comply with Section 903.

402.6.5 Signage. Signage should comply with Section 710 and should be multisensory. Provide schedule, routes, time and weather for transportation shelters. Where practical, provide directions to closest toilet facilities.

402.6.6 Amenities. Amenities may include newspaper machines, two-way communications, ITM's (e.g. MetroCard), drinking fountain, waste receptacles, etc., complying with Sections 602, 707, 708, and 906.

403 Walking Surfaces

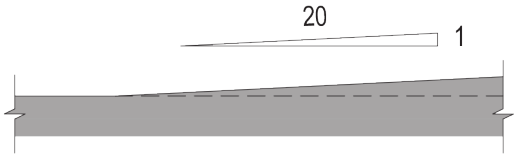
403.1 General. Walking surfaces should comply with Section 403.

403.2 Floor Surfaces. Floor surfaces should comply with Section 302.

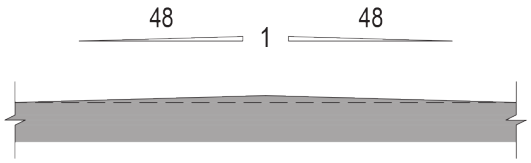
403.2 Advisory. Exterior routes are also addressed under Section 302. Only resort to the code minimums where feasibility is questionable. Avoid irregular textures, r*idge*s, rough or uneven traveling surfaces where possible, and those that have large or protruding joints.

403.2.1 Exterior Walking Surfaces. Walking surfaces should comply with Section 302.5, be well lit with even, firm; and well drained non-slip surface for wet conditions. Joints should be closed and flush for mobility aids. Avoid highly reflective surfaces.

403.3 Slope. The running slope of walking surfaces should not be steeper than 1:20. The cross slope should not be steeper than 1:48.



(a)
Running Slope



(b)
Cross Slope

Fig. 403.3
Walking Surface Slope

403.3 Advisory. Exterior walkways and nature trails often contain slopes that exceed the recommended pitch. Provide information to let users know of conditions that they will encounter along challenging paths, so they can decide for themselves whether they want to traverse them. Consider a difficulty rating system such as those used for hiking and skiing tails. Consider short cuts with steps for people who can walk stairs.

403.4 Changes in Level. Changes in level should comply with Section 303.

403.5 Route Width Clearances. Route clearances should comply with Section 403.5.

403.5.1 Clear Width. Clear width should comply with Section 403.5.1.

403.5.1 Advisory. Tier I is intended for most adult applications. If in doubt use this tier. It meets the legal requirements, comfortably accommodate a large percentage of the population and most building classifications and use groups. Tier II is intended for children up to the age of 12, primarily for *2014 NYCBC,* Section 305.1, Educational Group E (academies, day care facilities, libraries accessory to Group E occupancies and schools). Tier III is intended for Institutional Group I-1 (e.g., adult homes, assisted living facilities, convalescent facilities) and Group I-2 (e.g., adult homes, hospitals and nursing homes). Often a person may use a mobility device in a prone or supine position with legs fully extended or may require the use of a variety of stretcher types. Tier III also addresses the elevator cab requirement of the *2014 NYCBC*, Section 3002.4.2 Elevator Car to Accommodate Ambulance Stretcher.

403.5.1.1 Tier I Primary Route Clear Width. Width of the primary route should be a minimum of 72 inches (1830 mm). Protruding objects should comply with Section 307. Width of the path should accommodate expected volume and 2-way pedestrian traffic. Exterior public sidewalks, as per DOT, should be 96 inches (2440 mm) minimum.

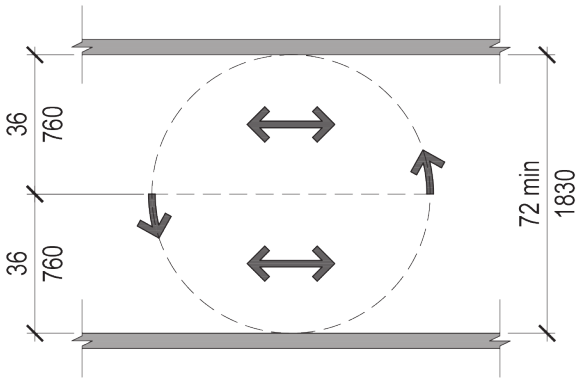


Fig. 403.5.1.1
Tier I Primary Route Clear Width

403.5.1.1.1 Tier I Secondary and Tertiary Route Clear Width. In some instances, a minimum of 72 inches (1830 mm) may not be possible for secondary routes depending on the building classification, size, and configuration. It is recommended these and tertiary routes should be a minimum of 48 inches (1220 mm) in width where the code minimum egress width and door maneuvering clearances requirements do not dictate wider clearances. Provide passing space complying with Section 403.5.3.

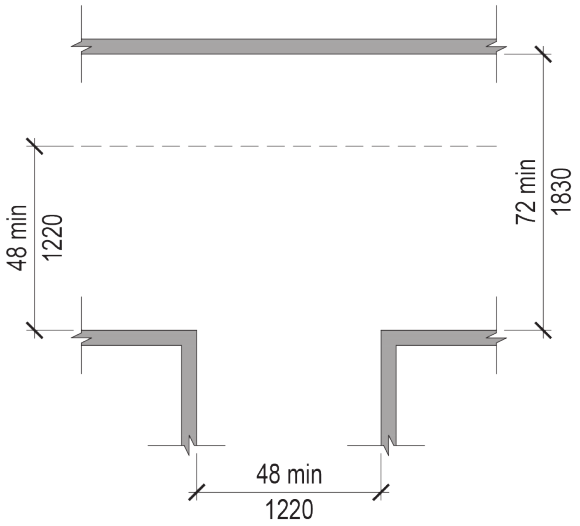


Fig. 403.5.1.1.1
Tier I Secondary and Tertiary Route Clear Width

403.5.1.2 Tier II Primary Route Clear Width. Width of the primary route should be a minimum of 60 inches (1525 mm). Protruding objects should comply with Section 307. Width of the path should accommodate expected volume and 2-way pedestrian traffic. In Group E serving classrooms the required minimum corridor width is 66 inches (1676 mm) as per *2014 NYCBC*, Section 1018.2.

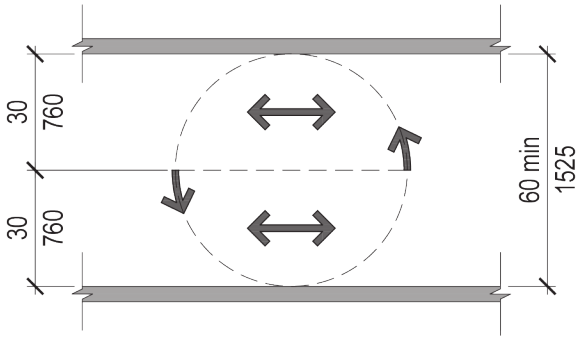


Fig. 403.5.1.2
Tier II Primary Route Clear Width

403.5.1.2.1 Tier II Secondary and Tertiary Route Clear Width. In some instances, a minimum of 60 inches (1525 mm) may not be possible for secondary routes depending on the building classification, size, and configuration. It is recommended these and tertiary routes should be a minimum of 36 inches (915 mm) in width where the code minimum egress width and door maneuvering clearances requirements do not dictate wider clearances. Provide passing space complying with Section 403.5.3.

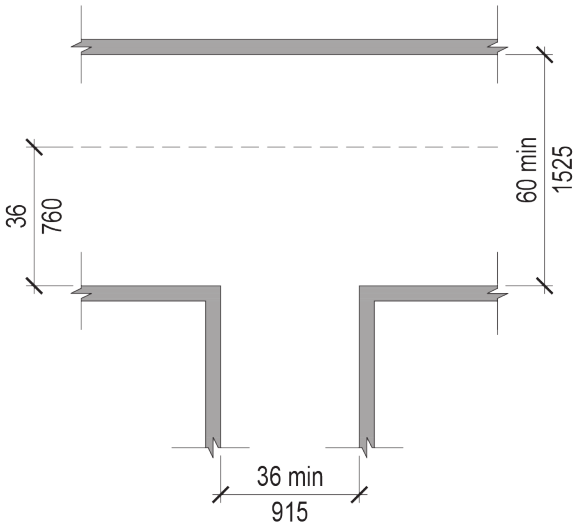


Fig. 403.5.1.2.1
Tier II Secondary and Tertiary Route Clear Width

403.5.1.3 Tier III Primary Route Width. Width of the primary route should be a minimum of 96 inches (2440 mm). Protruding objects should comply with Section 307. Width of the path should accommodate expected volume and 2-way pedestrian traffic.

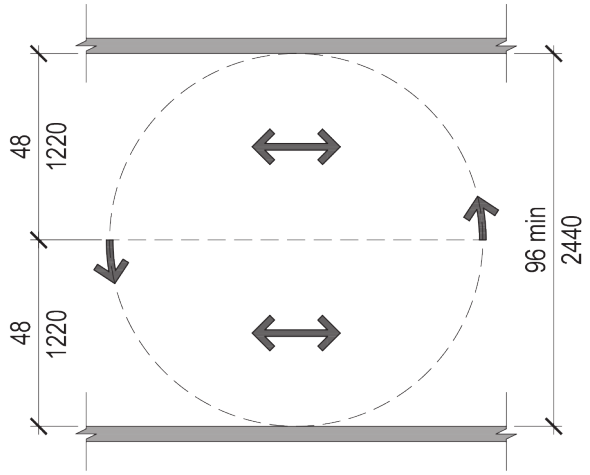


Fig. 403.5.1.3
Tier III Primary Route Clear Width

403.5.1.3.1 Tier III Secondary and Tertiary Routes Clear Width. In some instances, a minimum of 96 inches (2440 mm) may not be possible for secondary routes depending on the building classification, size, and configuration. It is recommended these and tertiary routes should be a minimum of 60 inches (1525 mm) in width where the code minimum egress width and door maneuvering clearances requirements do not dictate wider clearances. Provide passing space complying with Section 403.5.3.

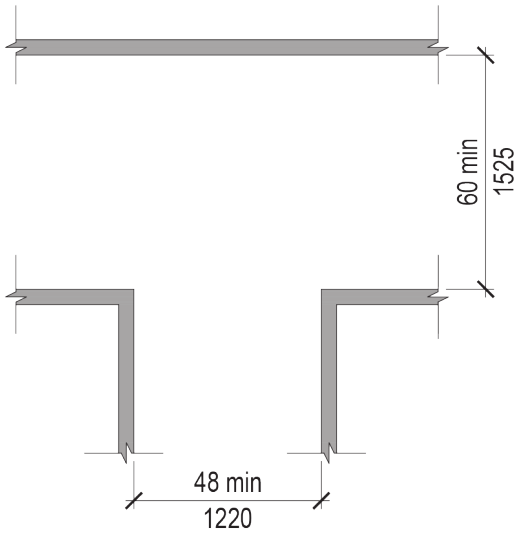
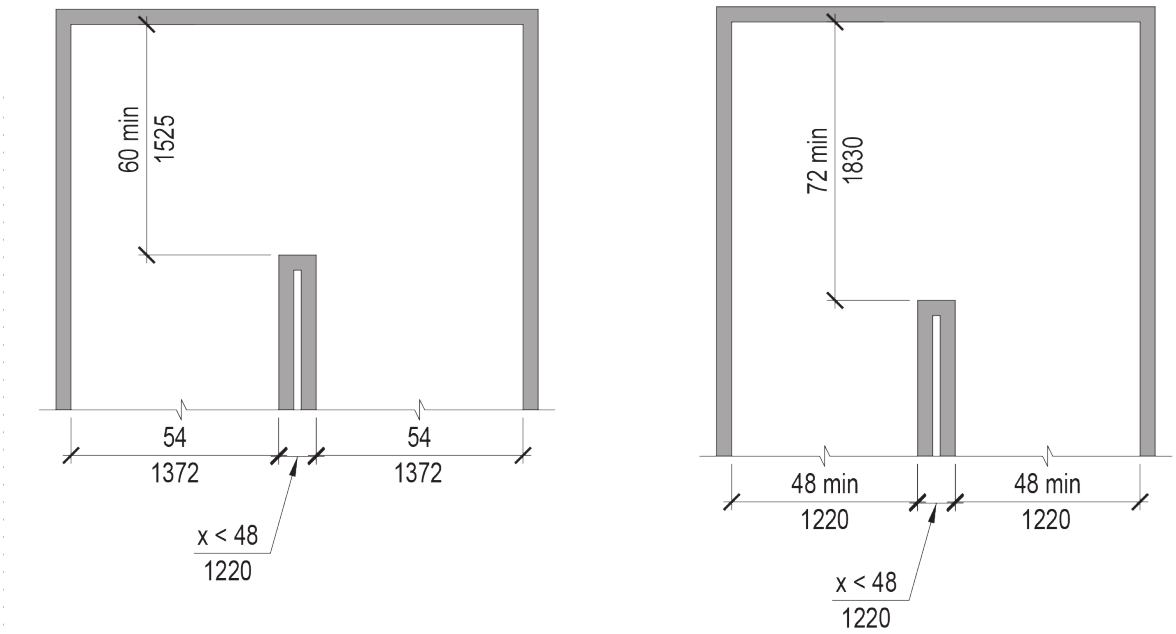


Fig. 403.5.1.3.1
Tier III Secondary and Tertiary Routes Clear Width

403.5.2 Clear Width at Turn. Clear width at turn should comply with Section 403.5.2.

403.5.2.1 Tier I Clear Width at 180 Degree Turn. Where a route makes a 180 degree turn around an object that is less than 48 inches (1220 mm) wide, clear width should be 54 inches (1372 mm) minimum approaching the turn, 60 inches (1525 mm) minimum during the turn and 54 inches (1372 mm) minimum leaving the turn.

ALTERNATE: Where the clear width at the turn is 72 inches (1830 mm) minimum, the route approaching and leaving the turn should be 48 inches (1220 mm) minimum in width.



(a)
180 Degree Turn

(b)
180 Degree Turn Alternate

Fig. 403.5.2.1
Tier I Clear Width at 180 Degree Turn

403.5.2.1.1 Tier I Clear Width at 90 Degree Turn. Where a route makes a 90 degree turn around an object that is greater than 48 inches (1220 mm) wide, clear width should be 48 inches (1220 mm) minimum approaching and leaving the turn.

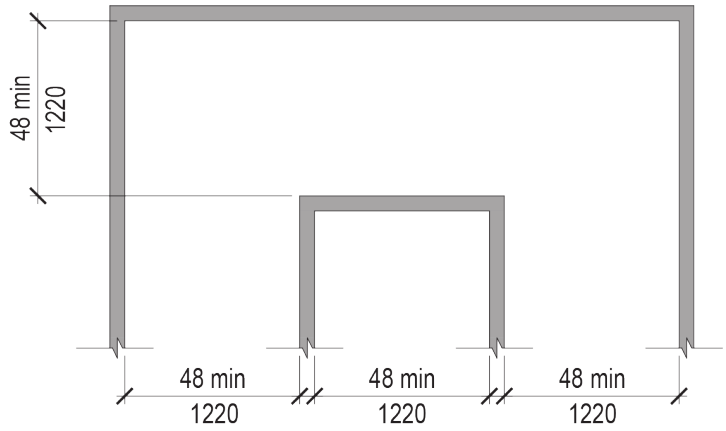
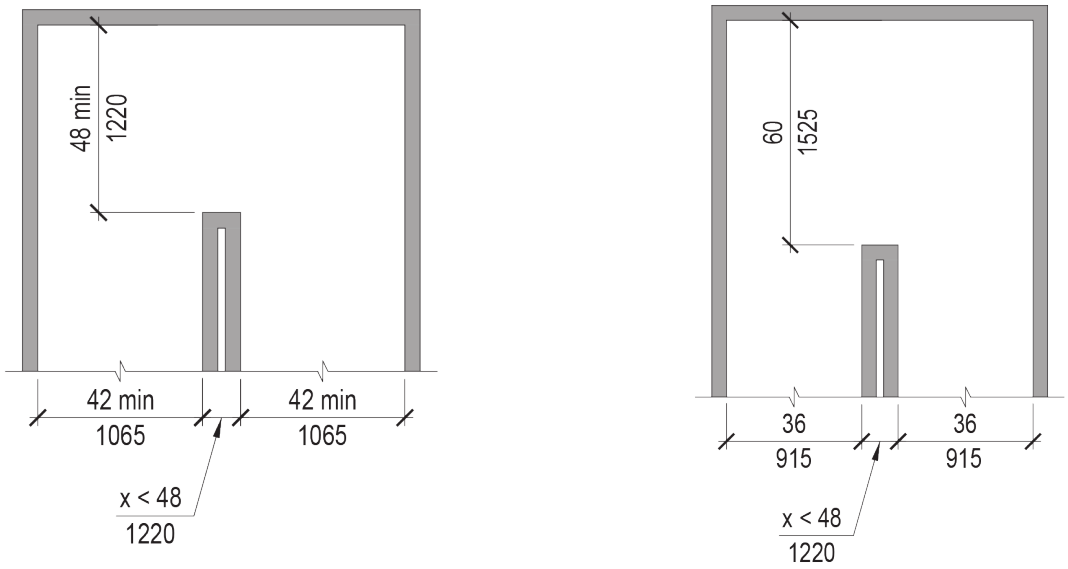


Fig. 403.5.2.1.1
Tier I Clear Width at 90 Degree Turn



(a)
180 Degree Turn

(b)
180 Degree Turn Alternate

Fig. 403.5.2.2
Tier II Clear Width at 180 Degree Turn

403.5.2.2 Tier II Clear Width at 180 Degree Turn. Where a route makes a 180 degree turn around an object that is less than 48 inches (1220 mm) wide, clear width should be 42 inches (1065 mm) minimum approaching the turn, 48 inches (1220 mm) minimum during the turn and 42 inches (1065 mm) minimum leaving the turn.

ALTERNATE: Where the clear width at the turn is 60 inches (1525 mm) minimum, the route approaching and leaving the turn should be 36 inches (915 mm) minimum in width.

403.5.2.2.1 Tier II Clear Width at 90 Degree Turn. Where a route makes a 90 degree turn around an object that is greater than 48 inches (1220 mm) wide, clear width should be 36 inches (915 mm) minimum approaching and leaving the turn.

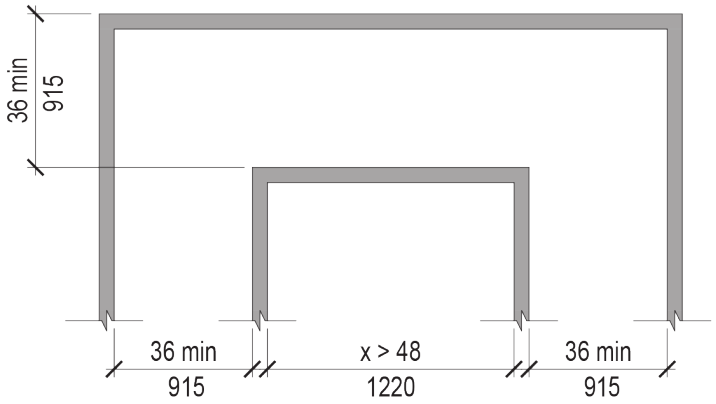
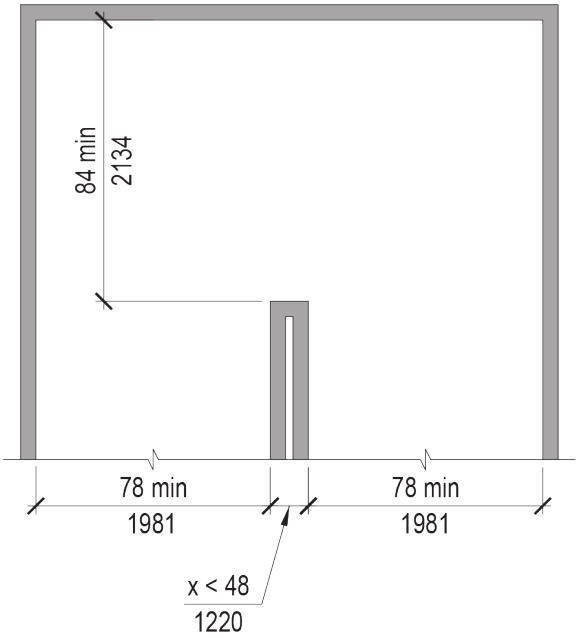
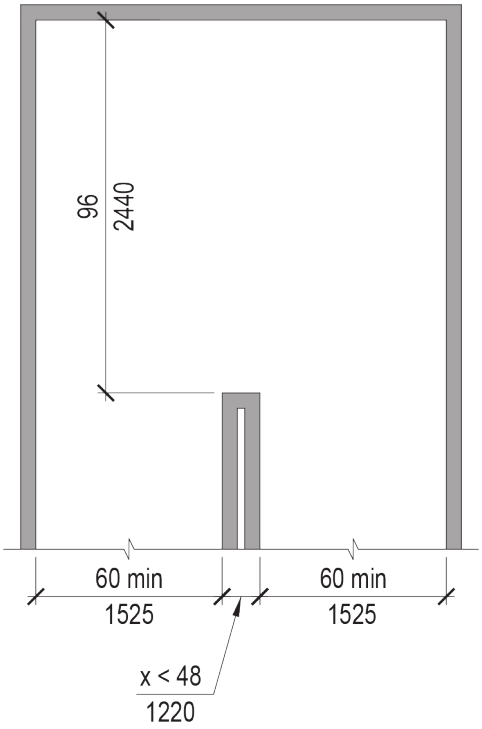


Fig. 403.5.2.2.1
Tier II Clear Width at 90 Degree Turn



(a)
180 Degree Turn



(b)
180 Degree Turn Alternative

Fig. 403.5.2.3
Tier III Clear Width at 180 Degree Turn

403.5.2.3 Tier III Clear Width at 180 Degree Turn. Where a route makes a 180 degree turn around an object that is less than 48 inches (1220 mm) wide, clear width should be 78 inches (1981 mm) minimum approaching the turn, 84 inches (2134 mm) minimum during the turn and 78 inches (1981 mm) minimum leaving the turn.

ALTERNATE: Where the clear width at the turn is 96 inches (2440 mm) minimum, the route approaching and leaving the turn should be 60 inches (1525 mm) minimum in width.

403.5.2.3.1 Tier III Clear Width at 90 Degree Turn. Where a route makes a 90 degree turn around an object that is greater than 48 inches (1220 mm) wide, clear width should be 60 inches (1525 mm) minimum approaching, during and leaving the turn.

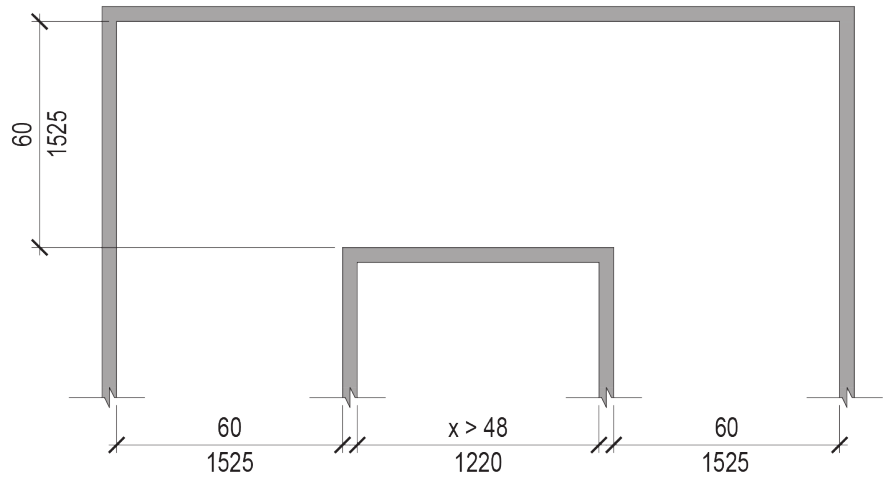
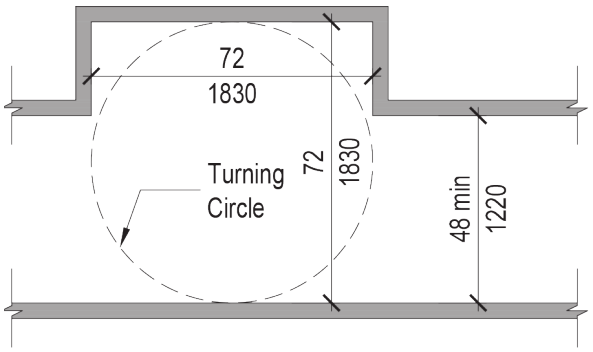
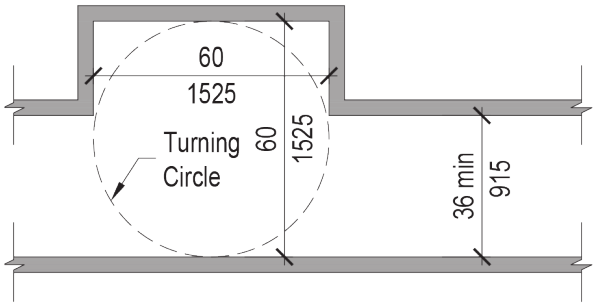


Fig. 403.5.2.3.1
Tier III Clear Width at 90 Degree Turn

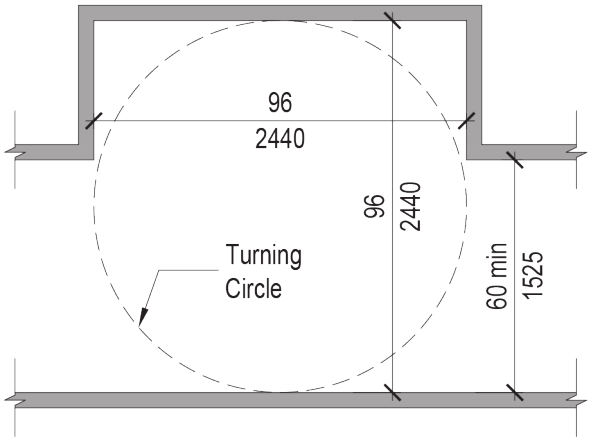
403.5.3 Passing Spaces for Secondary and Tertiary Routes. Where it is not possible to provide a route with a continuous width, provide passing spaces at intervals of 100 feet (30 m) maximum. Passing space should accommodate the turning circle of the particular tier: Tier I, 72 inches (1830 mm); Tier II, 60 inches (1525 mm); Tier III, 96 inches (2440 mm).



(a)
Tier I



(b)
Tier II



(c)
Tier III

Fig. 403.5.3
Passing Spaces for Secondary and Tertiary Routes

403.5.4 Corridor Dead Ends for Secondary and Tertiary Routes. Dead end corridors should comply with Section 403.5.4.

403.5.4.1 Tier I. Provide a 72 inch (1830 mm) turning space complying with Section 304 for the termination point of a dead end corridor. Consider 2-way communication at isolated dead ends.

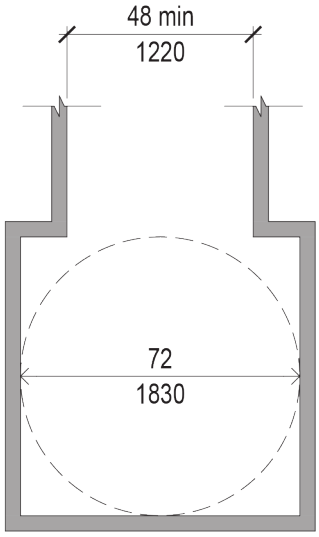


Fig. 403.5.4.1
Tier I Corridor Dead End

403.5.4.2 Tier II. Provide a 60 inch (1525 mm) turning space complying with Section 304 for the termination point of a dead end corridor. Consider 2-way communication at isolated dead ends.

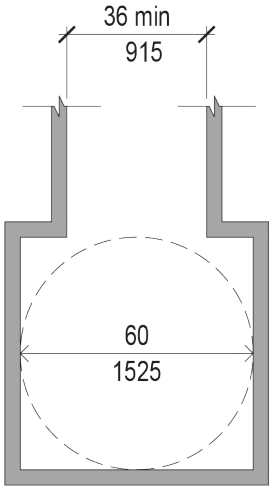


Fig. 403.5.4.2
Tier II Corridor Dead End

403.5.4.3 Tier III. Provide a 96 inch (2440 mm) turning space complying with Section 304 for the termination point of a dead end corridor. Consider 2-way communication at isolated dead ends.

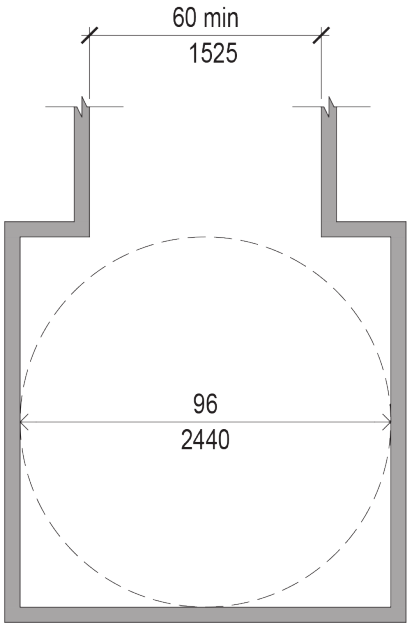


Fig. 403.5.4.3
Tier III Corridor Dead End

403.5.5 General Room and Space Circulation. General room and space circulation should comply with Section 403.5.3.

403.5.5 Advisory. Circulation within a room or space should provide a minimum of 36 inches clear and a turning circle complying with Section 304 at dead ends. It is recommended to provide wider circulation in larger rooms 48 inches or wider depending upon the type of space and function (e.g. 72 inches for the main aisle in a courtroom) occupancy load, and anticipated user traffic and other considerations. Refer to *2014 NYCBC,* Section 1104 regarding minimum route requirements for specific types of spaces (e.g., employee work areas, press boxes, multilevel buildings and facilities). In some specific spaces a minimum route is not required [e.g., common use circulation paths located within employee work areas less than 300 square feet (27.9 m2)].

403.5.5.1 Tier I General Room and Space Circulation. Unless specifically provided in other sections of the *IDG*, circulation within rooms and spaces should be provided with a 48 inch (1220 mm) minimum circulation path. Primary circulation route in rooms and spaces larger than 300 square feet (27.9 m2) should comply with Section 403.5.1 or Section 403.5.2.

403.5.5.2 Tier II General Room and Space Circulation. Unless specifically provided in other sections of the *IDG*, circulation within rooms and spaces should be provided with a 36 inch (915 mm) minimum circulation path. Primary circulation route in rooms and spaces larger than 300 square feet (27.9 m2) should comply with Section 403.5.1 or Section 403.5.2.

403.5.5.3 Tier III General Room and Space Circulation. Unless specifically provided in other sections of the *IDG*, circulation within rooms and spaces should be provided with a 54 inch (1372 mm) minimum circulation path. Primary circulation route in rooms and spaces larger than 300 square feet (27.9 m2) should comply with Section 403.5.1 or Section 403.5.2.

403.6 Handrails. Where handrails are provided at the sides of a corridor, they should comply with Sections 505.

403.6 Advisory. Corridors acting as ramps should be provided with handrails on both sides. Handrails also function as wayfinding.

403.7 Illumination. Lighting along routes should be consistent and even, without producing strong shadows, hot spots, or dark areas. Glare should be reduced to a minimum when possible by the use of materials and finishes. Where there are different lighting levels, provide a gradual transition.

403.8 Wayfinding. Wayfinding should comply with Section 714.

403.9 Signage. Signage should comply with Section 703.

403.10 Detectable warnings. Detectable warnings should comply with Section 705

403.11 Moving Walkways. Automatic walkways should comply with Section 403.11 and *ASME A17.1/CSA B44-2013, Safety Code for Elevators and Escalators*, Section 6.2 Moving Walks. When an automatic walkway is used, an adjacent route complying with Section 403 should be provided.

403.11 Advisory. Moving walkways are appropriate for large scale facilities such as airports, arenas, train stations and malls. They assist a wide range of users such as people who use mobility devices, parents with children, the elderly, people with baggage and packages, etc. They provide efficient ingress, egress and navigation through a facility, and function as wayfinding to direct visitors to primary spaces.

403.11.1 Angle of Inclination. The angle of inclination from the horizontal should not exceed (1:20) within 60 inches (1525 mm) of the entrance and egress ends. It should not exceed (1:8) at any point.

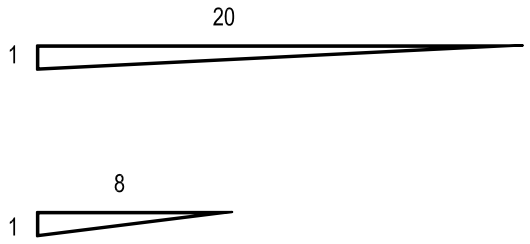


Fig. 403.11.1
Angle of Inclination
of Moving Walkways

404 Doors, Doorways and Gates

404.1 General. Doors, doorways and gates should comply with Section 404.

404.1 Advisory. Automatic doors are recommended. At entrances they provide hands-free ease of access for everyone. Consider automatic sliding doors to eliminate conflict with arc of swinging doors. Refer to Section 404.3. Consider the use of designated entrance and exit doors to control the flow of pedestrian traffic especially for facilities that have a high occupancy load. All doors should provide emergency egress. If any doors are not inclusive, signage should be provided to the nearest inclusive doorways (See Local Law 47/12 regarding directional signage). Revolving door and revolving turnstiles should not be part of an inclusive route. Automatic doors make sense in high traffic facilities and buildings with strong maintenance programs (commercial, institutional, luxury residential buildings, etc.) There can be problems with sequencing of exterior and vestibule doors in cold weather (e.g. blasts of cold air when outside doors do not close before vestibule doors open). Automatic doors address the excessive exterior opening force required to overcome weather/ wind infiltration and pressure differences. The *2010 ADA Standards* and *A117.1-2009* do not contain opening force for exterior doors because the manual force required is excessive and not usable by some people. Automatic doors easily resolve the problem.

404.1.1 Building Entrances. Building entrances should comply with the following as applicable:

1. All entrances should be inclusive. Stairs are supplemental to the primary means to the entrance. Automatic doors complying with Section 404.3 are recommended.

2. Separate entry and exits for large facilities to control traffic flow are recommended.

3. Consider the use of large doors and large maneuvering clearances at primary entrances to large facilities that exceed the recommendations of Section 404.2.2.

4. Provide shade and weather protection at all entrances.

5. Regardless of required egress exits, all entrance doors should provide inclusive ingress and egress.

6. Provide a vestibule, space, lobby or other area on the interior side of primary entrance.

7. If any entrances are not inclusive provide directional signage to inclusive entrances.

8. In applicable building classifications such as institutional and mercantile, provide a help desk complying with Section 710.5, directories complying with Section 711.

9. Provide seating complying with Section 903 for adults and children.

10. Locate help desk, bathrooms, drinking fountains, telephones, trash receptacle, directories, seating area, and other amenities within close proximity of the primary entrance(s).

11. Provide two-way communications complying with Section 708.

12. Entrances for dwelling units should comply with Section 1002.

13. Shield direct view to electric light sources at entrances to reduce harshness .

14. Glass doors should be distinguished from adjacent glazing and markers and signage should contrast with background.

15. Slope entire entry clearance away from threshold. Do not slope to drain within the clearance to avoid increased slope or potential water/ice accumulation.

404.2 Manual Doors, Doorways and Manual Gates. Manual doors, doorways and manual gates, including ticket gates, should comply with the requirements of Section 404.2.

404.2.1 Double-Leaf Doors, Doorways and Gates. Where double leaf doors are provided, both leaves of doorways should comply with Sections 404.2.2 and 404.2.3.

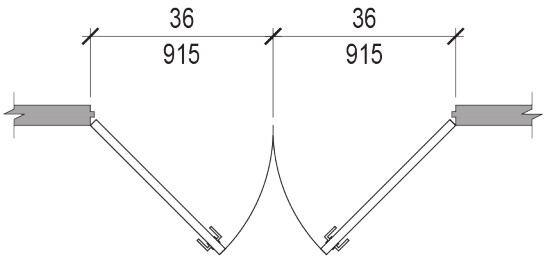
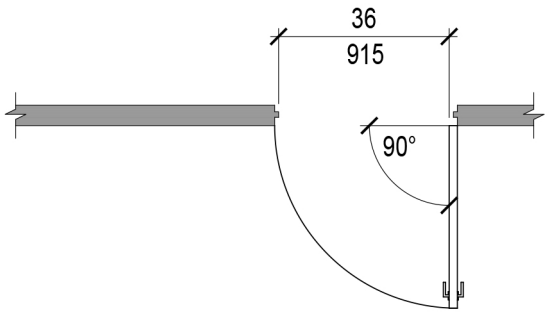


Fig. 404.2.1
Double-Leaf Doors, Doorways and Gates

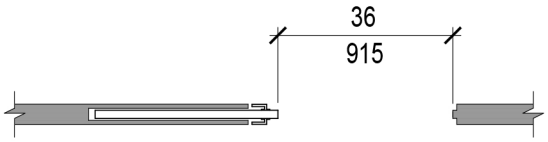
404.2.2 Clear Width. Doorways should have a clear opening width of 36 inches (915 mm) minimum. Clear opening width of doorways with swinging doors should be measured between the face of the door and stop, with the door open 90 degrees. There should be no projections into the clear opening width.

EXCEPTION: Door closers and doorstops should be permitted to be 78 inches (1980 mm) minimum above the floor.

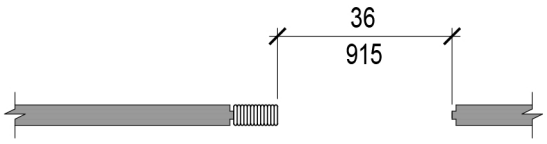
404.2.2 Advisory. A 36-inch clear opening requires a minimum 38-inch wide door. When ordering doors, add 2 inches to the door size to accommodate the door face projecting into the opening as well as the stop with the door open at a 90 degree angle. Replacing standard hinges with swing-clear-offset-hinges swings the door clear of the opening adding approximately 2" of additional clearance. Use of 38 inch doors (36 inch clear opening) may cause problems where space is tight, such as apartment layouts in affordable housing. Note that the NYS Division of Housing and Community Renewal (DHCR) *Visitability Standards,* call for a 36-inch door, not opening. This produces an opening that provides more maneuvering clearance than the 32-inch clear code requirement. Also, hardware impacts should be considered for wider doors, especially those with closers, to determine if doors will be harder to open. Some facilities may require wider doors to accommodate equipment and devices [e.g., *2014 NYCBC*, Sect. 1008.1.1.1 Group I-2, for movement of beds. Provide a clear width not less than 41.5 inches (1054mm)].



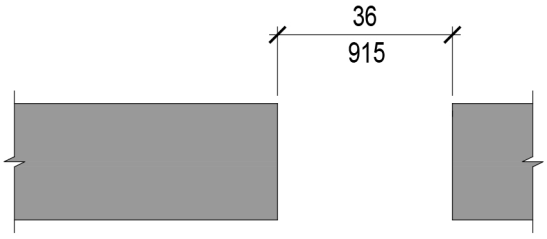
(a)
Hinged



(b)
Pocket/Sliding



(c)
Folding



(d)
Doorways Without Doors

Fig. 404.2.2.
Clear Width of Doorways

404.2.2.1 Tier III Clear Width. Doorways should have a clear opening width of 44 inches (1118 mm) minimum.

404.2.2.1.1 Swing Clear Offset Hinges. These hinges are an inexpensive and easy means to widen the clear width of an existing doorway by increasing the opening by approximately 2 inches (51 mm).

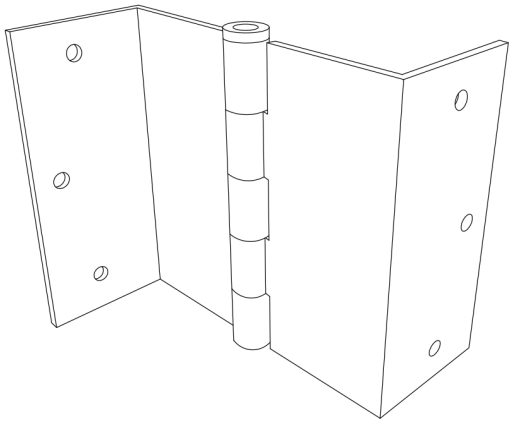
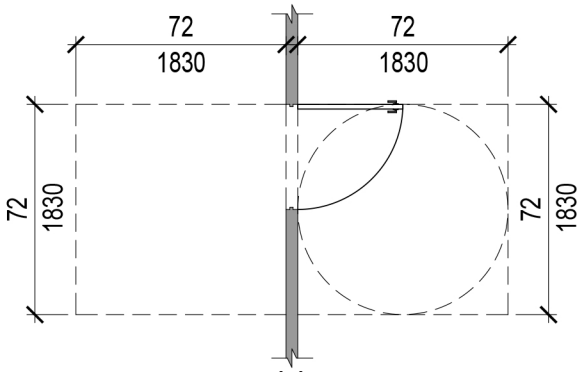


Fig. 404.2.2.1.1
Swing Clear Offset Hinge

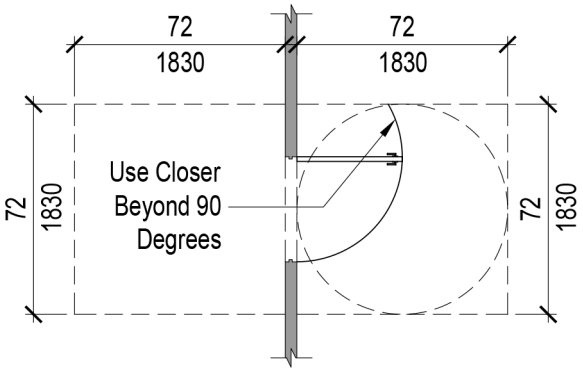
404.2.2.2 Door Swing Beyond 90 Degrees. Doors that are allowed to swing greater than 90 degrees should comply with Section 404.2.7 and 404.2.8.

404.2.2.2 Advisory. Doors are typically shown at 90 degrees as the standard position to measure legal clear opening width, but also allows the occupant to be able to close the door and to enter the room without excessive maneuvering. There are many situations where it is advantageous to swing the door beyond the 90 degrees especially to increase the maneuvering clearance. Tight clearances in some buildings may prevent over-swing. Often the space behind doors is used inappropriately, defeating the purpose.

404.2.3 Maneuvering Clearances. Maneuvering clearances at doors and gates should comply with Section 404.2.3 and should include the full clear opening width of the doorway. Maneuvering clearances should be provided on both sides of the door. This is especially important for a 2-way swinging door. Door should be located off center, adjacent to clear floor space boundary for hinge approach pull side.



(a)
Off Center



(b)
Centered

Fig. 404.2.3
Maneuvering Clearances at Doorways

404.2.3 Advisory. The maneuvering clearance allows enough space for motorized scooters, other mobility devices, and accommodates most configurations and variety of occupants. The 72-inch clearance may not be possible in some conditions and building types (e.g. apartment buildings with a 5'-0" wide corridor). Please note that maneuvering clearances as per *A117.1 - 2009, Figure 404.2.3.2 Maneuvering Clearance at* Manual Swinging Doors (c) Hinge Approach Pull Side, requires a minimum 60 inch corridor and a 36 inch side clearance that is accommodated by placing clearance adjacent to the door.

404.2.3.1 Door Type. Swing, sliding, folding doors and doorways without doors should have a maneuvering clearance 72 inches (1830 mm) wide and 72 inches (1830 mm) long.

404.2.3.2 Recessed Doors. Recessed doors should have a maneuvering clearance of 72 inches (1830 mm) wide and 72 inches (1830 mm) long from the face of the door.

404.2.3.3 Floor Surface. Floor surface within the maneuvering clearance should be an unobstructed plane with a slope not steeper than 1:48 and should comply with Section 302.

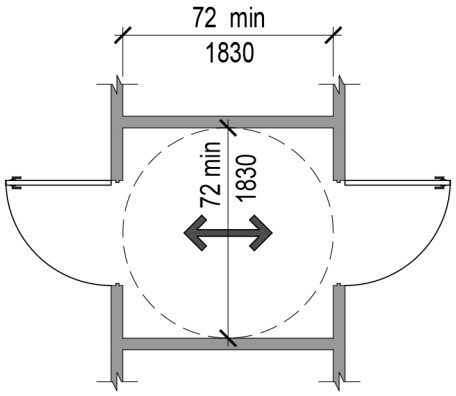
404.2.3.3 Advisory. Floor surface recommendations contained in Section 302 apply to maneuvering clearances including: materials, opening, slip resistance, tactile surface characteristics, lippage and surface distortion. They may be used as part of the wayfinding system complying with Section 714. The clear floor space should contain a single plane that posses no tripping or tipping hazards.

404.2.4 Thresholds. Thresholds should comply with Section 404.2.4.

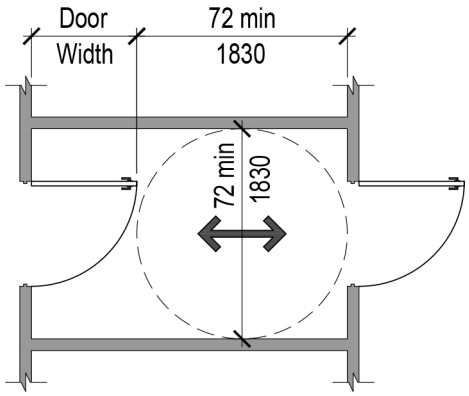
404.2.4.1 Interior Doorway Thresholds. Interior doorways containing thresholds or any surface changes are not recommended.

404.2.4.2 Exterior Doorway Thresholds. Exterior doorways containing thresholds or any surface changes are not recommended. If a threshold is provided due to weather protection, it should comply with Section 303.

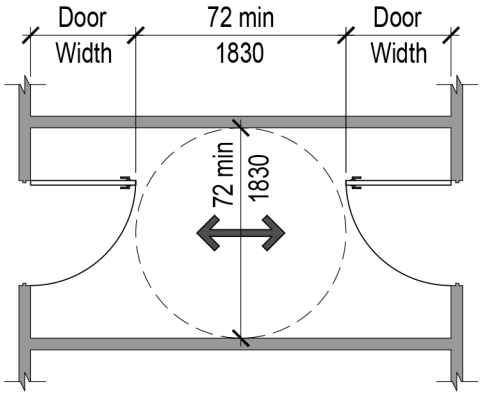
404.2.5 Two Doors and Gates in Series. Distance between two hinged or pivoted doors or gates in series should be 72 inches (1830 mm) plus the width of any door swinging into the space. The space between doors should provide a clear turning space complying with Section 304.



(a)
Outward Facing



(b)
Inward / Outward Facing



(c)
Inward Facing

Fig 404.2.5
Two Doors in a Series

404.2.6 Door and Gate Hardware. Handles, pulls, latches, locks, and other operable parts on doors should have a shape that is easy to grasp with one hand and does not require tight grasping, pinching, or twisting of the wrist to operate and complying with Section 309. Operable parts of such hardware should be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum above the floor. Push plates for 1-way and 2-way swinging doors should be within and should extend beyond this range. Push plates require less dexterity and can be used for a variety of alternate operational scenarios complying with Section 309.4.1. Where sliding doors are in the fully open position, operating hardware should be exposed and usable from both sides.

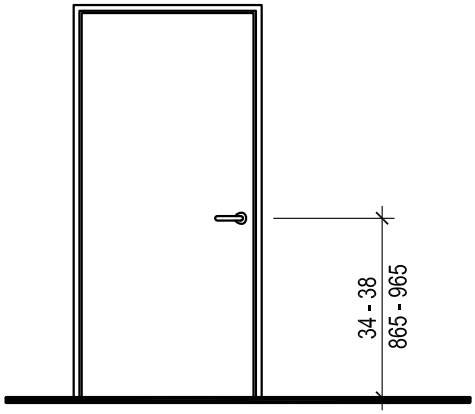


Fig. 404.2.6
Door Hardware

404.2.6 Advisory. Two peepholes in a door allow use from both a seated and standing positions complying with Section 1002. Glazing in doors allows users to see people approaching from the other side and should comply with Section 404.2.10.

404.2.6.1 Supplemental Fully Manual Locksets. Consider fully manual locksets without automatic spring loaded latching / handle return for institutional and other environments for people who use wheelchairs and others that have diminished hand and arm dexterity. This allows sequential operation.

404.2.6.1 Advisory. 1, Optional door hardware that includes fully manual locksets and semi-automatic door openers help people who use mobility devices and others who have diminished hand and arm dexterity. Fully manual locksets allow the user to avoid concurrent tasks. Semi-automatic door openers comprising a spring loaded mechanism will also reduce the concurrent maneuvers by popping the door open just enough to allow the user to manually open it the rest of the way. 2, Avoid concurrent tasks since sequential tasks are usually easier for some institutional environments. 3, Operation should be as intuitive as possible. 4, Note that rated doors require automatic latching.

404.2.7 Non-Electric Door Closers and Openers. Should comply with Section 404.2.7.

404.2.7.1 Non-Electric Door Closers.

404.2.7.1.1 Closer Devices. Door closers should be adjusted so that from an open position of 90 degrees, the time required to move the door to an open position of 12 degrees should be 5 seconds.

404.2.7.1.2. Spring Hinges. Door spring hinges should be adjusted so that from the open position of 70 degrees, the door should move to the closed position in 1.5 seconds minimum. Due to short closing duration, spring hinges are not recommended unless duration can be increased to comply with Section 404.2.7.1.1.

404.2.7.2 Non-Electric Partial Door Opener. Door openers should open the door from a closed position to an open position of 12 degrees in 1.5 seconds. This device should not be used on fire doors, or where it conflicts with other life safety codes.

404.2.8 Manual Door-Opening Force. Fire doors should have the minimum opening force allowable by the appropriate administrative authority. The force for pushing or pulling open doors other than fire doors should be as follows:

1. Interior hinged door: 5.0 pounds (22.2 N) maximum.

2. Sliding or folding door: 5.0 pounds (22.2 N) maximum.

These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

404.2.8 Advisory. Exterior door opening force. The *2010 ADA Standards and A117.1-2009* do not contain door opening force for exterior doors because the excessive exterior opening force required to overcome weather/wind infiltration and pressure differences. The manual force required to open the door makes it unusable by some people when it exceeds 5.0 pounds (22.2 N). Automatic doors easily resolve the problem. The weakness to this strategy is that the door should still be usable if the power fails, but for some with diminished abilities that is not viable.

404.2.9 Door Surface. Door surfaces within 10 inches (255 mm) of the floor, measured vertically, should be a smooth surface on the push side extending the full width of the door. Parts creating horizontal or vertical joints in such surface should be within 1/16 inch (1.6 mm) of the same plane as the other. Cavities created by added kick plates should be capped.

EXCEPTIONS:

1. Sliding doors.

2. Tempered glass doors without stiles and having a bottom rail or shoe with the top leading edge tapered at no less than 60 degrees from the horizontal should not be required to meet the 10 inch (255 mm) bottom rail height requirement.

3. Doors that do not extend to within 10 inches (255 mm) of the floor.

4. Kickplates should extend 10 inches (255 mm) minimum above the floor.

404.2.10 Vision Lites. Doors, gates and sidelites adjacent to doors or gates containing one or more glazing panels that permit viewing through the panels should have the bottom of at least one panel on either the door or an adjacent sidelite 43 inches (1090 mm) maximum above the floor. This bottom edge should be 28 inches (712 mm) maximum for children's facilities. Provide safety glazing. Consider electrochromic glazing (smart glass) for privacy that when activated changes from translucent to transparent.

EXCEPTIONS: Vision lites with the lowest part more than 66 inches (1675 mm) above the floor are not required to comply with Section 404.2.10. This exception does not apply to children's facilities.

404.2.11 Marking of Transparent Doors and Fixed Adjacent Transparent Sidelights. Refer to Section 404.5 for recommendation for marking as per the *2014 NYCBC* Section BC 2410.

404.2.10 Advisory. Vision lights either in or adjacent to the door are strongly recommended at primary entrances or for doors where there are potential pedestrian traffic conflicts. The vision lights help the occupants to see what is coming and to enhance their orientation. This is especially true for institutional facilities such as hospitals.

404.3 Automatic Doors and Power Assisted Doors and Gates. Automatic doors and power assisted doors and gates should be provided at all public entrances and vestibules and comply with Section 404.3. Fully powered automatic doors should comply with *ANSI/BHMA A156.10-2006 Power Operated Pedestrian Doors* listed in Section 105.2.6. Power-assisted and low-energy doors should comply with *ANSI/BHMA A156.19-2002 Power Assist and Low Energy Power Operated Doors* listed in Section 105.2.5. Provide emergency back-up power.

EXCEPTION: Doors, doorways, and gates designed to be operated only by security personnel should not be required to comply with Section 404.3.5.

404.3 Advisory. An automatic door opener provides easiest access to the greatest number of people. Persons with diminished mobility have difficulty performing a series of overlapping maneuvers like pulling the door open while operating the hardware; avoiding the arc of the door swing and navigating through the opening while the door closes. It is a far better solution to use fully automatic doors and perhaps fully automatic sliding doors to eliminate swing arc conflicts. Full powered automatic doors should comply with *ANSI/BHMA A156.10;* power-assist and low-energy doors should comply with *ANSI/BHMA A156.19* Provide back-up power. Provide a fail safe in case of power failure so that the doors can operate in manual mode. Automatic doors and gates should be provided for all high occupancy facilities.

404.3.1 Clear Opening Width. Doorways should have a clear opening width of 36 inches (900 mm) in power-on and power-off mode.

404.3.2 Maneuvering Clearances Maneuvering clearances at power-assisted doors and gates should comply with 404.2.3.

404.3.3 Thresholds. Thresholds and changes in level at doorways should comply with Section 404.2.4.

404.3.4 Two Doors in Series. Doors in series should comply with Section 404.2.5.

404.3.5 Control Switches. Opening devices should include push button/plate, floor mat, motion sensor, and card readers. Time delay should be 10 seconds with an obstacle sensor that will delay door closing.

404.3.5.1 Wall Switch Control Location. Push button/plate and card readers should be 36 inches (915 mm) from the latch side of the door opening, 34 inches (865 mm) to 38 inches (965 mm) above the floor.

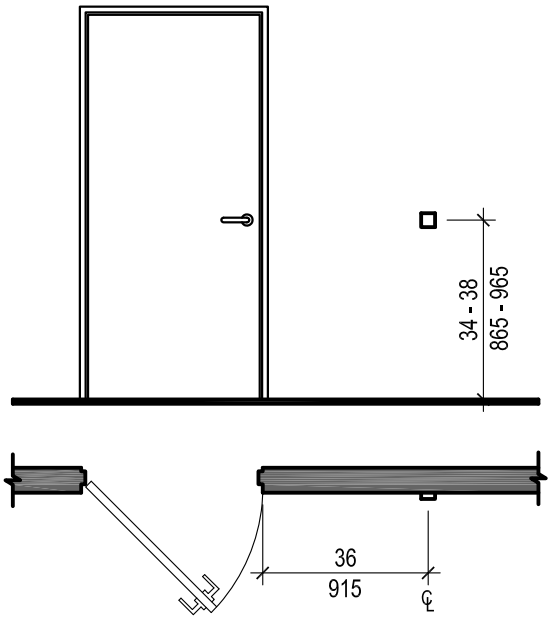


Fig. 404.3.5.1
Wall Switch Control Location

404.3.5.2 Floor Mat Location. Floor mat location should comply with *ANSI/BHMA 156.10* as per Section 105.2.

404.3.6 Manual Override. Automatic doors should be provided with a manual override for manual operation of doors with door hardware per Section 404.2.6. Handles and pulls should be centered 34 inches (865 mm) to 38 inches (965 mm) above the floor. Where sliding doors are in the fully open position, operating hardware should be exposed and usable from both sides for manual operation. All automatic locks must contain a manual override to avoid entrapment (e.g., single occupant restrooms).

404.4 Signage. Signage and location should comply with Section 703. Tactile signage should comply with Section 703.3. Room identification system should comply with Section 712.

404.5 Marking of Transparent Doors and Fixed Adjacent Transparent Sidelights. As per the *2014 NYCBC* Section BC 2410 and specifically Section 2410.3 Locations: "Transparent doors and fixed adjacent transparent sidelights shall be marked in two areas on the glass surface. One such area shall be located at least 30 inches (762 mm) but more than 36 inches (914 mm) above the ground, floor or equivalent surface below the door or sidelight and the other at least 60 inches (1524 mm) but not more than 66 inches (1676 mm) above the ground, floor or equivalent surface below the door or sidelight." Refer to BC 2410 for additional information and requirements.

405 Ramps

405.1 General. Ramps should comply with Section 405.

405.2 Slope. Ramp runs should have a running slope from 1:16 to 1:20.

EXCEPTION: In existing building and facilities, where such slopes are not feasible, the grade change may be addressed by elevator or for very limited applications, a lift.

405.2 Advisory. When the slope of a ramp is steeper than 1:16, navigation becomes difficult for a person using a mobility device, and those with diminished mobility. Ramp slopes of 1:16 to 1:20 may be more usable, but many existing urban sites and building conditions may not accommodate the longer ramps and landings.

405.3 Cross Slope. Cross-slope of the ramp runs should not be steeper than 1:48. Ramps subject to wet conditions should be provided with drainage.

405.4 Floor Surfaces. Floor surfaces of the ramp run should comply with Section 302.

405.5 Clear Width. The clear width of a ramp run should be 44-48 inches (1065 mm to 1220 mm) measured between handrails. *Means of egress ramp width should be 44 inches (1118 mm) minimum and comply with requirements for corridors as per the 2014 NYCBC Section 1010.5.1.* High traffic two-way ramps should be 72 inches (1830 mm) minimum with separating handrails.

405.5 Advisory.

1. Ramps should be wide enough to accommodate the expected peak traffic flow and may exceed recommended width.

2. In locations such as transportation hubs and sports complexes, with wide ramps, consider a 44-48 inch ramp within the wider ramp. For some people, navigating up or down a ramp requires the use of handrails on both sides.

3. The additional clearance above the 36-inch code minimum will be welcome for people that use mobility devices, people of larger stature, people that require an assistant and others that prefer the additional maneuvering clearance. A narrower ramp may be more accommodating to people of smaller stature and some children that use both handrails. The 44-inch width is more forgiving by providing a greater margin of maneuvering error resulting in a safer ramp. Two walking people passing each other on a ramp run is also more accommodating with the larger width.

4. The 72-inch two-way ramp is influenced by *2014 NYCBC* Section 1010.5.1.

5. Two-way traffic can typically be accommodated with rest areas and landings on narrower ramps.

6. The means of egress requirement for specific ramps used for egress is important for establishing the minimum width. Examine *2014 NYCBC* Section 1010.5.1 width.

405.5.1 Design. As per *2014 NYCBC* Section 2410.4 Design: " The marking design shall be at least 4 inches (102 mm) in diameter if circular or 4 inches (102 mm) in its least dimension if elliptical, or shall be at least 12 inches (305 mm) in horizontal dimension if the marking is less than 4 inches (102 mm) in its least dimension. In no event shall the vertical dimension of any marking including lettering be less than 11/2 inches (38 mm) in height."

405.5.2 Materials. As per *2014 NYCBC* Section 2410.5 Materials: "Markings may comprise, but are not limited to:

1. Muntin bars, separate bars or other equivalent bars;
2. Chemical etching;
3. Sandblasting;
4. Adhesive strips
5. Decals; or
6. Paint, gilding or other opaque marking materials.

405.6 Rise. The rise for any ramp run segment should be 30 inches maximum.

405.7 Landings. Ramps should have entry landings at the bottom and top of the ramp assembly. Landings should comply with Section 405.7.1.

405.7.1 Slope. Landing should have a slope not steeper than 1:48 and should comply with Section 302.

405.7.2 Entry Landing Width. Landing should have a clear width of 72 inches (1830 mm).

405.7.2.1 Tier III Entry Landing Width. Landing should have a clear width of 96 inches (2440 mm).

405.7.3 Entry Landing Length. Landing should have a clear length of 72 inches (1830 mm).

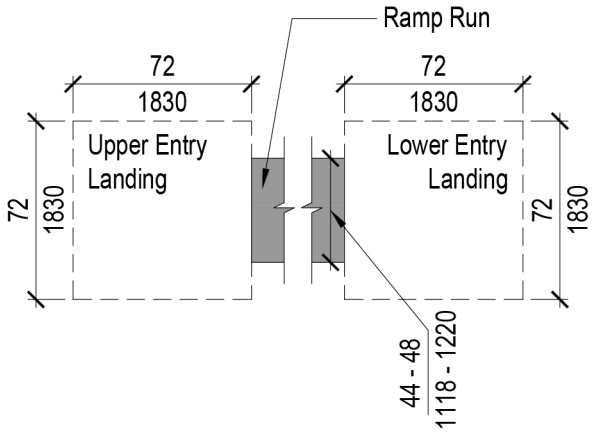
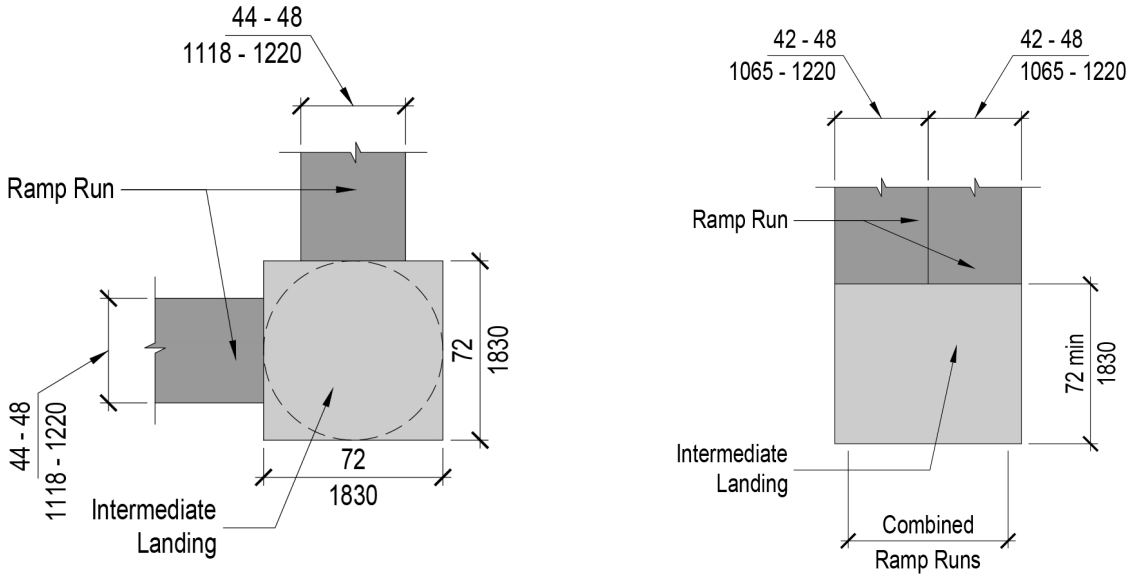


Fig. 405.7.3
Ramp Entry Landings

405.7.3.1 Tier III Entry Landing Length. Landing should have a clear length of 96 inches (2440 mm).



(a)
90 Degree Turn

(b)
180 Degree Turn

Fig. 405.7.4
Change in Direction

405.7.4 Change in Direction. Ramps that change direction at ramp landings should contain a landing sized to provide a turning space 72 inches (1830 mm) in length and 72 inches (1830 mm) in width. Secondary ramps wider than 72 inches (1830 mm) that change direction at ramp landings should contain a landing at least as wide as the widest ramp run leading to the landing. Switchback configurations should contain a landing as wide as the combined parallel ramp runs.

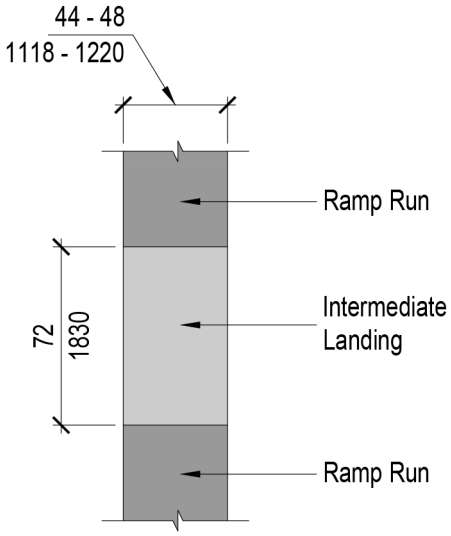


Fig. 405.7.4.1
Intermediate Landings

405.7.4.1 Intermediate Landing. An intermediate landing located between entry landings should be at least as wide as the widest ramp run leading to the landing with a length of 72 inches (1830 mm). Switch-back or u-shaped ramps should contain intermediate landings 72 inches (1830 mm) minimum in length and a minimum width equal to the combined widths of both ramp runs leading into the landing.

405.7.4.1.1 Intersecting routes. Any intersecting routes should be provided with a landing that allows unobstructed intersection and should comply with Section 304.

405.7.4.1.2 Adjacent Seating Access. Ramps that are used as a means of accessing designated seating or tiered levels should be provided with landing that allows unobstructed intersection and should comply with Section 304.

405.7.4.2 Rest Area Alcove. A rest area alcove should be provided for every two ramp segments of 30 feet (9.15 m) minimum each or every other landing. The rest area should be adjacent to a landing. The rest area should be a clear space 72 inches (1830 mm) in length and 72 inches (1830 mm) in width. If provided, a bench should be located adjacent to the length of the clear floor space.

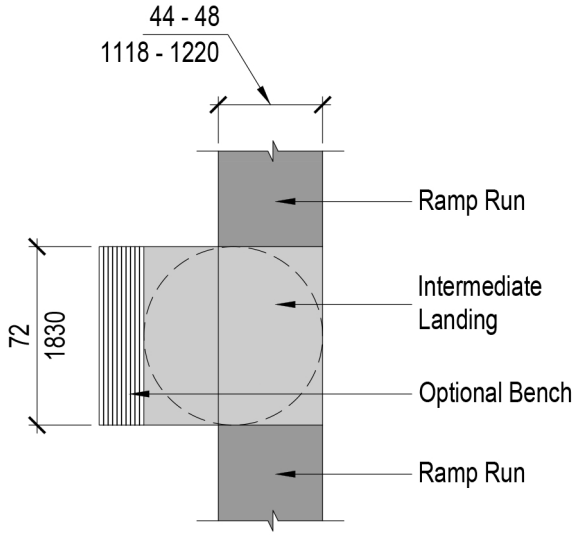


Fig. 405.7.4.2
Rest Area

405.7.4.2 Advisory. Consider a place to sit and a place to set packages in the rest areas. In some instances, security may need to be addressed (hidden corners, etc.).

405.7.5 Doorways and Gates. Where doorways or gates are adjacent to a ramp landing, maneuvering clearances complying with Sections 404 should not overlap the landing area.

405.8 Handrails. Handrails should consist of dual height handrails running parallel and should comply with Section 505. Handrails are required for all ramp configurations.

405.8 Advisory. Ramps that are used to access tiered seating cannot be provided with handrails on both sides of the aisle because they will obstruct access to the seating. The recommended solution is to place a dual height handrail at the center of the aisle with breaks in the railing occurring at landing. Elimination of the handrail altogether to avoid sight obstruction should not be allowed.

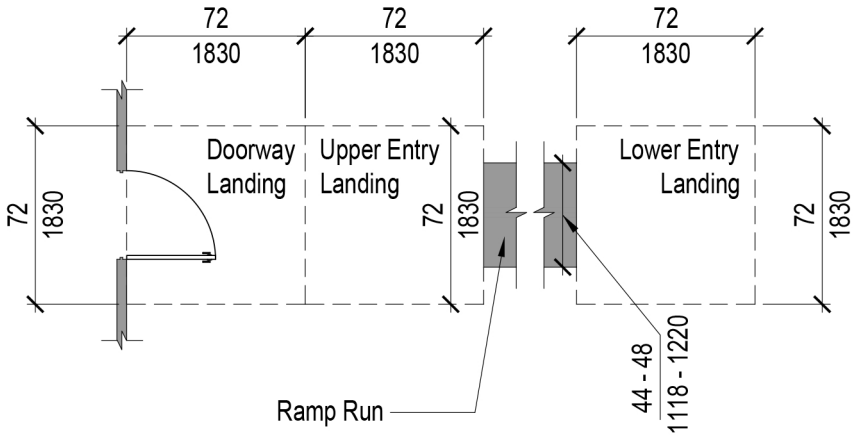


Fig. 405.7.5
Doorway Landing

405.9 Edge Protection. Edge protection complying with Section 405.9.1 or 405.9.2 should be provided on each side of ramp runs and at each side of ramp landings.

EXCEPTIONS:

1. Edge protection should not required on ramps not required to have handrails and that have flared sides complying with Section 406.3.

2. Edge protection should not be required on the sides of ramp landings serving an adjacent ramp run or stairway.

3. Edge protection should not be required on sides of ramp landings having a vertical drop-off of 1/2 inch (13 mm) maximum within 10 inches (255 mm) horizontally of the minimum landing area specified in Section 405.7.

4. Edge protection should not be required on the sides of ramped aisles where the ramps provide access to adjacent seats and aisle access ways.

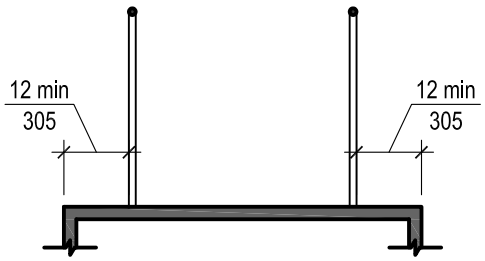
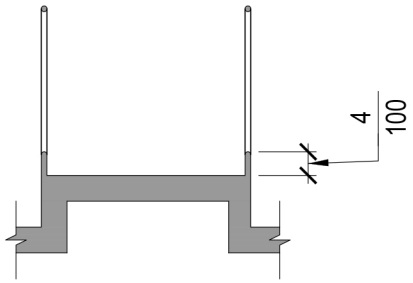


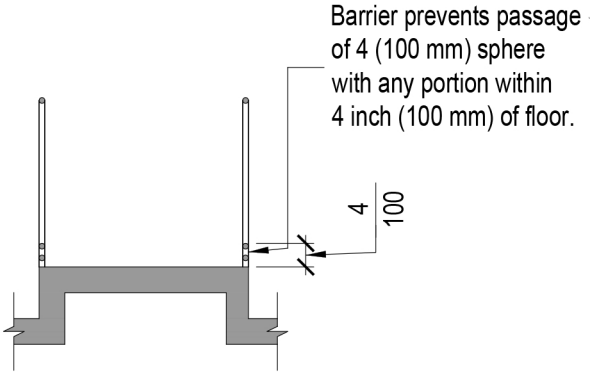
Fig. 405.9.1
Extended Floor Surface

405.9.1 Extended Floor Surface. The floor surface of the ramp run or ramp landing may extend 12 inches (305 mm) minimum beyond the inside face of the railing complying with Section 505. If curb or barrier is used complying with Section 405.9.2, the extension is not necessary.

405.9.2 Curb or Barrier. A curb or barrier should be provided to address a drop-off that prevents the passage of a 4-inch (100 mm) diameter sphere where any portion of the sphere is within 4 inches (100 mm) of the floor.



(a)
Curb



(b)
Barrier

Fig. 405.9.2
Ramp Edge Protection

405.9.2.1 Curb. A curb should be a minimum of 4 inches (100 mm) in height.

405.9.2.2 Barrier. Barriers should be constructed so that the barrier prevents the passage of a 4-inch (100 mm) diameter sphere.

405.10 Weather Protection. Landings subject to wet conditions should be designed to prevent the accumulation of water. Exterior ramps should be provided with a continuous cover, or a protected rest area. Where surfaces may freeze, consider an automatic ice melt system.

405.11 Illumination. Ramps and adjacent stairs should be lighted to a higher level than surrounding area and glare should be kept to a minimum.

405.11 Advisory. Lighting and contrast can be used in wayfinding to locate and use ramps, stairs, and rest areas. Lighting must be even to avoid strong shadows. Try to reduce glare.

405.12 Wayfinding. Wayfinding should comply with Chapter 714.

405.12 Advisory. Wayfinding should be enhanced by providing options to accommodate a variety of user abilities. Refer to Chapter 7.

405.13 Signage and Graphics. In addition to standard signage, integrate with handrails and ramp surfaces. Location identification should be provided on the top surface of the handrail extension in both tactile characters and Braille in accordance with Section 703.3 and 703.4. Provide on ramp bottom and top landing floor surface location visual identification in accordance with Section 703.2. Provide information kiosks.

405.13 Advisory. Multiple cuing, such as the use of an audio and visual notice of changes in a path, helps some user groups.

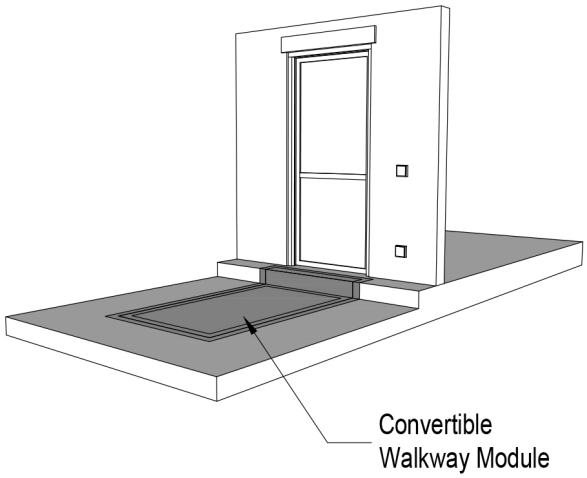
405.14 Tactile Indicators. Upper and lower entry landings should contain raised strip (corduroy) tactile indicators along the entire landing surface perpendicular to the direction of travel. that is the width of the ramp and 24 inches (610 mm) in depth. Tactile indicators should comply with Section 705.6.

405.15 Stairs. Stairs should be provided as an alternative separate approach in conjunction with ramps. Stairs should comply with Section 504 Stairways. Stair landings should not overlap ramp landings.

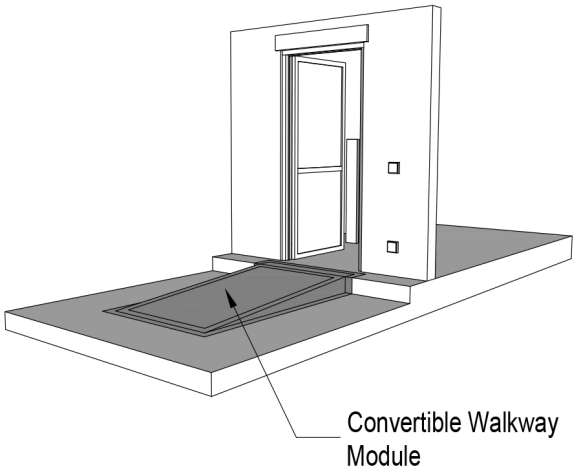
405.15 Advisory. Integrate the ramp with the interior as much as possible. Short ramp lengths navigating rises of 8” inches or less may replace or eliminate the need for stairs. Ramps with a rise of 6 inches or less do not require handrails.

405.16 Convertible Walkways. Convertible Walkways should comply with Section 405.16 and may comprise various permanently installed configurations that allow conversion from one configuration to another such as from steps to a sloped walkway.

405.16 Advisory. Convertible Walkways are not included in the *2014 NYCBC*. This type of device has unresolved code issues, but that does not mean it should not be considered. Handrails, edge protection, slope, sidewalk pedestrian traffic tripping hazards and other types of obstruction such as street furniture, tree pits, lighting, and waste receptacles must be properly coordinated. Solutions employed should not create additional obstacles. Compromise solutions may be possible. Tripping hazards are a critical issue for pedestrian traffic. Length of a ramp run either perpendicular or parallel to the face of a facility may make this type of solution infeasible in some locations. The run should not substantially obstruct the sidewalk. The device should not extend onto an adjacent property and the run should not create conflicts with egress or other requirements. In NYC, due to the density and scarcity of space in many locations, access cannot be provided using conventional and code compliant solutions. One of the scoping rules that might help creative solutions like this would be that they can function within a supervised environment. How to do this is tough but examples like hotel entrances and many other buildings have doormen or salespeople or other designated people who could take responsibility for the operation of these devices. They are intended though to be operated by the patron to maintain their independence.

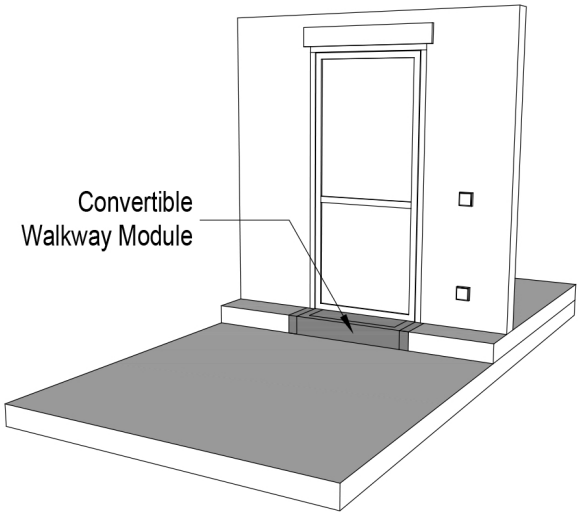


(a)
Step Position

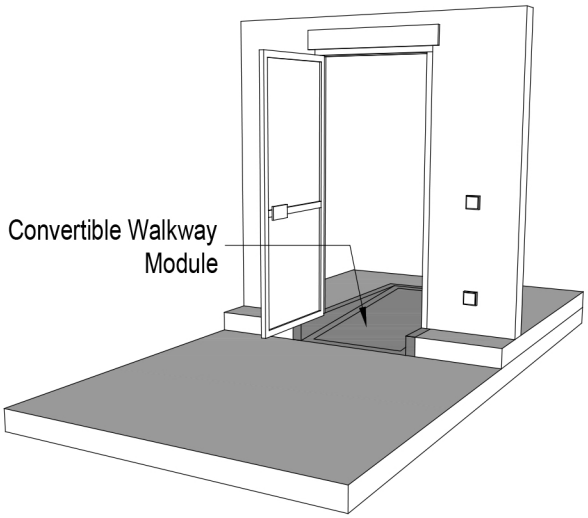


(b)
Sloped Position

(A)
One Step Sidewalk Installation

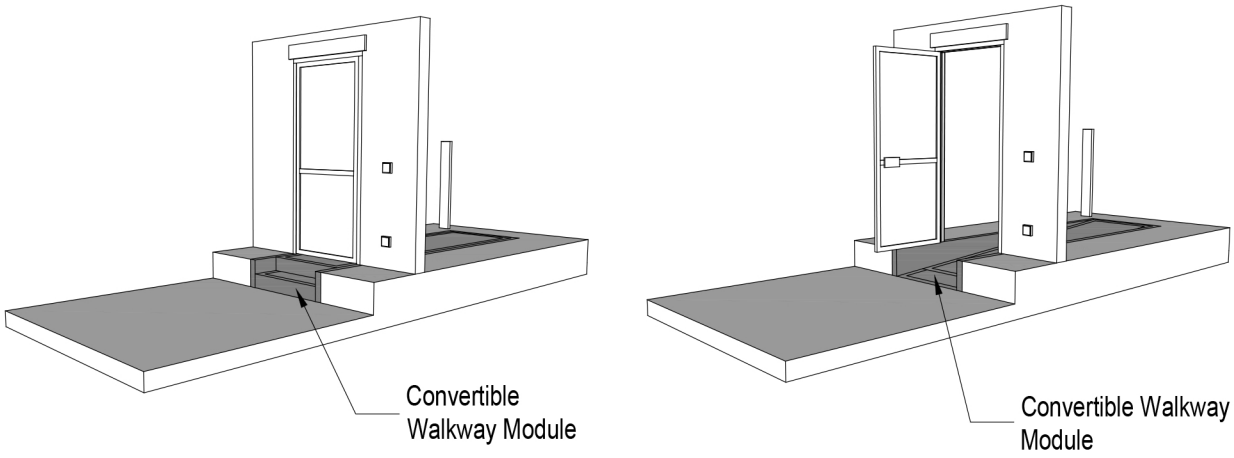


(a)
Step Position



(b)
Sloped Position

(B)
One Step Flush with Upper Landing



(a)
Step Position

(b)
Sloped Position

(C)
Two Step Flush with Upper Landing

Fig. 405.16
Convertible Walkways[2]

405.16 Advisory Cont'd. We suggest exploration of alternate solutions so that people who use mobility devices such as motorized wheelchairs and scooters as well as others who have difficulty navigating stairs may have an alternate means of access. Lift-U, Division of Hogan Mf., Inc is one company that has proposed some creative solutions to this problem that are relevant to their automatic vehicle access solutions that are currently installed in NYC buses and accessible vans. Automatic ramps for buildings pose another set of challenges as discussed above.

405.16.1 Controls. Controls should be secure and require key, card, code or other means for safety purposes. They should be mounted within close proximity of the unit, but may be remotely controlled with appropriate safeguards. Push button/plate, key pad, card readers and other types of devices should be 36 inches (915 mm) minimum from the side of the unit and mounted 34 inches (865 mm) to 38 inches (965 mm) above the floor.

405.16.2 Remote control. Remote control of unit should be secure and provide direct line of sight to unit and sight line that allow observation of pedestrian movement to avoid obstruction hazards during use. This may also include proximity sensors, two-way communication with camera, speaker and microphone.

405.16.3 Alarms. Provide visual, auditory and tactile alarms. Motion sensors should be provided to warn of pedestrian and other conflicts. Strobes and/or floor surface embedded LED indicators should surround the perimeter of the affected floor area. Alarms should automatically initiate upon activation of unit or pedestrians, animals or others such as those using the sidewalk for recreational and other uses such as street vendors.

2 Design by Lift-U, Division of Hogan Mfg., Inc. Convertible Walkways.

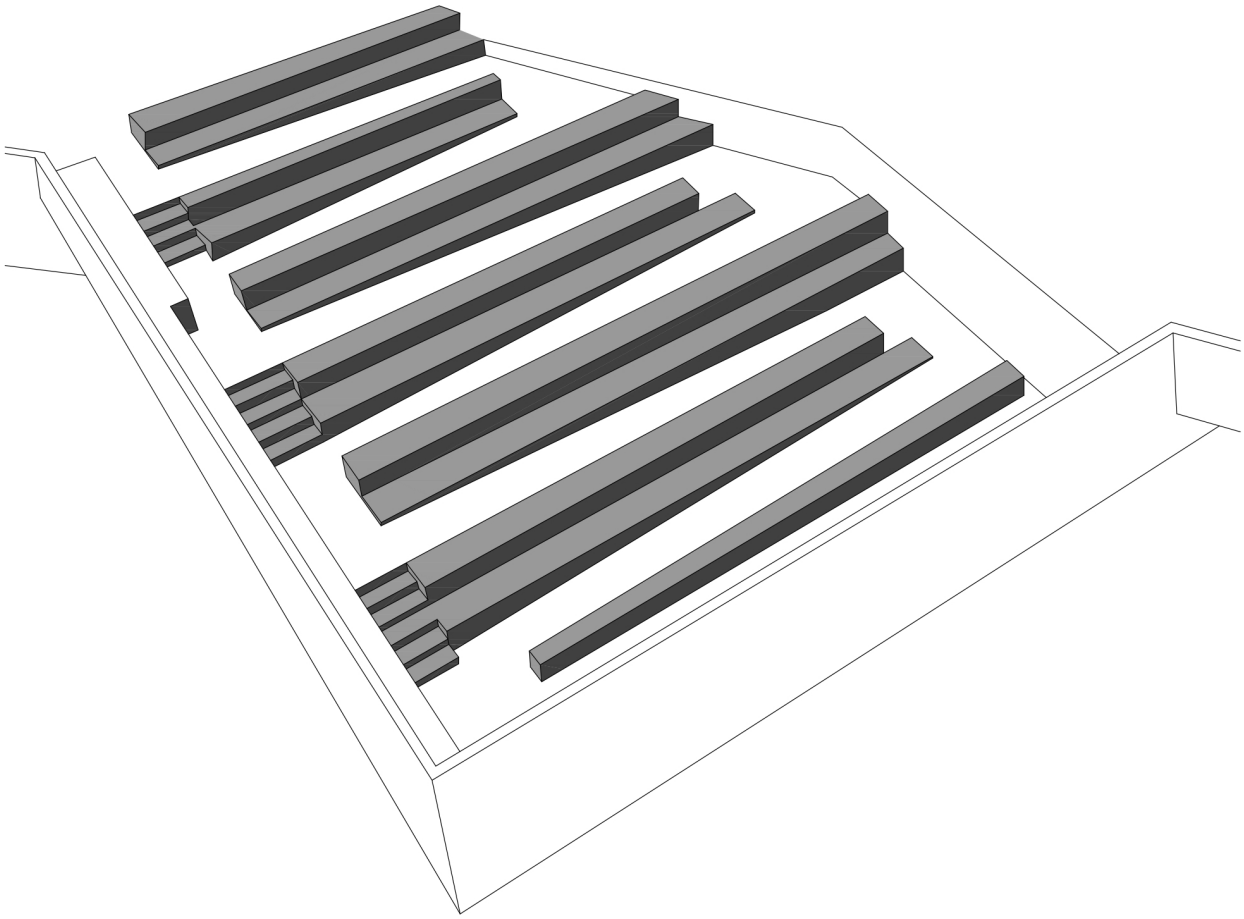


Fig. 405.18
Sloped Walk / Bleacher Seating Example[3]

405.18 Advisory. This design is included as an example of a creative solution. When a sloped walkway does not exceed a slope of 1:20 is not considered a ramp. Thus, typical ramp components are not required that would normally include landings, handrails, edge protection extended floor surface or other types of barriers. The ramp components could create conflicts with seating access and partially obstruct lines of sight.

3. Highline Park (Phase I), City of New York, 10th Avenue Overlook. A design collaboration between James Corner Field Operations (project lead), Diller Scofidio + Renfro, and Piet Oudolf.

405.16.4 Automatic Doors. Doors should automatically close and lock during activation of unit if ramp segment obstructs stairs or causes other operational hazards. Doors should be automatic for installations where landing area must be on the interior side of door. Once ramp is deployed, the door should automatically open to provide maneuvering landing clearance at the top of ramp. Provide proper interfacing.

405.17 Temporary and Portable Ramps. Temporary and portable ramps should comply with Section 405 and may comprise various configurations including: single tack run, dual-track run, single-fold, mutliple-fold, and telescoping.

405.17 Advisory. In existing buildings and sites, temporary and portable ramps may be used for special events such as a temporary stage performance access or during alterations of buildings. Portable ramps are useful for navigating street curbs where curb ramps do not exist or to navigate small elevation changes on site and in buildings. Some individuals may carry a light weight set of telescoping ramp runs, stored on a scooter or in a vehicle in case of an emergency, but elevation differences of 6 inches or greater will technically trigger the use of handrails and other requirements. Vehicle ramp requirements allow a much steeper slope than the standard 1:12. The requirements may be found in the *U.S. Department of Transportation, Federal Transit Administration, Part 38-American with Disabilities Act (ADA) Accessibility Specifications for Transportation Vehicles.*

405.18 Sloped Walk / Bleacher Seating. Sloped walk/bleacher seating is the integration of a sloped walkway and bleacher seating that provides access to seating of varying height without the necessary use of communicating stairs.

406 Curb Ramps.

406.1 General. Curb ramps should comply with Section 406, Section 405.2, Section 405.3. They should be designed to prevent an accumulation of water and comply with the following:

1. A standardized set of curb ramp configurations that includes dual ramp corners, single ramp corners, corner ramps without flares, mid-block ramps, island ramps, passenger loading zones ramps, etc. Mid-block curb ramps are not recommended by DOT due to traffic conflicts.

2. Provide recreational ramp for bicycles and one for pedestrians. Where possible provide a physical barrier between each. Refer to Sections 402.4.3, and 406.15.

3. Locate so that vehicles are visible from each direction. Do not locate where sight lines for approaching traffic are obstructed by building corners. This may require the use of a single diagonal curb ramp.

4. Avoid conflicts with vehicle stops, storm drains, fire hydrants, standpipes, street trees, street furniture, telephones, mail boxes, street lights, street signs, parking meters, utility access, etc.

5. Do not locate any obstruction immediately within the curb ramp approach. This may result in a use conflict with the flares. Consider a barrier such as a planter that is as deep as the ramp that will allow elimination of the side flares.

6. Curb ramps should not project into the roadway. If necessary, for narrow sidewalks that are not sufficiently wide enough to accommodate a curb ramp, consider a sidewalk extension as per Section 406.9 Sidewalk Extensions.

7. Provide the name of the street within the curb cut in addition to the standard street signage.

8. Provide pedestrian signals complying with Section 406.16

406.1 Advisory. The examples of perpendicular curb ramps provided here address a very limited number of configurations and do not resolve the wide range of existing site conditions in New York City. Perpendicular and parallel curb ramps, blended transitions, raised crosswalks raised intersections, driveways, pedestrian roadbed plazas, and hybrid configurations are just a few examples that require a deeper exploration than provided here. Recommended reading is the *Manual on Uniform Traffic Control Devices: MUTCD - 2009, US Access Board's proposed Guidelines for Pedestrian Facilities in the Public Right-of Way.* https://www.acess-board.gov

406.2 Running Slope. The running slope of a curb ramp should be 1:12 maximum .

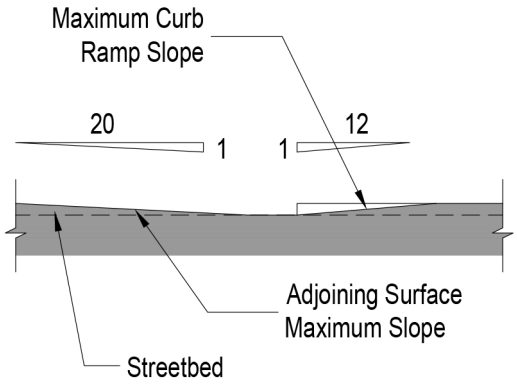
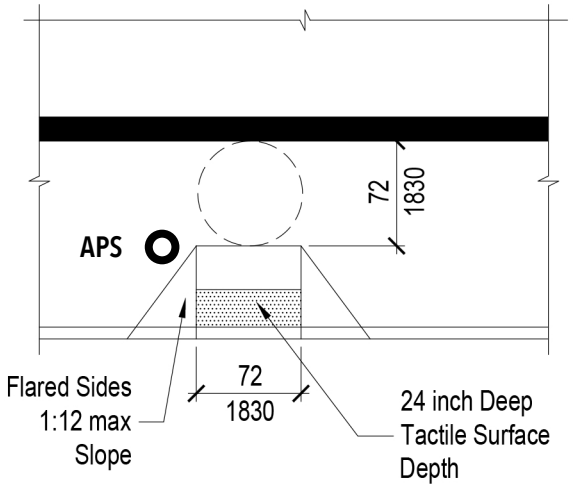


Fig. 406.2
Counter Slope of Surfaces Adjacent to Curb Ramps

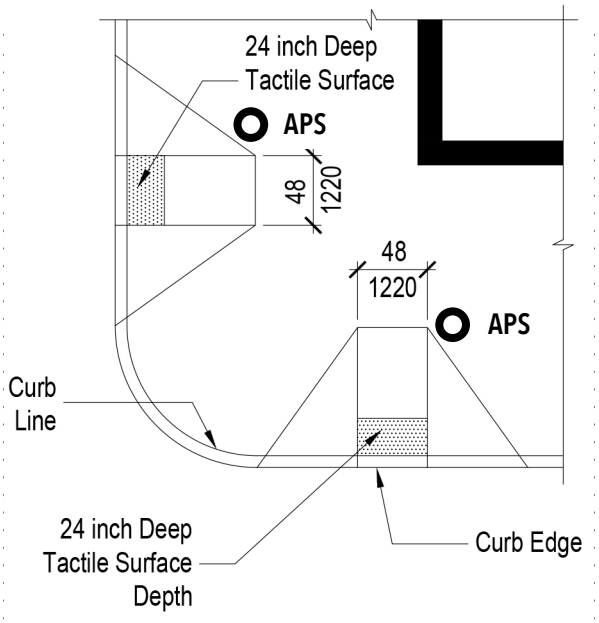
406.2.1 Cross Slope. The cross slope of a curb ramp should not exceed 1:48 maximum.

406.2.2 Counter Slope. Counter slopes of adjoining street bed immediately adjacent to the curb should not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps should be at the same level.

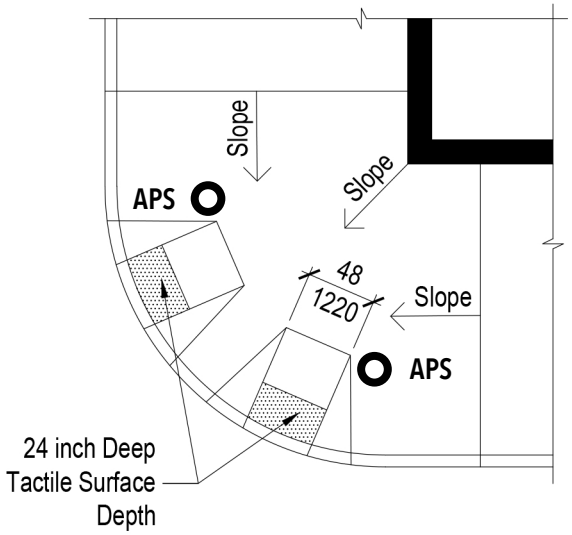
406.3 Sides of Curb Ramps. Where provided, curb ramp flares should not be steeper than 1:12.



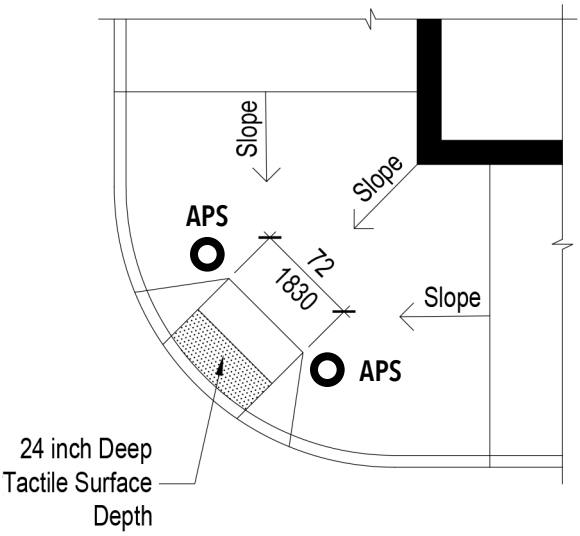
(a)
Mid Block



(b)
Corner



(c)
Dual Compound Corner



(d)
Single Compound Corner

Fig. 406.3
Sides of Curb Ramps

406.3.1 Compound Corners. Compound corners may be used to address corners with substantial elevation differences between the sidewalk grade and roadbed.

406.3.1 Advisory. The NYC DOT standard for pedestrian ramps includes compound corners consisting of curb ramps contained within a sloped corner. A form of blended transition as per Section 106.5 Defined Terms. This addresses very limited space and/or excessive difference between the sidewalk elevation and the roadbed elevation. Corner slope should not exceed 1:18, but some existing locations are extreme and may require, but should never exceed 1:12 slope Consider an indicator immediately adjacent to sloped corner. In some instances curb ramp flares are not necessary, such as when the sides of the curb ramp are blocked with a wall, railing or other obstruction. For more excessive existing conditions consider sidewalk slope beginning farther back from the corner.

406.4 Width. Curb ramps should be 48 inches (1220 mm) to 60 inches (1525 mm) wide for configurations that contain two ramps at a single location. Curb ramps should be 72 inches (1830 mm) minimum width for configurations that contain one ramp at a single location.

406.4 Advisory. It is recommended to increase the curb ramp width to 72 inches where only a single ramp can be accommodated at a single location. The 72 inches allows two-way pedestrian traffic and more room for error since the pedestrian traffic is not split between two ramps.

406.5 Floor Surface. Floor surfaces of curb ramps should be proceeded by a 24-inch (610 mm) deep detectable warning complying with Section 705, extending the full width of the ramp.

406.5 Advisory. The detectable warning strips need to be limited to 24 inches (610 mm) in depth because they are used as a tactile indicator of a boundary.

406.5 Advisory. Cross walk marking should comply with DOT regulations. Markings are required to be permanent material such as thermoplastic reflective strips. Consider the use of different roadbed material in lieu of marking, such as pavers or texture (e.g. Section 302.6). Consider the use of color or contrast complying with Section 705.3. Historically, when different materials were used, matching the material for restoration or repairs has been difficult or impossible when they are not commonly available. This should not limit the surface to only asphalt, especially in landmark districts. Refer to Section 302.6 for sensory characteristics.

406.6 Location. Curb ramps and the flared sides of curb ramps should be located so they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Curb ramps at marked crossings should be wholly contained within the markings, excluding any flared sides.

406.7 Landings. Landings should be provided at the tops of curb ramps. The clear length of the landing should be 72 inches (1829 mm) minimum. The clear width of the landing should be as wide as the curb ramp, excluding flared sides, leading to the landing. Slope of landing should be 1:48 in any direction

406.8 Obstructions. Curb ramps should be located or protected to prevent their obstruction by parked vehicles.

406.8 Advisory. Provide a physical means of separating pedestrians from car, bicycle/ pedestrian recreational lanes and traffic. This may be accomplished with a raised area or edge (with cuts or ramps as necessary to allow perpendicular crossing), bollards, railing, planters, landscape elements such as trees, and shrubs. See section 402.4.3 regarding recreational lanes. See “Active Design Supplement Promoting Safety,” that helps reduce the risk of injury in neighborhoods, streets and outdoor spaces while increasing walking, cycling and access to public transit in Section 105.3.1.

406.8.1 Handrails. Handrails are an obstruction in curb ramps and should not be used.

406.9 Sidewalk Extensions. A sidewalk extension may be necessary to accommodate a curb ramp if the sidewalk is too narrow. The extension should not be less than the adjacent parking space width. Sidewalk extensions may be considered for both corners and mid-block crossings with a traffic signal. They reduce pedestrian crossing distance in the roadbed and reduce exposure to moving vehicles.

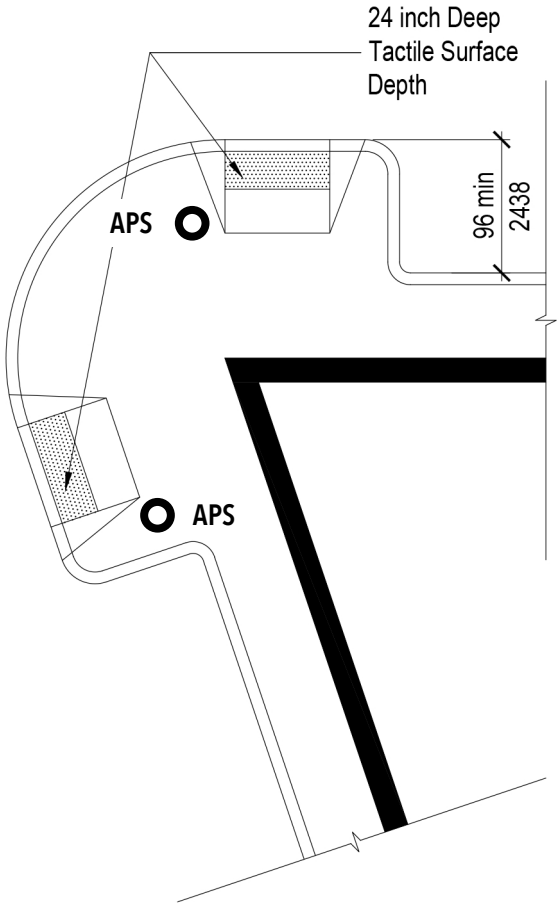


Fig. 406.9
Sidewalk Extension Example

406.9 Advisory. Sidewalk extensions are commonly referred to by DOT as neckdowns. The extensions increase the surface area necessary to install compliant ramps and increase safety. See NYC DOT's *Street Design Manual*, Section 2.2.2 Curb Extensions, for additional information. See "Active Design Supplement Promoting Safety," that helps reduce the risk of injury in neighborhoods, streets and outdoor spaces while increasing walking, cycling and access to public transit in Section 105.3.1.

406.10 Diagonal Curb Ramps. Diagonal or corner curb ramps with returned curbs or other well-defined edges should have the edges parallel to the direction of pedestrian flow. The bottoms of diagonal curb ramps should have 24 inches (610 mm) minimum clear space outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings should provide the 60 inches (1524 mm) minimum clear space within the markings. Diagonal curb ramps with flared sides should have a segment of curb 24 inches (610 mm) minimum in length on each side of the curb ramp and within the marked crossing (see Fig. 406.10).

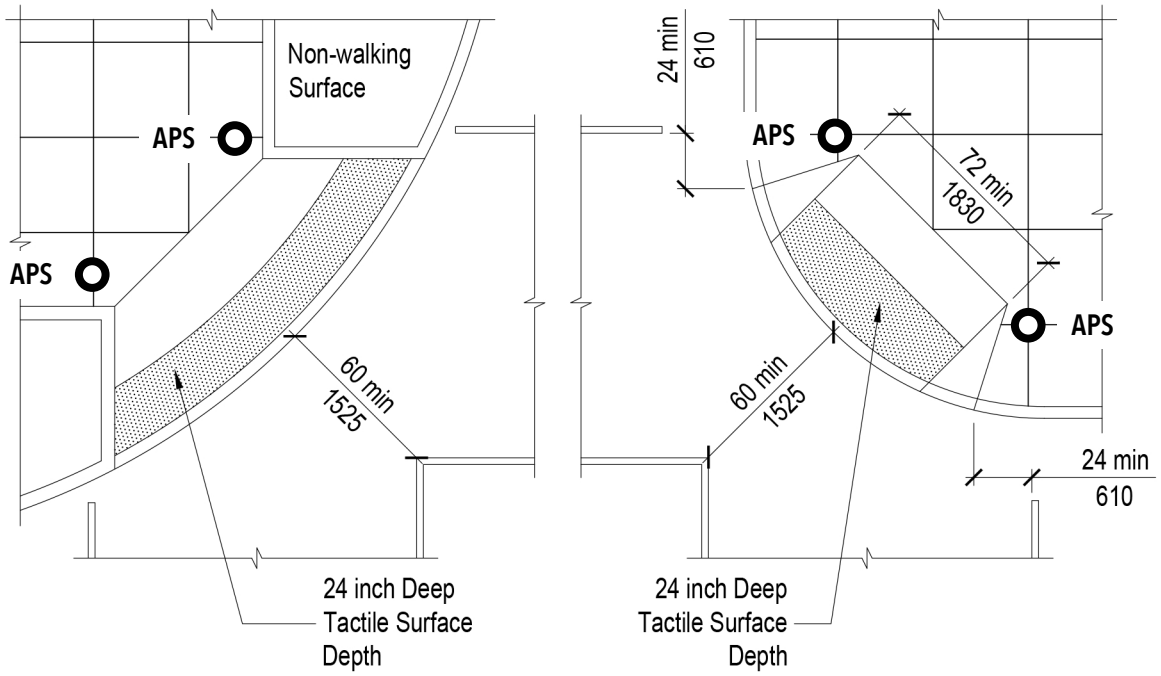
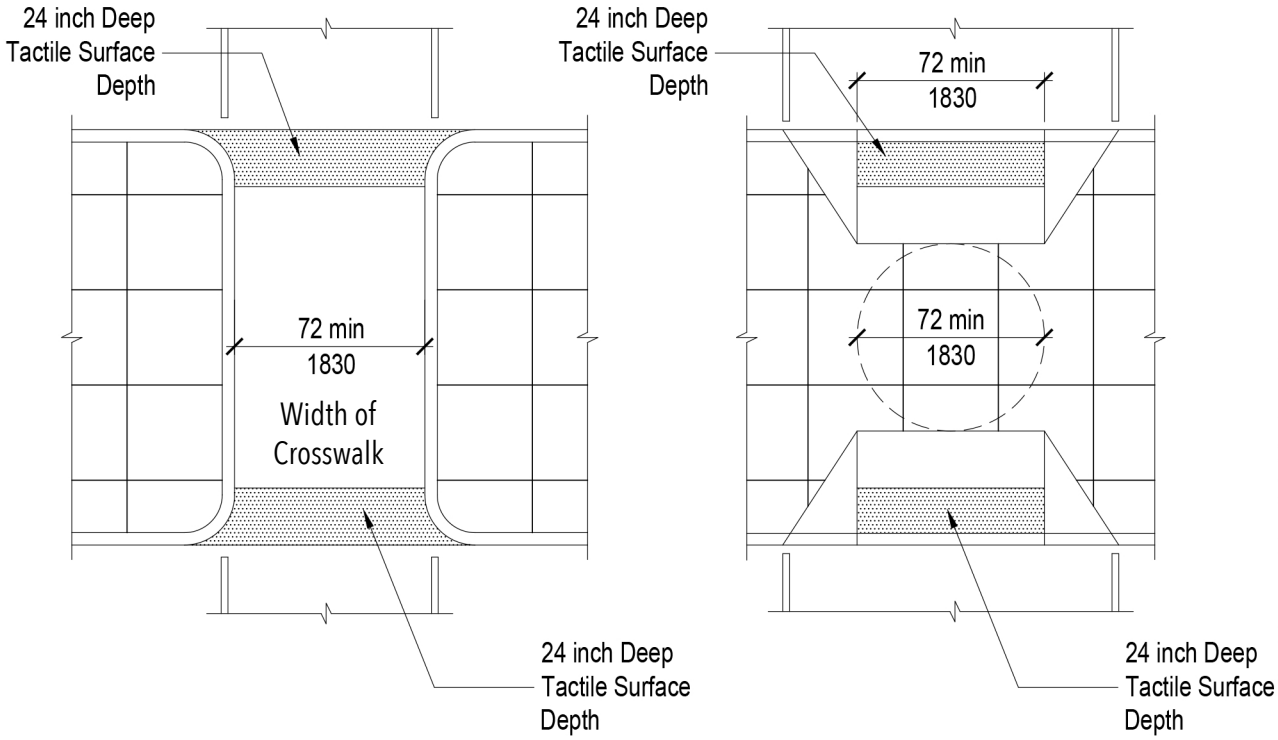


Fig. 406.10
Diagonal Curb Ramps

406.10 Advisory. The diagonal ramp configuration should be considered if there is very limited space or obstructions in the sidewalk that prevent the installation of two ramps. Under some existing conditions, the entire corner may be sloped at small street corners that do not contain enough area for the use of a standard curb ramp. Another option is a compound ramp as per Section 406.3 advisory, using a single curb ramp.

406.10.1 Blended Transition Corners. An alternative to a diagonal curb ramp is a blended transition at a corner where the elevation transitions from sidewalk level to street level. It may be a raised pedestrian street crossing, depressed corner, or similar connection between the pedestrian access route at the level of the sidewalk and the level of the pedestrian street crossing that has a grade of 1:20 or less.

406.11 Islands. Raised islands in crossings should contain a 72 inches (1830 mm) minimum cut-through level with the street or have curb ramps at both sides. Cut-through to be as wide as the marked crossing. Each curb ramp should have a level area 72 inches (1830 mm) minimum in length and 72 inches (1830 mm) minimum in width at the top of the curb ramp in the part of the island intersected by the crossing. If a landing is reduced, always run the longer side of the landing in the direction of pedestrian traffic. The landings and an accessible route should be permitted to overlap.



(a)
Cut Through at Island

(b)
Curb Ramp at Island

Fig. 406.11
Islands

406.11 Advisory. The 72 inch ramp width allows two-way pedestrian traffic and more room for error since any congestion at the ramp may create a street crossing delay resulting in a serious safety condition. The 72 inch level landing may not be possible for some existing conditions, but where there is enough space, it should be provided to increase safety and usability. Islands are necessary for extremely wide streets such as Queens Blvd. where the amount of time needed to cross may require two traffic light cycles to avoid a too long crossing duration that may be dangerous. It may be necessary to install APS units on the island. Consider the use of pedestrian barriers to increase the level of safety and perhaps provide benches complying with Section 903 for those that need to rest. It is also helpful to include cross walk signage with a full crossing duration countdown that starts the moment the green signal is actuated (see Section 406.16). This informs the pedestrian how much time is remaining to complete the crossing.

406.11.1 Cut-Through Floor Surface. Floor surface of an island cut through at road grade should be provided with detectable warning on the cut-through surface complying with Section 705.1 through 705.5. Cut-through to be as wide as the marked crossing.

406.12 Detectable Warnings at Raised Marked Crossings. Marked crossings that are raised to the same level as the adjoining sidewalk should be proceeded by a 24-inch (610 mm) deep detectable warning complying with Section 705, extending the full width of the marked crossing. Prevent the accumulation of water.

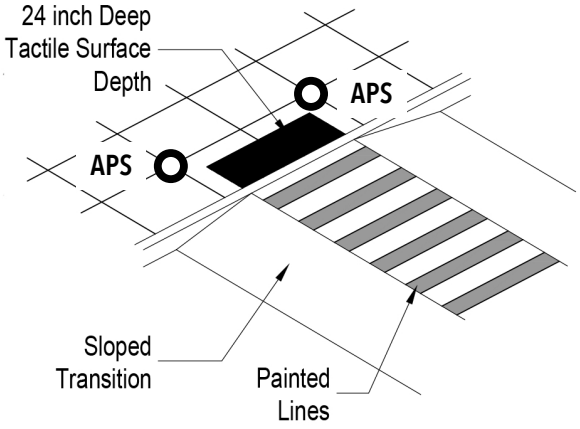


Fig. 406.12
Raised Marked Crossing

406.13 Detectable Warnings at Curb Ramps. Detectable warnings provided on curb ramps should comply with Sections 406.13 and 705.

406.13.1 Area Covered. Floor surfaces of curb ramps should be proceeded by a 24-inch (610 mm) deep detectable warning complying with Section 705, extending the full width of the ramp. Curb ramp flares should not contain detectable warnings.

406.13.2 Location. The detectable warning should be located so the edge nearest the curb line is 6 inches (150 mm) to 8 inches (205 mm) from the curb edge.

406.13.3 Visual Contrast. Detectable warning surfaces should contrast visually with adjacent surfaces, either light-on-dark or dark-on-light. Contrast should be at least 70%.

Contrast = [(B1 — B2)/B1] x 100

Where B1 = Light reflectance value (LRV) of the lighter area and B2 = Light reflectance value (LRV) of the darker area. Note that in any application both white and black are never absolute; thus, B1 , never equals 100 and B2 is always greater than 0.

406.14 Detectable Warnings at Islands or Cut-through Medians. Detectable warnings should be provided on curb ramps or at raised marked crossings leading to islands, or cut-through medians, the island or cut-through median should so be provided with detectable warnings complying with Section 705, that are 24 inches (610 mm) in depth, and extend the full width of the pedestrian route or cut-through. Where such island or cut-through median is less than 48 inches (1220 mm) in depth, the entire width and depth of the pedestrian route or cut-through should have detectable warnings. Detectable warning 24 inches (610 mm) in depth is the recognized National standard for boundary.

406.14.1 Recreational Lane Crossover. Recreational lanes should comply with Section 402.4.3. Provide detectable warning 24 inches (610 mm) in depth at all crossover points to warn pedestrians that they are crossing into a recreational lane. See NYC DOT's *Street Design Manual* (2009), and the *Active Design Guidelines* series in Section 105.3.

406.15 Accessible Pedestrian Signals. Accessible pedestrian signals should comply with Section 406.15.

406.15.1 General. As per the *MUTCD 2009 Edition* Section 4E.09: "accessible pedestrian signals and detectors provide information in non-visual formats (such as audible tones, speech messages, and /or vibrating surfaces). The factors that make crossing at signalized location difficult for pedestrians who have visual disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets. Furthermore, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern signal phase change." Refer to the *MUTCD 2009* for the complete set of requirements.

406.15.1 Advisory. Accessible pedestrian signals are covered in detail in the *Manual on Uniform Traffic Control Devices (MUTCD)* – Federal Highway Administration: http://*MUTCD*.FHWA.DOT.Gov/ The PDF version of the *2009 MUTCD* with Revision Numbers 1 and 2 Incorporated, dated 2012 is easy to access online. APS requirements must strictly comply with the *MUTCD*. Information contained in this section is not comprehensive and you must comply with all the legal requirements. In addition to 4E there are other relevant sections including Section 3B.18 and Figure 2B-26. Only some of the requirements are captured in the *IDG* to provide some guidance, but there is a wealth of information out there. You are directed to the *MUTCD* website for the detailed legal requirements. In addition, you should examine the *National Cooperative Highway Research Program Project 3-62, Guidelines for Accessible Pedestrian Signals*. See A Guide to Best Practices: http://www.apsguide.org/ it provides an understanding of how blind pedestrians cross at signalized intersections that comprise a number of street crossing tasks: locating the street, street recognition, intersection assessment and crossing the roadway. All the above should be basic knowledge for orientation and mobility specialists to assist their clients.

406.15.2 Components. APS components comprise: push buttons or passive detection devices; sounds; verbal messages; audible locator tone; tactile arrow; audible locator beacon; name of street in Braille, raised print; and tactile map. Refer to the *MUTCD 2009* for the complete set of requirements including signage graphics.

406.15.3 Location. As per the *MUTCD 2009 Edition*, Section 4E.10: "Accessible pedestrian signals that are located as close as possible to pedestrians waiting to cross the street provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device." The *MUTCD* standard: "If two accessible pedestrian push buttons are placed less than 10 feet apart or on the same pole, each accessible pedestrian push button shall be provided with the following features (see Sections 4E.11 through 4E.13): A, A push button locator tone; B, A tactile arrow; C, A speech walk message for WALKING PERSON (symbolizing WALK) indication; and D, a speech push button information message." Refer to the *MUTCD 2009* for the complete set of requirements.

406.15.4 Walk Indications. As per the *MUTCD 2009 Edition*, Section 4E.11: "Technology that provides different sounds for each non-concurrent signal phase has frequently been found to provide ambiguous information. Research indicates that a rapid tick tone for each crossing coming from accessible pedestrian signal devices on separated poles located close to each crosswalk provides unambiguous information to pedestrians who are blind or have a visual disability. Vibrotactile indications provide information to pedestrian who are blind and deaf and are also used by pedestrians who are blind or have low vision to confirm the walk signal in noisy situations." Refer to the *MUTCD 2009* for the complete set of requirements.

406.15.5 Tactile Arrows and Locator Tones. As per the *MUTCD 2009 Edition*, Section 4E.12: " To enable pedestrians who have a visual disabilities to distinguish and locate the appropriate push button at an accessible pedestrian signal location, push buttons shall clearly indicate by means of tactile arrows which crosswalk signal is actuated by each push button. The tactile arrows shall be located on the push button, have high visual contrast (light on dark or dark on light), and shall be aligned parallel to the direction of travel on the associated crosswalk." It is critical that the arrow aligns precisely parallel with the crosswalk to accurately guide the user. Refer to the *MUTCD 2009* for the complete set of requirements.

406.15.6 Extended Push button Press Features. As per the *MUTCD 2009 Edition*, Section 4E.13: "Pedestrians may be provided with additional features such as increased crossing time, audible beaconing, or a speech push button information message as a result of an extended push button." Refer to the *MUTCD 2009* for the complete set of requirements.

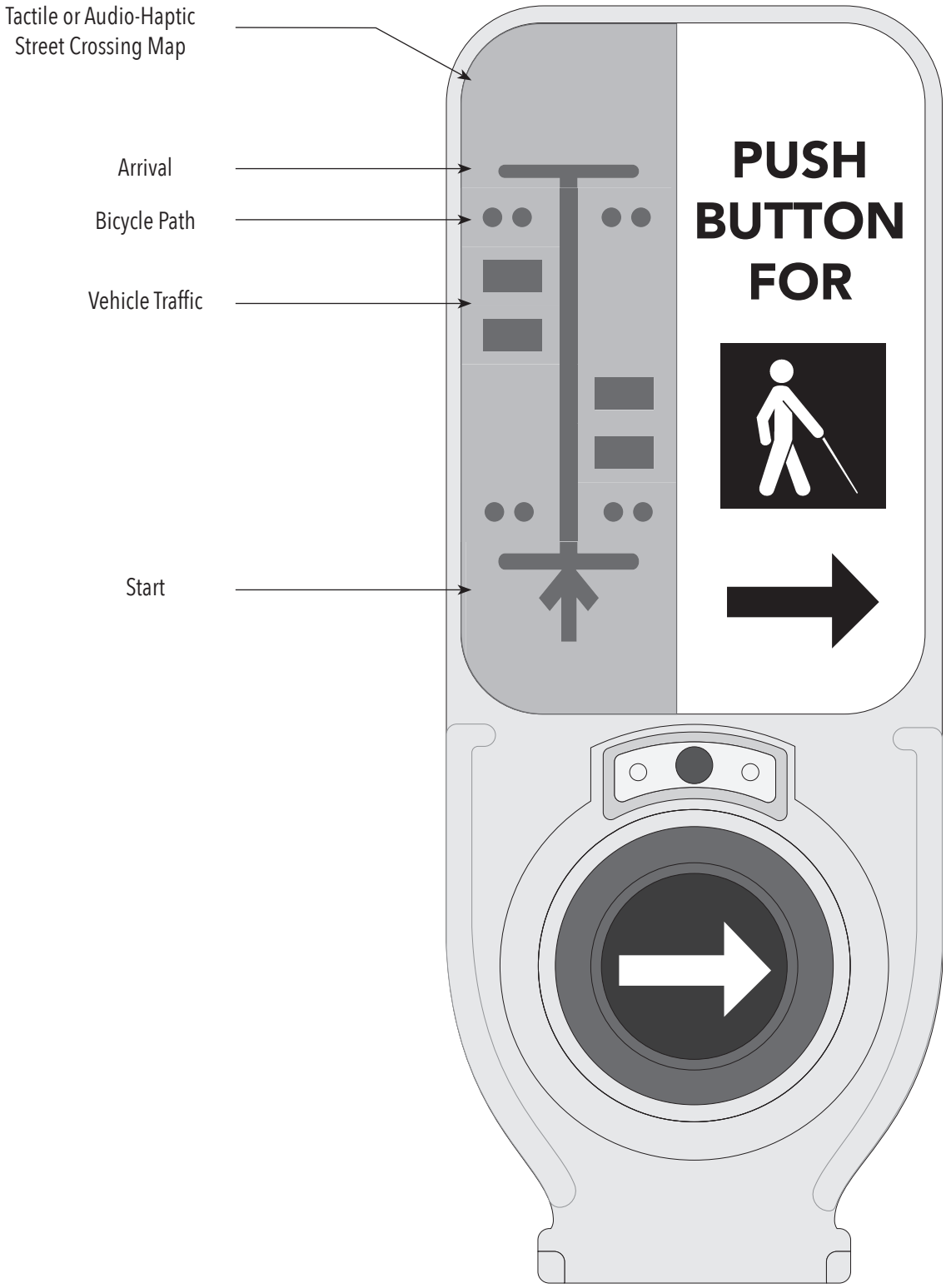


Fig. 406.15
Accessible Pedestrian Signal (APS)
Push Button Unit Example
(Base Unit - Polara Enterprises, LLC) (Tactile Map by NYC DOT)

406.16 Sensory Pedestrian Signals (SPS). Sensory pedestrian signals should comply with Section 406.16 and comprise enhanced visual, auditory and tactile/vibration overlapping formats that is a flexible, fully interfaced system. Consistency, intuitiveness and sensory characteristics are critical for effectiveness. Consistency citywide provides standardization.

406.16 Advisory. Refer to the NYC DOT web site for accessible pedestrian signals: http://www.nyc.gov/html/dot/html/pr2006/pr06_04.shtml. Recommended reading regarding pedestrian signals can be obtained through the Access Board website: http://www.access-board.gov/. See the *National Cooperative Highway Research Program's Accessible Pedestrian Signals: A Guide to Best Practices.* http://www.walkinginfo.org/aps/.

406.16.1 System Components. System components comprise: multi-sensory location indicators with street names; distance and crossing duration; directionality; destination indicators (how close you are getting to the other side of the street); vehicle conflict/danger stepped alarm; embedded induction loop for use with hearing aid t-coils; pedestrian safety traffic signal override to turn all signals red in a pedestrian emergency; pedestrian and vehicle monitoring; interfaced electronic devices based on a modular system for new components, upgrades, and servicing or replacement.

406.16.2 Operable Parts. Operable parts should comply with Section 309. Operable parts and functionality should be greatly enhanced especially for alternate operation and interfaced with PDA devices such as a smart phone.

406.16.3 Signal Countdown. Signal countdowns should display a full signal duration.

406.16.3 Advisory. The countdown is intended for pedestrians but the reality is that drivers take cues from it. It helps both the pedestrians and drivers to make judgment calls regarding the overall signal time: the pedestrian to make the crossing and the driver to make the light. This provides more information than a 3 second yellow light that often prompts drivers to speed up rather than slow down or stop. Pedestrians and drivers take cues from everything around them and each signal may have a variety of user scenarios varying throughout a typical day.

406.16.4 Embedded LED Lighting / Sensors. See Section 402.4.10 Lighting and sensors should interface with SPS at intersections containing surface embedded LED's and sensors. Sensors can monitor pedestrians, recreational users and vehicle interaction that interface with lighting, signals, signage, cameras, safety devices and emergency alerts. Pedestrian vehicle conflicts could change all signals red, actuate embedded LED's that outline each side of the roadbed crosswalk and activate strobes and cameras and automatically send out a 911 pre-recorded message. When the crosswalk sign indicates "walk" the outline of the crosswalk in that direction lights up (consider cobalt blue similar to tarmac lights on an airport runway). It provides a visual warning indicator to drivers that they are approaching and entering a pedestrian zone especially at night or in rain or snowy weather. It encourages pedestrians to stay within the crosswalks and drivers to take caution as they approach and enter the crosswalk or "pedestrian zone." Pedestrian/vehicle conflict sensors at intersections interfaced with the SPS could activate high intensity strobe lights mounted above grade at each corner of the intersection. The roadbed LEDs flash, strobes activate and a camera records the conflict. Alerts should be stepped by increasing in intensity over a specified time frame such as every second or fraction of a second that passes or as the conflict level increases. The embedded LED's could also be interfaced with the green signal to indicate which crosswalks to use while enhancing pedestrian safety by acting as an intuitive indicator to drivers that pedestrians have the right of way.

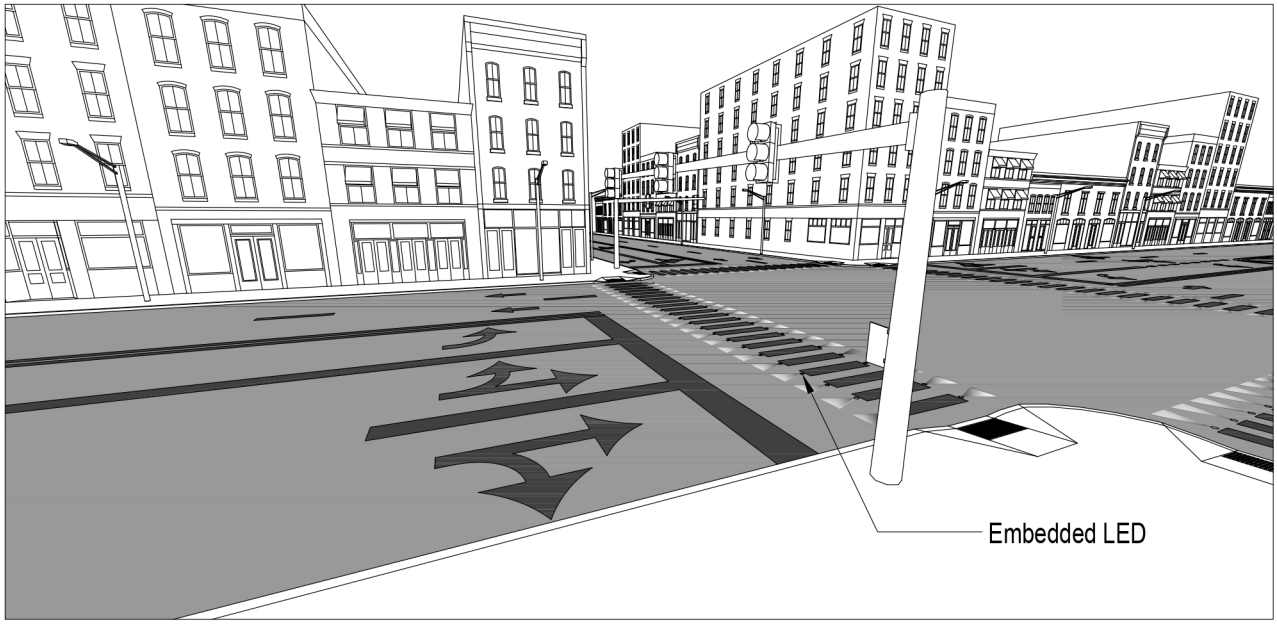


Fig. 406.16.4
Embedded LED Lighting / Sensors Example

406.16.4 Advisory. The *MUTCD* does not allow embedded LED's that are not described in Chapter 4N, Section 4N.01 and 4N.02. In-Roadway Lights. See *Uniform Traffic Control Devices (MUTCD) – Federal Highway Administration*: *http://MUTCD.FHWA.DOT.Gov/* Embedded LED's in NYC especially under Vision Zero will increase safety and save lives due to visually enhanced crosswalk boundaries that alert drivers. There have been some concerns about maintenance and damage, but based on the history of in-roadway reflectors and ongoing maintenance at intersection across the City this should not be problematic, especially since LED's have a very long lifespan.

See Section 402.4.10. Cities throughout the world are making their environments smarter. A comprehensive system will eventually interface, monitor, control and prioritize usage: vehicle, recreational and pedestrian routes, services, sensory pedestrian signals, public smart phone, pedestrian billboards, emergencies, maintenance, and events. The system will be dynamic. For additional information see the New York Times article *Copenhagen Lighting the Way to Greener, More Efficient Cities* by Diane Cardwell, Dec. 8, 2014.

406.16.5 Vehicle Black Boxes. Vehicle black boxes interfaced with the SPS could play a significant role in increasing pedestrian safety utilizing accident avoidance technology.

406.16.6 Personal Smart Vests. Smart vests interfaced with the SPS for pedestrians who are blind could significantly enhance safety.

406.16.6 Advisory. See smart vest technology: http://www.crainsnewyork.com/article/20131211/TECHNOLOGY/131219972 for people with sight disabilities. It uses a proprietary accident avoidance technology which may be helpful in developing a standardized system (universal black box) for all vehicles.

406.16.7 Smart Canes. Smart cane features are evolving at an increasing rate. It is possible that smart canes may be interfaced with the SPS System to provide real time and pre-recorded audio tactile information as per Section 406.16.1 as well as integration with Tactile Guideways (see Section 714.20). Induction loops may be used to provide directionality, information, junctions, addresses and intersections.

406.16.8 Personal Digital Assistant and Apps. The SPS system should interface with personal digital assistants (PDA), such as a smartphone, smart watch, smart cane or other type of device with the appropriate current and future apps.

406.16.9 Leading Pedestrian Intervals. Leading pedestrian intervals (LPI) should be interfaced with the SPS. LPI's show a walk sign for pedestrians before showing a green light to car traffic that are still stopped at red signal.

406.16.9 Advisory. Leading pedestrian intervals (LPI) improve street safety by giving pedestrians a chance to begin crossing the street before cars make turns through a crosswalk. LPI's must be interfaced with existing accessible pedestrian signals (APS) and certainly with SPS. Cars may be silent during the intervals due to new stop/start engine technology to conserve fuel. Electric vehicles also pose a safety concern for people with a sight disability who cannot detect cars due to lack of engine noise. People with vision loss may have no clear cue as to when the "WALK" signal begins, thus resulting in inadequate time to cross safely because one must wait to hear the traffic to begin crossing. Pairing or interfacing with SPS offers a multisensory solution.

If a leading pedestrian interval is used (see *MUTCD* Section 4E.06- Pedestrian Intervals and Signal Phases), the use of an accessible pedestrian signal should be considered (see *MUTCD* Section 4E.09 through 4E.13). Examine also the *National Association of City Transportation Officials (NACTO) http://nacto.org/ Urban Street Design Guide, Leading Pedestrian Interval* that states: "A leading Pedestrian Interval (LPI) typically gives pedestrians a 3-7 second head start when entering an intersection with a corresponding green signal in the same direction of travel. LPI's enhance the visibility of pedestrians in the intersection and reinforce their right-of-way over turning vehicles, especially in locations with a history of conflict."

406.16.10 Active Design. Use active design to focus on pedestrian safety and reduce pedestrian risk with the SPS.

406.16.10 Advisory. *Active Design Supplement: Promoting Safety* in Section 105.3.1 focuses on: complete streets; street closures/safe play areas; street calming; refuge islands; bus stop placement; in-pavement flashing lights; multi-way stop sign control; signals; lighting; pedestrian overpasses, painted designated bicycle lanes/boxes/crossings and graphics.

406.16.11 Rumble Strips. Rumble strips are a longitudinal safety feature installed at or near the center line of a paved roadway or a as a separator between recreational and vehicle lanes. Cut or raised elements alert drivers visually and through vibration and sound when deviating or crossing into another lane. It forces one to pay attention if they are encroaching on a recreational lane or crosswalk. It provides a warning to pedestrians with sight disabilities.

406.16.12 Graphics. More powerful visual graphics are encouraged as well as expanded use of detectable warnings, smart signs, variable message signs. Use textural and pigmented roadbeds, especially for dangerous intersections. This includes material, color and aggregate to alert both pedestrians and drivers. Reduce stress, confusion and enhance intuitive use.

406.16.13 Pedestrian Billboards. NYC's Department of Information and Technology (DoITT) installation of public smart phones with screens to be used as pedestrian billboards that may potentially provide traffic alerts and other information about a particular intersection to alert pedestrians that is interfaced with the SPS for a particular intersection. See LinkNYC Section 708.8 Information/Emergency Terminal.

406.17 Illumination. Locate street lights to increase illumination at all crossing areas to enhance physical elements (curb, flares, ramp, etc) of the crossing for pedestrians and to increase visibility of the pedestrians from moving vehicles.

406.18 Corner Obstructions. Obstructions should be set back a minimum of 40 feet from the corner. These include but are not limited to: subway entrances , sidewalk cafes, bus stops (with and without shelter), fire hydrants/ standpipes, trees, benches, telephone booth/ kiosks, mail boxes, street lights, street signs, parking meters, manholes, cellar doors, transformer vaults and subway grates.

406.19 Tactile Guideways. Tactile Guideways are a form of wayfinding for pedestrians that are relevant to navigating sidewalks, curb ramps and crosswalks, APS and SPS. See Section 714.20, Tactile Guideways for additional information.

407 Elevators

407.1 General. Elevators should comply with Section 407 and *ASME A17.1* listed in Section 105.2.7. Elevators should be passenger elevators as classified by *ASME A17.1.* Elevator operation should be automatic. At least two elevators are recommended to allow continuous operation regardless of failure, repair or maintenance. Two elevators allow phasing of work. Safety and access can be maintained and continuous service will avoid stranding those with limited physical abilities and those that require mobility devices that cannot navigate stairs, especially in taller buildings. Consider a portable platform lift stair climber, complying with Section 411 for use as a single elevator building back-up. This allows both egress and ingress whereas evacuation chairs are primarily for egress. But with the assistance of two people ingress may be possible in an emergency but not for daily assistance up and downstairs. See Section 411.1.

407.1 Advisory. A standard elevator should be used where feasible rather than a LULA. Destination-oriented elevators are recommended for operational advantages. LULA's complying with Section 408 must comply with limitations as per *2014 NYCBC* Section 1109.6.1, and recommended for dwelling units as a substitution for a residential elevator. A LULA should be used only if a standard elevator is not feasible with an MOPD waiver [e.g. buildings with a narrow footprint or maximum of 3 floors and less than 10,000 sf. and limited to 25 feet of travel height). LULA's may typically only substitute wheelchair lifts or private residence elevators, but is not approved as an alternative for a standard elevator.

407.1 Advisory cont'd. Residential elevators are very limited and are intended for dedicated usage. Small elevation changes may be accomplished with a platform lift complying with Section 410. Platform lifts shall not serve as part of an accessible means of egress, except as allowed as part of a required accessible route in *2014 NYCBC* Section 1109.7. Enclosed platform lifts are an economical alterative for dwelling units, but are slow, and limited to two contiguous floors with limited automatic operation. An elevator for accessible emergency egress in high-rise buildings is required as per the *2014 NYCBC* Sections 1007.2.1, 1007.4, 403 and at least one car must accommodate an ambulance stretcher as per Section 3002.4.2.

This includes emergency operation and signaling device requirements, emergency power and access from an area of rescue assistance or horizontal exit in addition to other requirements. Typically, elevators are automatically recalled to the ground floor for Fire Department operation during a fire or emergency. There are many reasons for control override: entrapment, panic overloading, stoppage on event floor, fire and smoke penetration etc. Safety and usability of elevator systems, especially for high-rises during emergencies could be enhanced by maximizing resistance to fire, smoke, explosions, impacts and seismic events. Voice/ alarm communications should be supplemented with visual two-way communications. Door seals need to be very effective. Provide an emergency air supply in cab. Positive air pressure reduces smoke migration. Electrical components should be water resistant. Electrical components and wiring needs to be water resistant to prevent operation failure from water penetration from sprinklers and/or firehose discharge. See *IDG* Section 504.11 and *2014 NYCBC* Section 1007.6. See also *IDG* Sections 408, 409 and 410.

Active Design encourages less dependence on elevators and encourages more physical activity through the use of stairs for those who are physically capable.

407.2 Landing Requirements. Elevator landing requirements should comply with Section 407.2. The landing clear floor space for each elevator should be 72 inches (1830 mm) in width and 72 inches (1830 mm) in depth and centered on the opening. Use Tier 3 recommendations for institutional facilities as per *IDG* Section 304.3.3 and for high rise [occupied floor located more than 75 feet (22.9 m) above grade]. Differentiate landing using visual, tactile and auditory means.

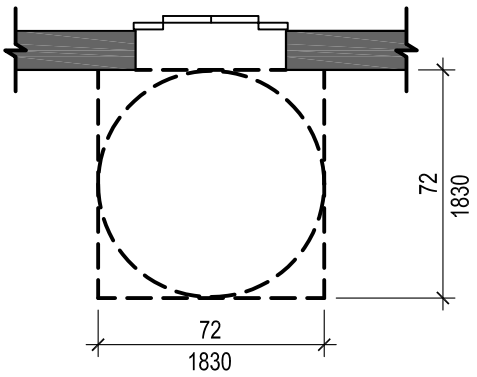


Fig. 407.2
Elevator Landing Clear Floor Space

407.2 Advisory. Consider tactile surface characteristics for the entire landing clear floor space complying with Section 302.6 or detectable surfaces complying with Section 302.7. Detectable surfaces such as a raised strip (corduroy) complying with Section 705.6 may be too aggressive for some applications. Truncated domes are inappropriate for this application.

407.2.1 Call Control. Elevator call buttons should be visual, audible and tactile, complying with Sections 407.2.1 and 309.4. Call buttons should be raised with tactile identifiers. Objects beneath hall call buttons should protrude 1 inch (25 mm) maximum.

407.2.1.1 Height. Call buttons and control panel components should be located between 36 inches (975 mm) and 48 inches (1220 mm) measured to the center line of the control to the floor.

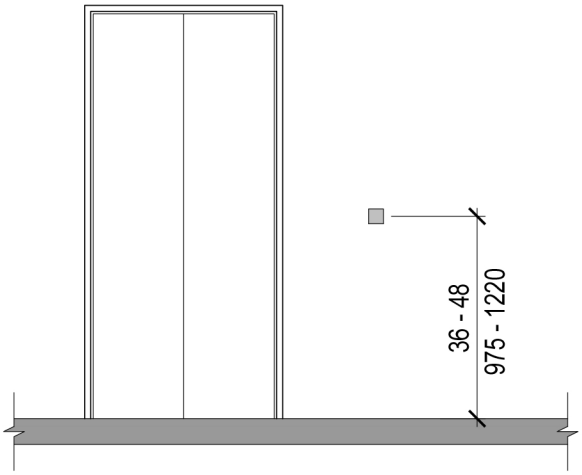


Fig. 407.2.1.1
Height of Elevator Call Buttons

407.2.1.2 Size. Call buttons should be 1 inch (25 mm) minimum in the smallest dimension of the operable part of the bottom.

407.2.1.3 Clear Floor Space. A Tier I clear floor space complying with Section 305 should be provided at the controls. This may overlap with the 72 x 72 inch landing recommendation.

407.2.1.4 Location. The call button that designates the up direction should be located above the call button that designates the down direction.

407.2.1.5 Signals. Call buttons should have visible, auditory and tactile signals to indicate when each call is registered and when each call is answered.

407.2.1.6 Keypads. Where keypads are provided, keypads should be a standard telephone arrangement and should comply with Section 407.4.7.2.

407.2.1.7 Destination-oriented Elevator Signals. Destination-oriented elevators should be provided with visible, audible and tactile signals to indicate which car is responding to a call. These should be activated by pressing a function button. The function button should be identified by the international Symbol of Accessibility and tactile indication. The symbol should comply with Section 703.6.3.1 and should be 5/8 inch (16 mm) in height and be a raised tactile character complying with Section 703.2. The tactile indication should also be three raised dots, spaced 1/4 inch (6.4 mm) at base diameter, in the form of an equilateral triangle. The function button should be located immediately below the key pad arrangement of the floor buttons, 1-inch (25 mm) high and the width of the keypad. Each control button should be 1 inch (25 mm) minimum height and 1 inch (25 mm) minimum in width.

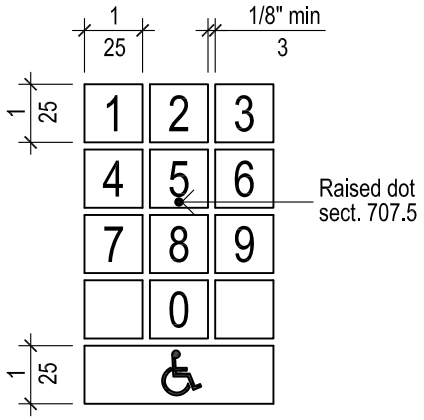


Fig 407.2.1.7
Destination-Oriented Elevator Control Buttons

407.2.1.7 Advisory. This system provides an effective alternative to standard controls. It increases dispatching efficiency and reduces congestion by distributing loading and reducing response time. The rider keys in the desired floor at the floor lobby, the designated car arrives and automatically takes the rider to that floor. There are some concerns by people with mobility disabilities and visual disabilities regarding this system that it does not work effectively for them. One must understand the system, locate their elevator, if in a bank of elevators, and efficiently board.

407.2.1.7.1 Verbal Annunciator. Provide a verbal annunciator for the function button. Pressing the function button should activate the verbal annunciator that indicates activation by saying “hello”, directs the user to key in the desired floor number, identifies which car is responding, left or right of the keypad, provides approximate time of arrival, and wishes the user a nice day.

407.2.1.7.1.1 Elevator Operational Scenario for People with a Sight Disability. People who have sight disabilities are at a disadvantage if they are the only passenger. An enhanced dispatch system is helpful. A person may simply ask another passenger which car has arrived or to press a floor button for them or to confirm that the car has arrived on their floor. Locating one floor out of a panel of fifty floor buttons is a problem for some requiring feeling the panel with their finger to locate the row and column to locate the correct button. Destination confirmation may require others to confirm. This reduces one’s level of independence and draws unwanted attention to the person’s disability. In a crowded car if that person is forced in a corner there are other concerns such as proximity to the controls and adequate time to navigate around other passengers when the floor is reached.

This is not to suggest that taking an elevator is a journey, but the needs and preferences of everyone should be taken into consideration.

Below is an operational scenario for people who are blind and frustrated with the ubiquitous standard elevators systems.

1. Locate hall buttons between every two cars rather than a single button on each wall. Physical call buttons should still be used. Verbal commands are highly recommended and may be supplemental and redundant to buttons and should accept a variety of elevator requests: “Car,” or “Next Car,” or “I need to get to floor (#) or the business name or person’s name or something else conveyed verbally.

2. Hall button activation confirmation from a dedicated speaker for each hall button: “Request Confirmed” button lights. Tactile confirmation by button vibration with 3 second minimum duration.

3. Pre-arrival floor lobby announcement with dedicated speaker located at each car door: “Car Arriving Here.” This provides sufficient time to maneuver within proximity of the next car.

4. Arrival announcement: “Unloading,” then after 5 seconds, change to“Boarding.”

5. Enter car and request floor: “7 (example floor).”

6. Confirmation: “7 Confirmed.”

7. Do not use a continuous floor count because it is tedious.

8. Floor arrival confirmation: “7 Unloading.”

9. Reverse steps upon leaving floor.

407.2.1.7.1.1 Advisory. Layout of elevators is important. A bank in a straight line is easier to view all cabs. If a circle or other non-typical configuration is used, one may not be able to see all cars from a particular point of view.

407.2.1.7.2 Visual Annunciator. Provide a visual annunciator for the function button. Characters should comply with Section 703.2. Pressing the function button should activate the visual annunciator that indicates activation by displaying “hello”, directs the user to key in the desired floor number, identifies which car is responding, left or right of the keypad, provides approximate time of arrival and wishes the user a nice day.

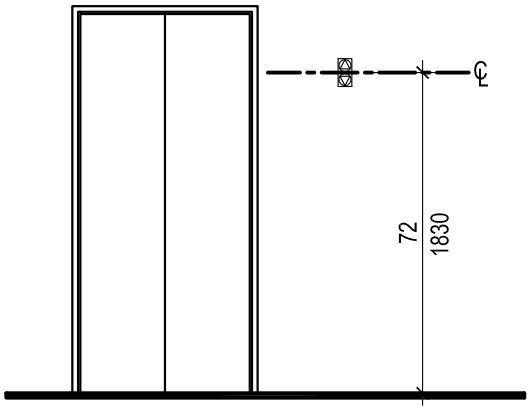
407.2.1.7.3 Tactile Annunciator. Provide a tactile annunciator and vibrating function button complying with Section 309.7.

407.2.1.8 Seating. Consider providing seating at each landing that complies with Section 903. Seating should not conflict with the clear floor space. Consider a recessed alcove that will not obstruct the landing or place seating within close proximity.

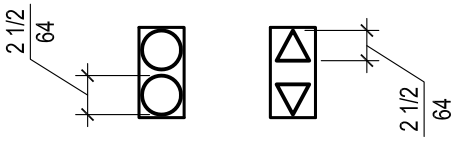
407.2.2 Hall Signals. Hall signals, including in-car signals, should comply with Section 407.2.2.

407.2.2.1 Visible, Audible and Tactile Signals. A visible, audible and tactile signal should be provided at each hoistway entrance to indicate which car is answering a call and the car’s direction of travel. In-car signals should be visible from the floor area adjacent to the call button.

407.2.2.2 Visible Signals. Visible signal fixtures should be centered at 72 inches (1830 mm) minimum above the floor. The visible lighted signal elements should be 2-1/2 inches (64 mm) minimum measured along the vertical center line of the element. Signals should be visible from the floor adjacent to the hall call button.



(a)
Height of Signals



(b)
Size of Signals

Fig. 407.2.2.2
Elevator Visible Signals

407.2.2.3 Audible Signals. Audible signals should sound once for the up direction and twice for the down direction, or should have verbal annunciators that indicate the direction of elevator car travel. Audible signals should have a frequency of 1500 Hz maximum. Verbal annunciators should have a frequency of 300 Hz minimum and 3,000 Hz maximum. The audible signal or verbal annunciator should be 10 dBA minimum above ambient, but should not exceed 80 dBA, measured at the hall call button.

407.2.2.3 Advisory. Verbal annunciators should identify the next arriving car, number of the car, and location in a bank of elevators using compass direction. A typical announcement may be: “Car #3 arriving on the north side of lobby.” Verbal and tactile/vibration annunciators supplement visual signals and are a component of wayfinding; refer to Section 714. Consider substituting compass direction with “left” or “right” of the call button.

407.2.2.4 Tactile/Vibration Signals. Consider tactile/vibration signals complying with Section 309.7, tactile signage complying with Section 703.3, and the use of an information/navigation reference point system complying with Section 708.7 that uses vibration.

407.2.2.5 Differentiation. Each destination -oriented elevator in a bank of elevators should have audible, visible and tactile means for differentiation.

407.2.3 Hoistway Signs. Signs at elevator hoistways should comply with Section 407.2.3.

407.2.3.1 Floor Designation. Floor designation should be provided in tactile characters complying with Section 703.3 located on both jambs of elevator hoistway entrances. Section 703.3, Tactile Characters also requires compliance with Section 703.4., Braille. Tactile characters should be 2 inches (51 mm) minimum in height. A tactile star should be provided on both jambs at the main entry level.

407.2.3.2 Car Designations. Destination oriented elevators should provide car identification in tactile characters complying with Section 703.3 located on both jambs of the hoistway immediately below the floor designation. Tactile characters should be 2 inches (51 mm) minimum in height. Car identification should vibrate and comply with Section 309.7.

407.2.4 Destination Signs. Where signs indicate that elevators do not serve all landings, signs in tactile characters complying with Section 703.3 should be provided above the hall call button fixture.

407.3 Elevator Door. Hoistway and elevator car doors should comply with Section 407.3.

407.3.1 Type. Elevator doors should be horizontal sliding type. Car gates should be prohibited.

407.3.2 Operation. Elevator hoistway and car doors should open and close automatically.

407.3.3 Reopening Device. Elevator doors should be provided with a reopening device complying with Section 407.3.3 that should stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person.

407.3.3.1 Height. The reopening device should be activated by sensing an obstruction passing through the opening between 5 inches (125 mm) and 29 inches (735 mm) above the floor.

407.3.3.2 Contact. The reopening device should not require physical contact to be activated, although contact should be permitted before the door reverses.

407.3.3.3 Duration. The reopening device should remain effective for 20 seconds minimum.

407.3.4 Door and Signal Timing. The minimum acceptable time from notification that a car is answering a call until the doors of that car start to close should be calculated from the following equation:

T=D/(1.5 ft/s) or T=D/(455mm/s)=5 seconds minimum, where T equals the total time in seconds and D equals the distance (in feet or millimeters) from the point in the lobby or corridor 60 inches (1525 mm) directly in front of the farthest call button controlling that car to the center line of its hoistway door.

EXCEPTIONS: For cars with in-car lanterns, T should be permitted to begin when the signal is visible from the point 60 inches (1525 mm) directly in front of the farthest hall call button and the audible signal is sounded.

407.3.5 Door Delay. Elevator doors should remain fully open in response to a car call for 3 seconds minimum.

407.3.6 Width. Elevator door clear opening width should comply with Section 407.3.6.

407.3.6.1 Location. Elevator door location should be centered to avoid favoring one side of the cab and reducing access to the other side. Only place door to a side if restricted by structural or existing conditions.

407.3.6.2 Width. Elevator door clear opening width should be 42 inches (1065 mm) minimum.

407.4 Elevator Car Dimensions. Elevator cars should comply with Section 407.4.

407.4.1 Car Dimensions. Inside dimensions of the elevator cars should be 80 inches (2030) minimum in width and 72 inches (1830 mm) minimum in depth.

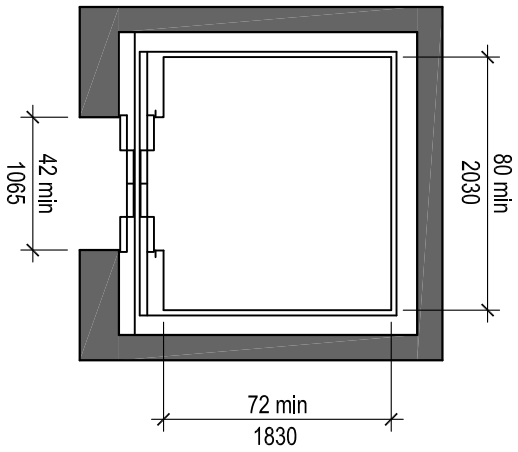


Fig. 407.4.1
Inside Dimension of Elevator Cars

407.4.1 Advisory. Due to limited time for navigating to and into the elevator, and taking into account other occupants and angled entry, it is advantageous for a person using a mobility device to have a 42 inch door opening. This allows some forgiveness for maneuvering errors. A turning space within the cab should be provided to allow a 180 degree turn for forward entry and exit. Based on *A117.1-2009*, Table 407.4.1 the legal inside car side to car side dimension for a centered 42 inch door is 80 inches. At a minimum it is recommended to use a 36 door (any location) with a 72 inch x 72 inch cab. Also, consider a fold down seat for institutional facilities (e.g. hospitals and assisted living) complying with Section 903. As per the *2014 NYCBC*, Section 3002.4.2, at least one elevator subject to Section 3003.3 shall be provided with an elevator car of such size and arrangement to accommodate an ambulance stretcher 24 inches (610 mm) by 84 inches (2134 mm) minimum with not less than a 5 inch (127 mm) radius corners and shall be identified by the international symbol for emergency medical services (star of life) complying with Section 703.6.3.13 See *2014 NYCBC*,Chapter 30 for additional requirements.

407.4.2. Floor Surfaces. Floor surfaces in elevator cars should comply with Section 302.

407.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing should be in compliance with *ASME/ANSI A17.1* listed in Section 105.2.5.

407.4.4 Leveling. Each car should be equipped with a self-leveling feature that will automatically bring and maintain the car at floor landings within a tolerance of ½ inch (13 mm) under rated loading to zero loading conditions.

407.4.5 Illumination. The level of illumination at car controls, platform, car threshold and landing sill should be 5 foot-candles (54 lux) minimum.

407.4.6 Elevator Car Controls. Controls should be located as close as possible to both interior cab sides of the door opening. Elevator car controls should comply with Sections 407.4.6 and 309.

407.4.6.1 Location. The highest operable parts should be 48 inches (1220 mm) and the lowest operable parts should be 36 inches (915 mm). Consider locating the car controls 42-48 inches (1070-1220 mm) within this 6-inch (152 mm) comfort zone overlap for both seated and standing positions complying with Section 309.3.3

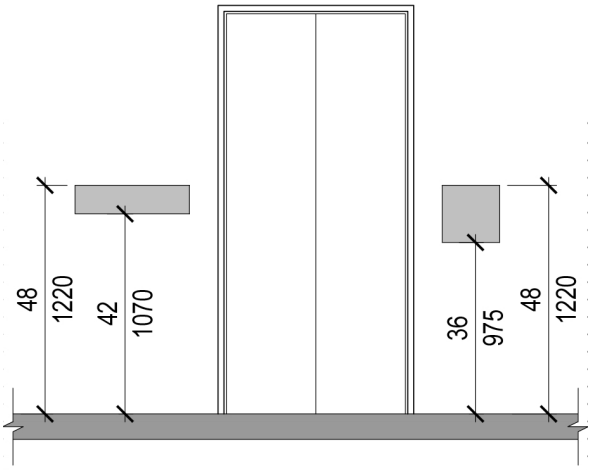


Fig. 407.4.6.1
Location

407.4.6.1 Advisory. Conventional control panel locations just need to be within one of the reach ranges specified in Section 309. The 36 to 48 inch high horizontal band is relatively narrow to accommodate a complete set of dedicated floor buttons for tall buildings. A larger 24 to 48 inch high comfort seated reach zone compiles with Section 309.3.1. Destination oriented elevators help resolve dedicated button concerns. Another option is to use a call sequential step scanning control and place it within the recommended upper 36 to 48 inch height.

The most accommodating solution is to use the comfort zones overlap heights for both a standing and seated position as per Section 309.3.3. This will require locating the control panel within a narrow 6-inch horizontal band. This may be better suited for destination oriented elevators especially for building with many floors, but is still possible for conventional elevator panels. By extending the width of the control panel, many floor buttons can be accommodated while increase usability for both standing and seated passengers.

407.4.6.2 Buttons. Car control buttons with floor designations should be raised and should comply with Section 407.4.6.2. Consider providing visual, tactile and auditory activation indication.

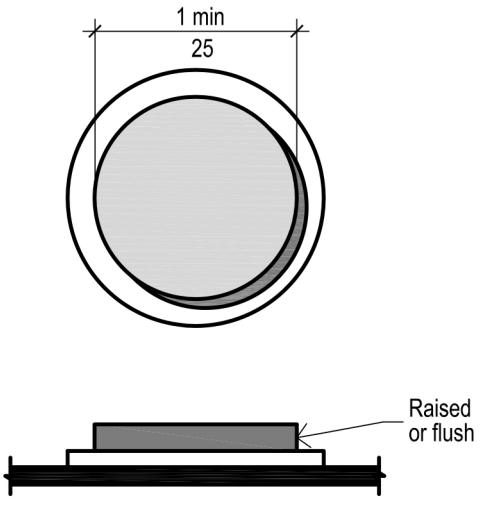


Fig. 407.4.6.2
Elevator Car Control Buttons

407.4.6.2.1 Size. Buttons should be 1 inch (25 mm) minimum in their smallest dimension.

407.4.6.2.2 Arrangement. Buttons should be arranged with numbers in ascending order. Floors should be designated ... -4, -3, -1, 0, 1, 2, 3, 4, etcetera, with floors below the main entry floor designated with minus numbers. Numbers should be permitted to be omitted, provided the remaining numbers are in sequence. When two or more columns or buttons are provided, they should read from left to right.

407.4.6.2.3 Contrast. Provide contrasting colors for car control buttons complying with Section 703.2.10.

407.4.6.3 Keypads. Car control keypads should be in a standard telephone keypad arrangement and should comply with Section 407.4.7.2.

407.4.6.4 Emergency Controls. Emergency controls should comply with Section 407.4.6.4.

407.4.6.4.1 Height. Emergency control buttons should have their center lines 36 inches (915 mm) to 38 inches (965 mm) above the floor.

407.4.6.4.2 Location. Emergency controls, including the emergency alarm should be grouped at the bottom of the panel.

407.4.7 Designations and Indicators of Car Controls. Designations and indicators of car controls should comply with Section 407.4.7.

407.4.7.1 Buttons. Car control buttons should comply with Section 407.4.7.1. Provide finish and contrast complying with Sections 703.2.10 and 703.3.12.

407.4.7.1.1 Type. Control buttons should be identified by back lite tactile characters complying with Section 703.3.

407.4.7.1.2 Location. Tactile characters and Braille designations should be placed immediately to the left of the control button to which the designations apply. Where a negative number is used to indicate a negative floor, the Braille designation should be a cell with the dots 3 and 6 followed by the ordinal number.

407.4.7.1.3 Symbols. The control button for the emergency stop, alarm, door open, door close, main entry floor, and phone, should be identified with tactile symbols as shown in Table 407.4.7.1.3.

407.4.7.1.4 Visible Indicators. Buttons with floor designations should be provided with visible indicators to show that a call has been registered. The visible indication should extinguish when the car arrives at the designated floor.

407.4.7.2 Keypads. Keypads should be identified by back lit tactile characters complying with Section 703.3 and should be centered on the corresponding keypad button. The number five key should have a single raised dot. The dot should have a base diameter of 0.118 inch (3 mm) minimum to 0.120 inch (3.05 mm) maximum, and a height of 0.025 inch (0.6 mm) minimum to 0.037 inch (0.9 mm) maximum. Keypad should be numeric only with a 12-key ascending telephone keypad layout and should comply with Section 707.5. Key pad keys should be a minimum of 1 inch (25 mm) in width and 1 inch (25 mm) in length.

407.4.7.2 Advisory. People with low vision have difficulty with keypads. They may be either an ascending order like a telephone or descending like a computer keyboard. Tactile numbers will help confirm the order and identify the number. The one inch minimum key size will enhance usability and speed.

407.4.8 Elevator Car Call Sequential Step Scanning. Elevator car call sequential step scanning should be provided where car control panels cannot comply with Section 407.4.6.1. Floor selection should be accomplished by applying momentary or constant pressure to the up or down scan button. The up scan button should sequentially select floors above the current floor. The down scan button should sequentially select floors below the current floor. When pressure is removed from the up or down scan button for more than 2 seconds, the last floor selected should be registered as a car call. The up and down scan button should be located adjacent to or immediately above the emergency control buttons.

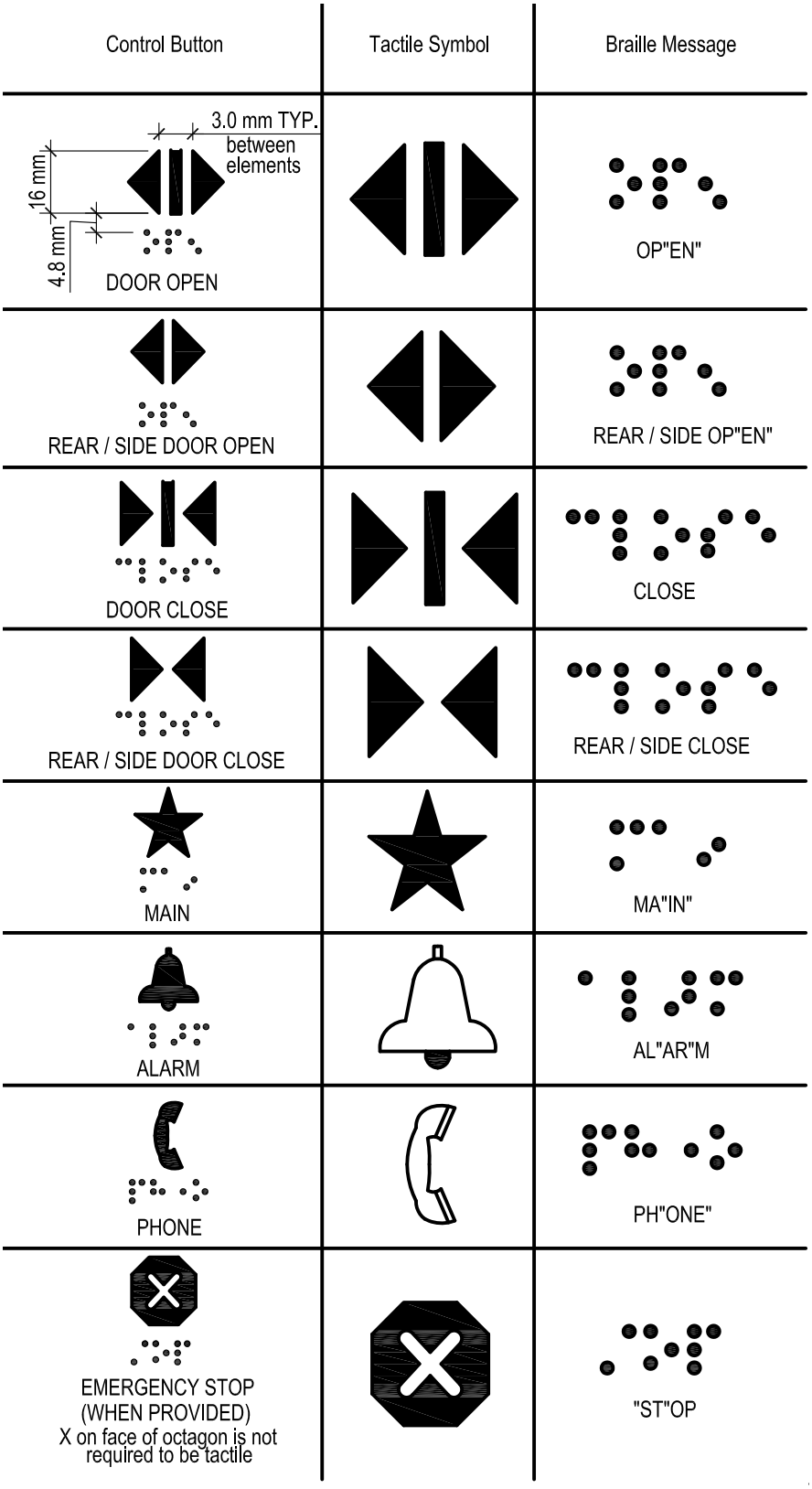


Fig. 407.4.7.1.3
Control Button Identification

407.4.8 Advisory. Based on the reduced reach ranges in Section 308. This forms a narrow band because it reduces the overall height of the band. This does not provide enough vertical space for a button dedicated to each floor in a high rise building and the other components of the elevator controls. This will result in the floor buttons being placed horizontally and extending towards the back of the cab or vertically that may exceed the high reach range. The logical choice for many buildings in New York City, may be the use of destination oriented elevators or sequential step scanning. A potential problem is unfamiliarity by the general public regarding the use of this system because it is not commonly used in the City. It is a good alternative to destination oriented elevators (with refinements).

407.4.9 Car Position Indicators. Audible and visual indicators should be provided on elevator cars.

407.4.9.1 Visible Indicators. Visible indicators should comply with 407.4.9.1.

407.4.9.1.1 Size. Characters should be 1 inch (25 mm) minimum in height.

407.4.9.1.2 Location. Indicators should be located above the car control panel or above the door.

407.4.9.2 Audible indicators. Audible indicators should comply with Section 407.4.9.2.

407.4.9.2.1 Signal Type. The signal should be an automatic verbal annunciator that announces the floor at which the car is about to stop. The verbal announcement indicating the floor should be completed prior to the initiation of the door opening.

407.4.9.2.2 Signal Level. The verbal annunciator should be 10 dBa minimum above ambient, but should not exceed 80 dBa, measured at the annunciator.

407.4.9.2.3 Frequency. The verbal annunciator should have a frequency of 300 Hz minimum to 3,000 Hz maximum.

407.4.10 Emergency Communications. Emergency two-way communication systems between the elevator car and a point outside the hoistway should comply with Section 407.4.10 and *ASMA/ANSI A17.1/CSA B44* listed in Section 105.2.5 and Section 708 for two-way communications systems including visual communication as per Section 708.5.

407.4.10.1 Height. Operable parts of a two-way communication system should be located between 36 inches (915 mm) and 48 inches (1220 mm) measured to the center line of the device to the floor.

407.4.10.2 Identification. Tactile characters complying with Section 703.3 and symbols complying with Section 407.4.7.1.3 should be provided adjacent to the device.

407.4.10.3 Instructions. Where instructions are provided, essential information should be presented in visual, raised characters and Braille complying with Sections 70.3, 703.3 and 703.4.

407.4.11 Visual and Audible Communications. A closed circuit TV system that allows two-way visual and audible communication as per Section 708 should be provided.

407.4.11.1 Monitors. Elevator cars should be provided with monitors located within the car controls location as per 407.4.1 or between 35 inches (890 mm) and 48 inches (1220 mm). An additional monitor should be centered at 72 inches (1830 mm) above the floor measured to the center line of the screen on both car walls adjacent to the door.

407.4.11.2 Optional Keyboard. When the keyboard is activated an automatic alert should be triggered at the lobby desk or security desk. The requisite monitors will display the typed communications. Comply with Section 704.4 TTY and 704.6 TTY shelf.

407.4.12 Handrails. Handrails should be provided in elevator cars and should comply with Section 505. Handrails should not obstruct control panel.

407.4.12 Advisory. Handrails are recommended for children and for those that have difficulty standing.

408 Limited-Use / Limited-Application Elevators (LULA)

408.1 General. This type of elevator is not recommended for inclusive applications due to space and operational restrictions, except within dwelling units and complying with Section 1007.2, Limited-use/limited-application elevators should comply with Section 408 and *ASME A17.1* listed in Section 408 and *ASME A17.1* listed in Section 105.2.5. Operation should be automatic.

408.1 Advisory. A LULA has all the features of a full commercial elevator and functions the same except it is limited in travel, capacity and size. LULA's are limited to a travel height of 25 feet or less, a capacity of 1400 lbs., and a clear platform size of 18 sq. ft.. LULA's should be used only if a full size commercial elevator is not technically feasible due to the foot print of the building and the limited travel height. LULA's are limited to three consecutive floors.

408.1a Advisory. A standard elevator should be used where feasible rather than a LULA and a LULA is preferred to vertical platform lifts in most applications. LULA's complying with Section 408 must comply with limitations as per *2014 NYCBC* Section 1109.6.1, and recommended for dwelling units as a substitution for a residential elevator. A LULA should be used only if a standard elevator is not feasible, and requires an MOPD waiver (e.g. buildings with a narrow footprint or maximum of 3 floors and less than 10,000 s.f. and limited to 25 feet of travel height). LULA's may typically only substitute wheelchair lifts or private residence elevators, but is not approved as an alternative for a standard elevator. Though the *2014 NYCBC* limits their use to 10,000 s.f. there are some very good places such as to serve a roof deck in a high rise or a split floor in a high rise lobby. There may be other ways to expand their usage by scoping allowable areas.

408.2 Elevator Landing. Landings serving limited-use/limited-application elevators should comply with Section 408.2.

408.2.1 Call Controls. Call buttons and keypads should comply with Section 407.2.1.

408.2.2 Hall Signals. Hall signals should comply with Section 407.2.2.

408.2.3 Hoistway Signs. Signs at hoistway doors should comply with Section 408.3.

408.2.4 Clear Floor Space. Clear floor space should comply with Section 407.2. Consider the use of tactile surface characteristics to distinguish from other floor surfaces.

408.3 Elevator Door. Hoistway doors should comply with Section 408.3.

408.3.1 Sliding Doors. Sliding hoistway and car doors should comply with Sections 407.3.1 through 407.3.3, and 408.3.3.

408.3.2 Swinging Doors. Swinging hoistway doors should open and close automatically and should comply with Sections 408.3.2, 404, and 407.3.2.

408.3.2.1 Power Operation. Swinging doors should be power-operated and should comply with *ANSI/BHMA A156.19* listed in Section 105.2.3.

408.3.2.2 Duration. Power-operated swinging doors should remain open for 20 seconds minimum when activated.

408.3.3 Door Location and Width. Car doors should provide a clear opening width of 36 inches (915 mm) minimum. Car doors should be positioned at a narrow end of the car.

408.4 Elevator Car Requirements. Elevator cars should comply with Section 408.4.

408.4.1 Inside Dimensions of Elevator Cars. Elevator cars should provide a clear floor area of 42 inches (1065 mm) minimum in width, and 60 inches (1524 mm) minimum in depth.The clear fllor area should not be less than 15.75 sf (1.46 m^2).

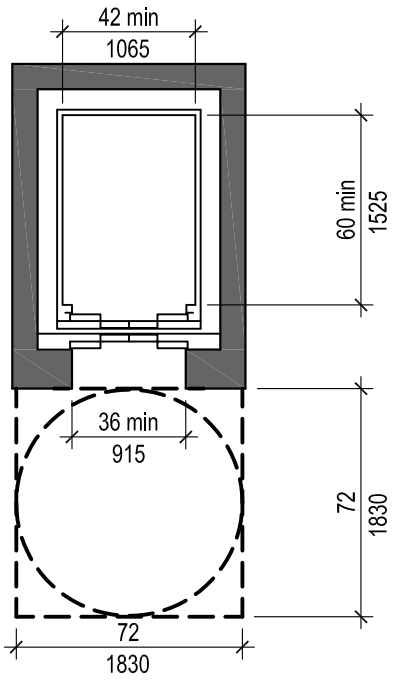


Fig. 408.4.1
Inside Dimensions of Limited-Use/ Limited-Application (LULA) Elevator Cars.

408.4.1 Advisory. The maximum platform size allowed by code for a LULA, is the *ASME 17.1* requirement of 18 square feet. A 42" x 60" is 17.5 square feet, slightly under the maximum. This maximum leaves few options. The 42 inch width is necessary to allow some side maneuvering clearance and the 60 inch length accommodates scooters and those who use wheelchairs with their legs extended, etc.

408.4.2 Floor Surface. Floor surfaces in elevator cars should comply with Section 302.

408.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing should be in compliance with *ASME/ANSI A17.1* listed in Section 105.2.5.

408.4.4 Leveling. Elevator car leveling should comply with Section 407.4.4.

408.4.5 Illumination. Elevator illumination should comply with Section 407.4.5.

408.4.6 Elevator Car Controls. Elevator car controls should comply with Section 407.4.6. Control panels should be centered on a sidewall.

408.4.7 Designations and Indicators of Car Controls Designations and indicators of car controls should comply with Section 407.4.7.

408.4.8 Emergency Communications. Car emergency signaling devices complying with Section 407.4.10 should be provided.

409 Private Residence Elevators

409.1 General. Private residence elevators should comply with Section 409 and *ASME A17.1/ CSA B44* listed in Section 105.2.5. Operation should be automatic. Use within dwelling units is supplemental to standard elevators and LULA's and should comply with Section 1007.3, Private residence elevators should comply with Section 409 and *ASME/ANSI A17.1* listed in Section 105.2.5.

409.1 Advisory. Private residence elevators should only be considered if a standard elevator, LULA or platform lift are not viable choices. A private residence elevator may have a maximum rise of 50 feet (15 m), but contains a smaller maximum 15 ft^2 platform area. The 15 square feet allows a 36" x 60" clear floor space complying with Section 305. This is larger than the legal minimum (30" x 48") and accommodates a variety of user scenarios.

409.2 Landing. Clear floor space should comply with Section 407.2.

409.2.1 Call Buttons. Call buttons at elevator landings should comply with Section 309. Call buttons should be 1 inch (25 mm) minimum in their smallest dimension.

409.3 Doors and Gates. Elevator car and hoistway doors and gates should comply with Sections 409.3 and 404.

EXCEPTION: The maneuvering clearances required by Section 404.2.3 should not apply for approaches to the push side of swinging doors.

409.3.1 Power Operation. Elevator car doors and gates should be power operated and should comply with *ANSI BHMA 156.19* listed in Section 105.2.3. Elevator cars with a single opening should have a low energy power operated hoistway doors and gates.

409.3.1 Advisory. ANSI allows the use of manual-open, self-close type hoistway doors. But this restricts the use of the elevator by some. Automatic doors are strongly recommended. Manual doors cannot be operated by everyone. Maneuvering clearances are very tight. If the occupant is carrying packages, it is a juggling act. Installation within a unit and rider limitations does not justify a reduction in usability. Usability should not be reduced to accommodate available space unless there are no other viable options.

409.3.2 Duration. Power operated doors and gates should remain open for 20 seconds minimum when activated.

409.3.3 Door or Gate Location. Car gates or doors should be positioned at a narrow end of the clear floor area required by Section 409.4.1. Door should have a clear opening width of 36 inches (915 mm).

409.4 Elevator Car Requirements. Elevator cars should comply with Section 409.4.

409.4.1 Inside Dimensions of Elevator Cars. Residential elevator cars should provide a clear floor area 36 inches (915 mm) minimum in width and 60 inches (1525 mm) minimum in depth.

409.4.1 Advisory. The dimensions are not minimums. They are viable dimensions based on the legal requirements as per ASME A17.1. The interior is too small to be inclusive. A multilevel dwelling unit is not inclusive by the installation of this type of elevator. A LULA should be considered unless the building is over three stories.

409.4.2 Floor Surfaces. Floor surfaces in elevator cars should comply with Section 302.

409.4.3 Platform to Hoistway Clearances. The clearances between the car platform sill and the edge of any hoistway landing should be 1 1/4 inches (32 mm) maximum.

409.4.4 Leveling. Each car should automatically stop at a floor landing within a tolerance of 1/2 inch (13 mm) under rated loading to zero loading conditions.

409.4.5 Illumination. The level of illumination at the car controls, platform, and car threshold and landing sill should be 5 foot-candles (54 lux) minimum.

409.4.6 Elevator Car Controls. Elevator car controls should comply with Section 409.4.6 and 309.4.

409.4.6.1 Buttons. Control buttons should be 1 inch (25 mm) minimum in their smallest dimension. Control buttons should be raised or flush.

409.4.6.2 Height. Buttons with floor designations should comply with Section 309.3.

409.4.6.3 Location. Controls should be on a sidewall, 12 inches (305 mm) minimum from any adjacent wall.

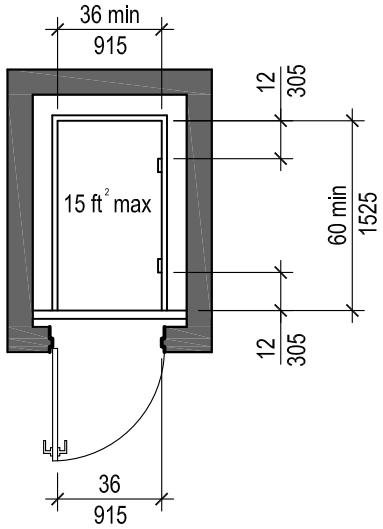


Fig. 409.4.6.3
Location of Controls in Private Residence Elevators

409.4.7 Emergency Communications. Emergency communications systems should comply with Section 409.4.7. Provide a telephone that should comply with Section 704.2.2 and Section 704.3. Provide an emergency signaling device complying with 702.2.

409.4.7.1 Type. A telephone and emergency signal device should be provided in the car.

409.4.7.2 Operable Parts. The telephone and emergency signaling device should comply with Section 309.3.

409.4.7.3 Compartment. If the device is in a closed compartment, the compartment door hardware should comply with Section 309.

409.4.7.4 Telephone Cord. The telephone cord should be 29 inches (735 mm) minimum in length.

410 Platform Lifts

410.1 General. Platform lifts should comply with Section 410 and *ASME/ANSI A18.1-1999* with *Addenda A18.1a-2001* and *A18.1b-2001*. listed in Section 105.2.6. that differentiates general installations from private residence installations. Platform lifts should not be attendant operated and should provide unassisted entry and exit from the lift. Platform lifts are not generally recommended, but there are situations where they may provide a solution where other vertical circulation is not viable. They should be permitted to be part of a route to the following:

1. Performance area(s) in occupancy Group A.
2. Wheelchair spaces in assembly areas.
3. Spaces not open to the general public with an occupant load of not more than five.
4. Within a dwelling unit or sleeping unit.
5. Raised judge's benches, clerks' stations, jury boxes, witness stands, or other raised or depressed areas in a court.
6. Where existing site constraints make use of a ramp or elevator infeasible.
7. Adjustable height inclusive spaces.

410.1 Advisory. Platform lifts are recommended for dwelling units. In other applications, they should only be considered for use where elevators and ramps are not feasible and for temporary installations. Only in very limited applications in new construction can a platform lift be used. In existing buildings, they are critical where no other option is viable Ensure that exterior lifts, are protected by locating under overhangs or covered, especially in areas subject to snow and ice accumulation. In addition to providing emergency communications, lifts should be under visual or video surveillance in case assistance is needed. Compliance with *A18.1* (see Section 105.2.6) is required by law and includes: continuous pressure up and down control switches, attendant call device, emergency stop switch, emergency alarms, audible signaling devices (that illuminate when actuated), two-way communication devices between unit and emergency personnel. In addition, refer to A18.1, Sections 210.1, 2.10.2, 210.6, 2.11, 2.11.1 and 2.11.2. In addition, there are several voluntary options, such as, stationary ramp in lieu of a flip-up ramp, grab bars, hand crank to raise and lower unit in case of power failure or mechanical breakdown, intermediate stopping and other features.

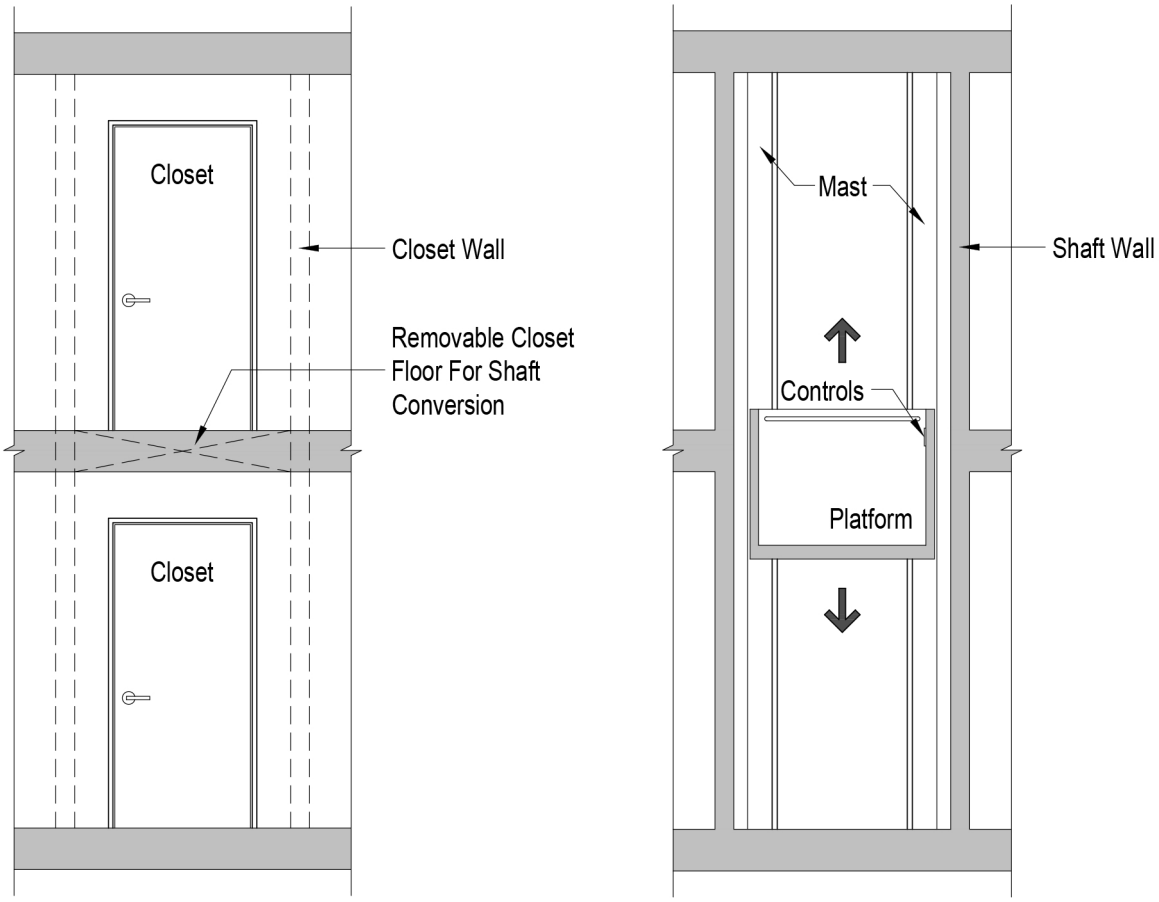
410.1.1 Vertical Platform Lifts. Vertical platform lifts as per *A18.1* are permitted 12 feet of travel (14 feet under new standard for residential and commercial applications) 15 square feet of platform size and a maximum speed of 30 ft per minute. Consult with equipment manufacturers regarding operation and to help the unit integrate with the immediate environment to reduce intrusiveness both spatially and aesthetically. See also Section 802.6.1 Adjustable Height Inclusive Spaces and Section 807.16 Witness Stands.

410.1.1 Advisory. Safety systems, mechanical system, communications, controls, lighting, and other requirements must comply with the *2014 NYCBC* and the applicable codes for platform lifts. An enclosed platform lift is limited to 12 ft of vertical rise (10 ft for residential lifts) and is slow at only 30 ft per minute. In case of power failure the system should provide a manual means of lowering the unit. It is recommended that standby power is provided for all platform lifts.

410.1.1.1 Enclosed Vertical Platform Lifts for Dwelling Units. In dwelling units, a vertical platform lift enclosed in construction having a minimum fire resistant rating of two hours and limited to two contiguous floors should be considered.

410.1.1.2 Adaptable Aligned Closet Enclosure in Dwelling Units. In dwelling units that do not require a lift at initial occupancy, two vertical contiguous closets should be located in proximity of the entrance with easily removable ceiling/floor assembly that does not damage the rated walls if removed. The shaft should be fully sheathed with 2-hour rated walls, including wall surfaces behind the adaptable ceiling/floor assembly. Doors may be located on the front, sides, or rear and can be a combination.

410.1.2 Inclined Platform Lifts. In dwelling units, inclined platform lifts are suggested as an alternative solution to an enclosed platform lift. Inclined platform lifts cannot conflict with means of egress.



(a)
Closet Configuration

(b)
Shaft Configuration

Fig. 410.1.1.2
Aligned Closets for Vertical Platform Lift Conversion

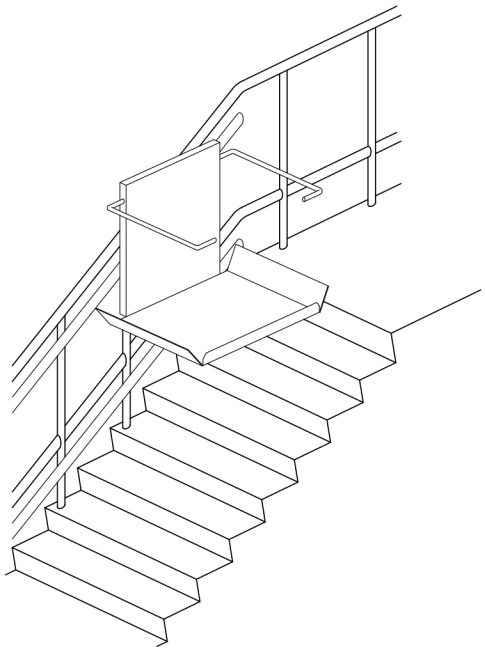


Fig. 410.1.2
Inclined Platform Lift

410.1.2 Advisory. Due to size, inclined platform lifts, will typically obstruct most if not the entire width of the communicating stair in a dwelling unit. These lifts are often intrusive. Refer to the *2014 NYCBC* Section 1009.1, Exception 4 for installations regarding Group R-2 and Group R-3 occupancies. A clear passage width not less than 20 inches (508 mm) is required. If the seat and platform can be folded when not in use, the distance shall be measured from the folded position. They do offer an advantage in that the vertical travel height is not limited like the vertical lifts. Stair location and continuity above two stories require careful planning for inclined platform lifts to function properly and for entering and exiting. Turns require fairly large unobstructed landings. Inclined platform lifts are not recommended for other applications unless there are no other viable choices. Do not use in NYC along a means of egress route, especially in fire stairs if they obstruct the route and conflict with the minimum legal width while in use. In New Jersey there are rules that allow installations on egress stairs when no other solution is technically feasible. Requirements include: tie into emergency power or use of a standby power system, auto fold/retraction, and tie into fire alarm system so the unit cannot be deployed in an emergency.

410.1.2 Advisory Cont'd. In some municipalities, automatic recall to the storage position is tied into the fire suppression system. Inclined platform lifts are limited as a temporary means of access during rehabilitation and maintenance of the elevator system. They should not be installed in fire stairs and thus would only be useful if there are communicating stairs that are not part of the required means of egress. See Section 407.1 regarding two elevator minimum recommendations.

410.1.2.1 Turns. Provide proper maneuvering clearance for turns. Indicate on floor plans the turning radius necessary to accommodate a 90 or 180 degree turn.

410.1.2.1 Advisory. If a platform lift is installed on stairs that contain turns or switchbacks, it is necessary to verify that both the stair width and landing contain enough clearance for the platform to make the turns. This should be shown in the design documents. It is useless to install a wide stair if proper landing sizes are not provided because the lift will not have sufficient space to turn. It will require the installation of a smaller and less useful platform.

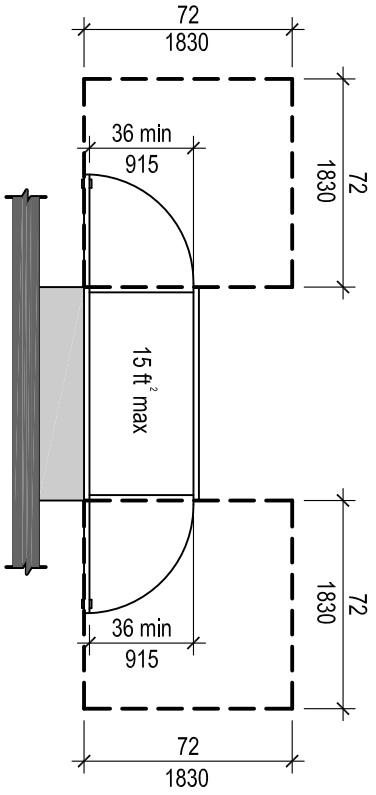
410.1.3 Stair Lifts for Dwelling Units. Stair lifts are inclined lifts with a transfer seat rather than a platform. These are only recommended in dwellings where the occupants can transfer from a wheeled mobility device and can ambulate or for the comfort and convenience of the occupants.

410.1.3 Advisory. Stair lifts provide comfort and convenience for some. It allows those with diminished mobility to navigate stairs within a dwelling unit. It is not appropriate for transfer from a mobility device since this will require a device at each level. The transfer sequence is awkward or dangerous for some. It is an economical and viable solution for some, especially for the elderly in existing buildings. Refer to the *2014 NYCBC* Section 1009.1, Exception 4 for installations regarding Group R-2 and Group R-3 occupancies.

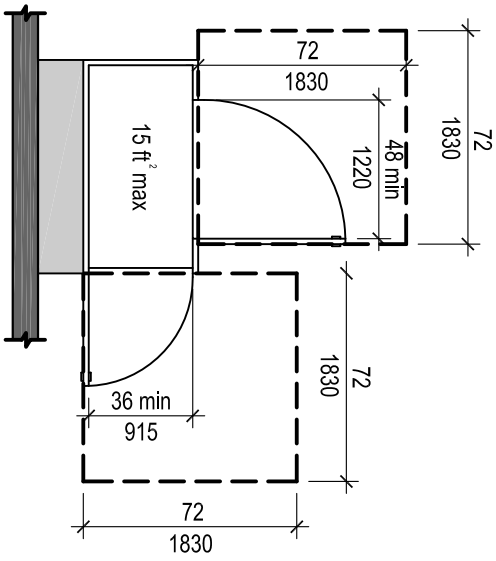
410.2 Lift Entry. Lifts with doors and gates should comply with Section 410.2.1. Lifts with ramps should comply with Section 410.2.2.

410.2.1 Doors and Gates. Doors and gates should be low energy power operated doors and gates complying with Section 404.3. Doors should remain open for 20 seconds minimum. End door clear opening width should be 36 inches (915 mm) minimum.

EXCEPTION: Lifts serving two landings maximum and having doors or gates on opposite sides should be permitted to have self-closing manual doors and gates.



(a)



(b)

Fig. 410.2.1
Platform Lift Doors and Gates

410.2.1.1 Alternate Side Entry. Side entry is not recommended due to maneuvering restrictions affecting people who use mobility devices. A side entry should only be considered when it is the only viable solution due to existing conditions, the door width should be 48 inches (1220 mm) minimum. The largest side door clear opening should be used while maintaining structural integrity of the platform enclosure. Provide a landing complying with Section 304 to allow sufficient maneuvering clearance to simplify entry and exit.

410.2.1.1 Advisory. The side entry requires the additional width to make the turn onto the platform. It is recommended to provide a platform width of 42 inches and a length of 60 inches for easier maneuvering staying within the 18 ft² maximum.

410.2.2 Ramps. End ramps should be at least as wide as the entry(s).

410.3 Floor Surfaces. Floor surfaces of platform lifts should comply with Section 302.

410.4 Platform to Runway Clearance. The clearance between the platform sill and the edge of any runway landing should be 1 1/4 inch (32 mm) maximum.

410.5 Clear Floor Space for Front and Rear Entry. Clear floor space of platform lifts should be 36 inches (915 mm) minimum width and 60 inches (1525 mm) minimum length complying with Section 305. Maximum platform size is 18 ft^2.

410.5.1 Clear Floor Space for Side Entry. Clear floor space for side entry should be 42 inches (1070 mm) minimum width and 60 inches (1525 mm) minimum length. Maximum platform size is 18 ft^2.

410.6 Operable Parts. Controls for platform lifts should comply with Section 309. Lifts should be universally keyed operation where security and safety is an issue, especially where children may have access to the lift. Automatic operation with a continuous pressure “on” button required by code increases user independence. Refer to *A18.1* for additional operational information: Section 2.10.1 Key Operation (optional); Section 2.10.2 Attendant Operation; Section 2.10.6 Emergency Stop Switch; 2.11 Emergency Signals; Section 2.11.1 for audible signaling devices; and Section 2.11.2 for two-way communications.

410.6 Advisory. Lifts should be provided with a dedicated back-up electrical circuit and capable of manual operation in case of power failure. Manual lowering is not allowed by occupant for safety reasons, but only by authorized personnel. It is recommended that back-up power is provided for all platform lifts. It is also suggested that in addition to the required battery back up on the alarm, all units should have a hands free phone just like elevators. It is also suggested to provide a bell, whistle, small compressed air horn or other non-electrical device that can be used to alert others in case all else fails.

410.7 Front and Rear Lift Landings. Front and rear lift landing should be a clear floor space 60 inches (1830 mm) in length and 42 inches (1830 mm) in width for a direct forward approach. Provide a clear floor space 72 inches (1830 mm) in length and 72 inches (1830 mm) in width for angle or perpendicular approach to the front or rear entry.

410.7.1 Side Lift Landing. Side lift landing should be a clear floor space 72 inches (1830 mm) in length and 72 inches (1830 mm) in width.

410.7.2 Edge Protection. Provide edge protection complying with Section 405.9.2. Provide detectable warning adjacent to lift entry(s).

410.8 Emergency Communications. Emergency communications systems should comply with Section 410.8.

410.8.1 Type. As per code, provide a means of two-way conversation between the car and emergency personnel. Refer to A18.1, Section 2.11.2.

410.8.2 Operable Parts. The telephone and emergency signaling device should comply with Section 309.3.

410.8.3 Compartment. If the device is in an enclosed compartment, the compartment door hardware should comply with Section 309.

410.8.4 Telephone Cord. If standard telephone is used the cord should be 29 inches (735 mm) minimum in length.

410.8.5 Emergency Assistance Alarm. An audible signaling device operable from the emergency stop switch or from a separate alarm switch is required by law. The switch, marked alarm, is required to illuminate when actuated. A signaling device must be audible inside the car and outside the runway. Refer to A18.1, Section 2.11.1 for additional information.

410.8.5.1 Dwelling Units. Platform lifts located in dwelling units should be provided with an emergency assistance alarm that is connected to a central alarm system. Consider a visual and audible annunciator on the exterior side of the primary entrance.

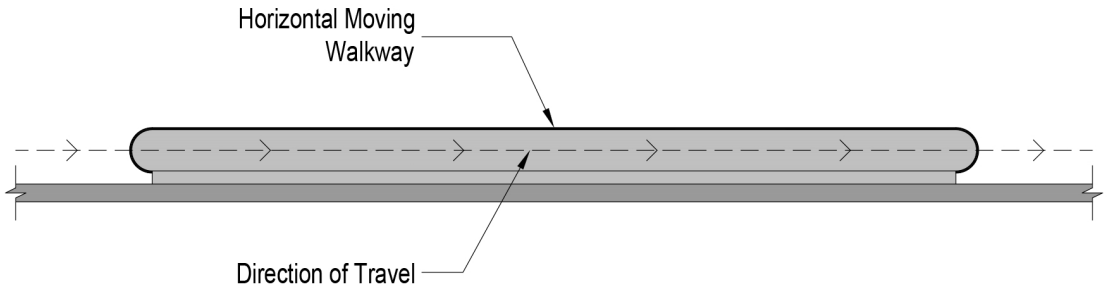
410.9 Storage. Provide recessed storage niche or compartment for lift in stationary positions at the bottom and/or top of run.

411. Portable platform lifts. Portable platform lifts should be self-contained units capable of navigating stair treads while carrying a seated person. Such units are recommended as a back-up in case of elevator power or mechanical failure, to supplement emergency systems during a fire or other emergency and as an interim means of providing vertical access during elevator maintenance. Portable platform lifts are recommended for all single elevator buildings. Units require an operator and are not intended to be occupant controlled.

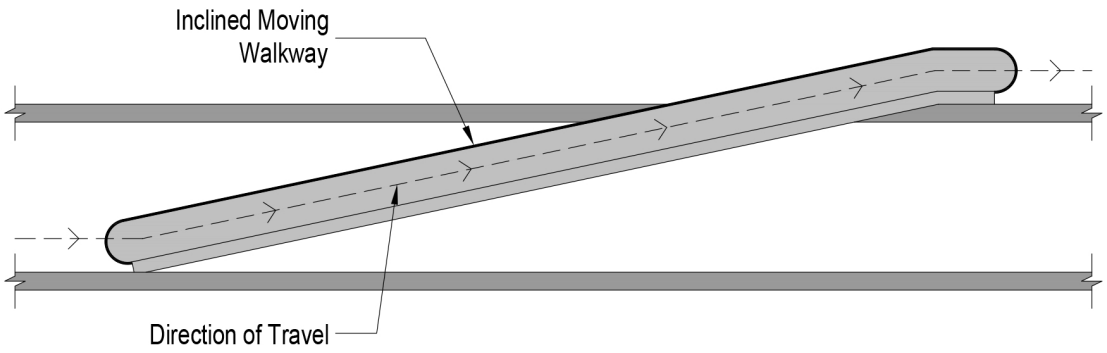
411 Advisory. Portable wheelchair lifts are often the only viable means of maintaining vertical access during repair, maintenance or rehabilitation of an elevator system. This is especially true in buildings containing a single elevator, where work cannot be phased. There are concerns regarding operator training, designation, hours of operation, level of convenience and minimum stair and landing clearances. At least one unit is recommended per building. Storage should be in close proximity of fire stairs and a dedicated closet should be considered for security reasons. Provide in the closet an outlet for battery charging and a dedicated small portable back-up generator.

411.1 Evacuation Chairs. Evacuation Chairs are primarily used for emergency egress. With the assistance of two people, ingress may be possible in an emergency, but not for daily assistance up and down stairs. See also Section 407.1.

412 Moving Walkways. Moving walkways should comply with Section 403.11.



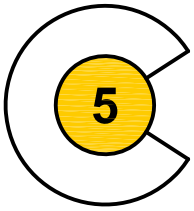
(a)
Horizontal



(b)
Inclined

Fig. 412
Moving Walkway

412 Advisory. Moving walkways are appropriate for large scale facilities such as airports, arenas, train stations, malls. They assist a wide range of users: parents with children, the elderly, people with baggage and packages, etc. They provide efficient ingress, egress and navigation through a facility, and can be used as part of the wayfinding to direct visitors to primary spaces.



General Site and Building Elements

500. Introduction. Chapter 5 includes: parking spaces and facilities, passenger loading zones, stairways, handrails and windows.

Parking spaces and facilities comprise inclusive vehicle spaces, standard vehicle spaces, passenger loading zones, bicycle parking, carriage and stroller storage, routes, spaces for large vehicles (e.g. buses), temporary parking, signage/wayfinding, weather protection, communications and lighting. An inclusive space accommodates either a car or a van, a variety of vehicle types and various entry and exit scenarios, including perpendicular configurations. Composition of the components makes a parking facility inclusive. It is not necessary and it is impractical to make all vehicle spaces inclusive due to need, size and other considerations, such as distance from a building entrance. Inclusive spaces should be located within close proximity and with the least circuitous route to the primary entrance(s). Routes to and from inclusive parking spaces should not normally pass behind parked vehicles for safety reasons. Parking facilities may also include: temporary/metered parking, valet parking drop-off, bus drop-off (including for Select Bus Service), speed reducers, barriers, wheel stops, rest areas, etc. A passenger loading zone uses a continuous sloped periphery that acts as a continuous ramp. Provide shelters with weather protection for exposed facilities, proper lighting, wayfinding and amenities such as seating, emergency alarms and help systems, telephones, trash and recycling receptacles and newspaper machines.

Bicycle/scooter/tricycle/handcycle/tandem bicycle parking is broken down into Class 1 and Class 2 facilities. These cover interior and exterior locations, floor/wall/ceiling spaces, standard and inclusive space sizes, signage, aisles, floor surfaces, emergency communications, lighting, security, seating and other amenities. The recommendations accommodate and encourage the use of bicycles, scooters, tricycles, handcyles and tandem bicycles to increase daily physical activity (see Section 105.3, Active Design Guidelines: Promoting Physical Activity and Health in Design). Scooter parking should have outlets for battery charging. Tricycle parking accommodates the elderly. Handcycles help those with diminished use of their legs and tandem bicycles assist those with sight disabilities. Carriage, stroller and cart storage may be part of the bicycle parking or located in a separate facility. Consider guard booths at areas that contain bicycle and stroller storage and where security is an issue. Consider bicycle share programs.

Stairways comprise treads, risers, surfaces, handrails, lighting, signage and communication elements, areas of refuge and other components. Stairs are not viable for people who use mobility devices and some people with limited dexterity, but are a vital component of the vertical circulation system. They should be easy to navigate and appealing to use for the widest range of people to encourage increased daily physical activity and to reduce reliance on mechanical vertical circulation systems (see Active Design Guidelines).

Handrails benefit everyone (e.g. children as well as elderly people with diminished dexterity and mobility, unsteady balance and reduced strength). Dual height handrail systems for children, used for decades in the NYC public school system, are early examples of inclusive design. Handrails can be used as part of a comprehensive wayfinding system.

Windows allow for both manual and automatic choices. Manual projected, recess and lever handle options as well as locking mechanisms and cleaning are covered. Natural illumination should be maximized, while glare should be minimized. Sunlight should be controlled to the advantage of the occupants with non-electrical means where possible (e.g. exterior shading system, awnings, overhangs, polarized and other types of glazing, blinds, shutters and shades).

501 General

501.1 Scope. The provisions of Chapter 5 should apply where recommended by the scoping provisions adopted by the administrative authority.

502 Parking Spaces and Facilities. Parking spaces and facilities should comply with Section 502. Inclusive spaces should comply with Section 502.1. Standard spaces and other types of spaces should comply with Section 502.2.

502 Advisory. It is not necessary and impractical to make all spaces inclusive due to size and other considerations, such as distance from a building entrance. Inclusive spaces are a component of inclusive parking accommodations. It is the composition of the components that makes the facility inclusive. This includes standard vehicle spaces, inclusive vehicle spaces, bicycle/scooter/tricycle/hand cycle/tandem bicycle spaces, carriage and stroller storage, routes, spaces for large vehicles (e.g. buses), temporary parking, signage, wayfinding, weather protection, communications and lighting.

502.1 Inclusive Parking Spaces. Inclusive parking spaces should comply with Section 502.1. The location of these spaces should be identified for drivers entering a parking lot or structure. They should be placed as close as possible to the entry of the facility or primary destination that the spaces serve. Where the location is not obvious or is distant from the approach or entrance viewpoint, directional signage should be placed along the route leading to them.

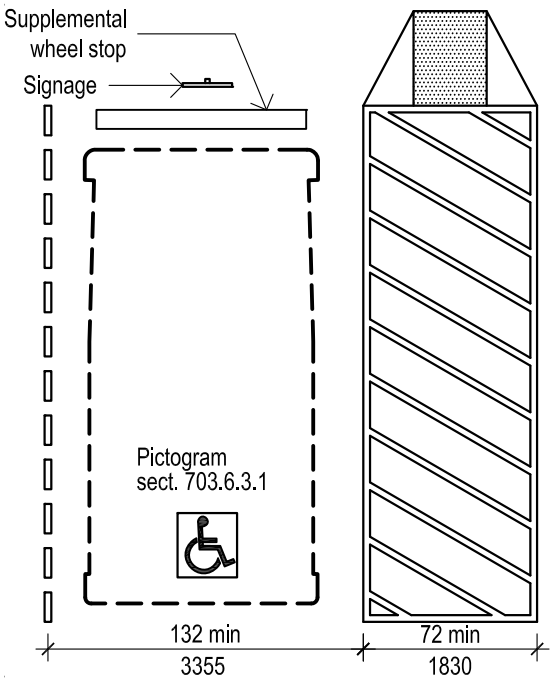


Fig. 502.1
Inclusive Parking Space

502.1 Advisory. Inclusive parking spaces should be placed as close as possible to entrances and require the least circuitous route to the facility that they serve. They may be located in alternative locations or a separate dedicated lot if they provide more convenience such as centrally placed for access to multiple facilities. Cautiously use this solution since a separate parking lot should be directly linked to the main parking facility and may not technically meet the minimum code requirements as a stand alone lot. An alternative solution is a shuttle service that is equipped with a lift to eliminate the need to travel lengthy distances, but this may decrease convenience.

502.1.1 Number of Spaces. Provide at least one inclusive space but not less than 5 percent of the total spaces provided in each parking lot.

502.1.1.1 Treatment Facilities. Provide inclusive spaces that are at least 20 percent of the total spaces for facilities specializing in treatment or mobility services.

502.1.1.2 Outpatient Medical Facilities. Provide inclusive spaces that are at least 10 percent of the total spaces for outpatient medical facilities.

502.1.2 Space Size. Inclusive parking space design is an alternative to providing separate types of spaces for car and vans. Inclusive parking spaces utilize one accommodating size for both cars and large vans, 132 inches (3350 mm) minimum in width with an adjacent access aisle 72 inches (1830 mm) minimum in width, 240 inches (6.1 m) minimum in length.

502.1.2 Advisory. An inclusive space accommodates a car or a van, and provides for a variety of vehicle entry and exit scenarios including perpendicular configurations. The 72 inch access aisle complies with Section 304 to allow maneuvering positions while accommodating an assistant and various vehicle equipment such as a lift or a pull out ramp. It eliminates the ratio for car and van spaces. It also accommodates other types of vehicles such as SUV's that are often used in lieu of cars or vans. On street inclusive parking is not included because NYC does no allow dedicated accessible on-street parking .

502.1.3 Vehicle Space Marking. Car and van parking spaces should be marked to define the width. The lines running the length of the space should be dashed. The width measurement of parking spaces and adjacent access aisles should be made from the centerline of the markings. The international symbol of accessibility should be centered in the space width in a blue box 24 inches (610 mm) wide and 24 inches (610 mm) long. The box should be located with the leading edge 12 inches (305 mm) from the entry end of the space. Marking within the box should be in white. The international symbol of accessibility should comply with Section 703.6.3.1.

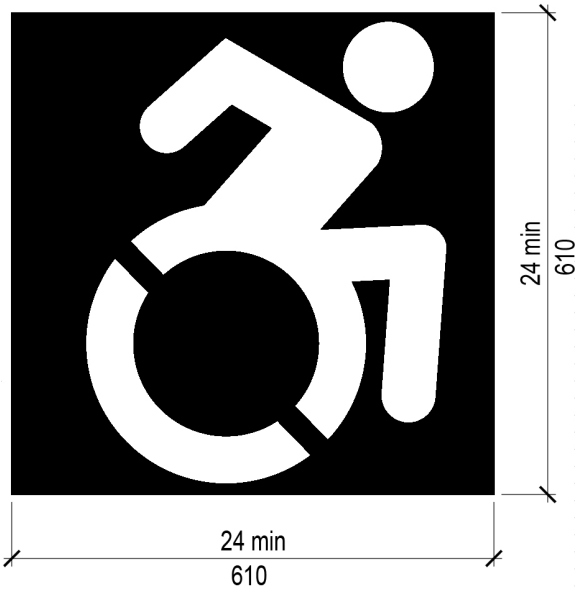


Fig. 502.1.3
International Symbol Updated

502.1.4 Access Aisle. Inclusive parking spaces should have an adjacent aisle complying with Section 502.1.4. Two inclusive spaces may share one access aisle.

502.1.4.1 Location. Access aisles should adjoin an accessible route. Access aisles should not overlap with the vehicular way. Consider access aisles placed on either side of the inclusive parking space. Parking spaces that are angled should have access aisles located on the passenger side of the parking space.

502.1.4.2 Width. Access aisles serving inclusive parking spaces should be 72 inches (1830 mm) in width.

502.1.4.3 Length. Access aisles should extend the full length of the parking spaces that they serve and should be 240 inches (6.1 m) minimum in length as per Section 502.1.2.

502.1.4.4 Marking. Access aisles should be marked to discourage parking in them. Access aisles should be marked with lines. The width measurements of access aisles and adjacent parking spaces should be made from the centerline of the markings. Markings should be 45 degree diagonal 4 inch (100 mm) wide stripes in blue at 24 inches (610 mm) on center. All markings should comply with DOT regulations or authority having jurisdiction. Provide "NO PARKING ANYTIME" on access aisle surface and above grade free standing signage complying with Section 703.2.

502.1.5 Floor Surfaces. Inclusive parking spaces and access aisles should comply with Section 302 and have surface slopes not steeper than 1:48. Access aisles should be the same level as the parking spaces they serve. Avoid drainage grates, manholes, and any other potential obstructions or hazards, including vegetation.

502.1.6 Vertical Clearance. Inclusive parking spaces, access aisles serving them, and vehicular routes from an entrance to the inclusive parking spaces to a vehicular exit serving them should provide a vertical clearance of 98 inches (2490 mm) minimum. Consider 114 inches (2892 mm) for larger vehicles.

502.1.7 Identification. Signage should comply with Section 502.1.7, Section 703 and Section 709.

502.1.7.1 Above Grade Identification. Inclusive parking spaces should be identified by above grade signs that include the International Symbol of Accessibility complying with Section 703.6.3.1. Signs identifying inclusive parking spaces should contain the designation "Car/Van Accessible." Such signs should be 60 inches (1525 mm) minimum above the floor of the parking space, measured to the bottom of the sign. In large parking facilities it is critical to provide a simple indication of wayfinding for both locating the entrance of the building and to locate the inclusive spaces. Level, compass direction, and zone information should make it easier to locate inclusive spaces within the facility using a unique color, level number and compass direction. Signage should be located overhead, wall and floor surface mounted. Provide large scale signage that is properly illuminated for distance reading from a moving vehicle at key points. Include pictograms.

502.1.7.2 Locations. Signage for inclusive parking should be located at key points including facility entrances, reference points or landmarks, bicycle parking, shelters, bathrooms, drinking fountains, telephones, rest areas, etc. Provide directional signage for both vehicle and bicycle parking. Refer to Section 502.3.7. Provide additional signage along the vehicle and pedestrian routes to inclusive spaces. Consider orientation maps.

502.1.8 Relationship to Routes. Parking spaces and access aisles should be designed so that cars/vans, when parked, cannot obstruct the required clear width of adjacent routes. Routes from inclusive parking should comply with Section 402, and not pass immediately behind parked vehicles, contain wheel stops, bollards or other physical obstruction to stop vehicles from penetrating a buffer zone 36 inches (915 mm) minimum between vehicle and route and should not have an irregular texture, r*idg*es, rough or uneven surfaces, or large or protruding joints. Routes should be physically separated from vehicular traffic.

502.1.9 Curb Ramps. Sidewalks located adjacent to an access aisle should contain a curb ramp to navigate elevation change and should comply with Section 406 and directly integrate with pedestrian route.

502.1.10 Wheel Stops. Provide wheel stops to prevent vehicle from conflicting with adjacent route or signage. Locate edge of bumper that touches wheel 30 inches (765 mm) from edge of sidewalk or pedestrian route edge. Do not use stops if they conflict with snow removal.

502.2 Parking Facilities

502.2.1 General. Parking facilities should comply with Section 502.2 and the *2014 NYCBC*, *NYC Zoning Resolution*, NYC DOT regulations and other applicable rules and regulations.

502.2.1 Advisory. Refer to the NYC Department of Transportation web site regarding rules and regulations relating to parking spaces, road markings and other relevant requirements under their jurisdiction. Minimum space size as per *NYC Zoning Resolution*, Section 36-52 and Section 25-62, is 18 feet long and eight feet, six inches wide. Residential width may be reduced to eight feet wide under some conditions.

502.2.2 Large Vehicle Spaces. Provide separate alternate parking spaces for buses, RV's, and other large vehicles. Provide sufficient meeting/waiting area space that will accommodate the entire number of passengers for each vehicle. This is especially important for group control. Provide benches and amenities in close proximity. Consider providing shelters.

502.2.2.1 Large Vehicle Spaces Dimensions. Large vehicle spaces dimensions should be 9 feet (2.74 m) minimum in width and 45 feet (13.7 m) minimum in length and 10 feet (3m) minimum in height.

502.2.3 Temporary Parking. Provide temporary parking area(s) with short duration metered parking to prevent use of regular parking and passenger loading zones to prevent double parking, congestion and vehicle conflicts.

502.2.4 Valet Parking /Shuttle Service. Provide valet parking, tram/bus/car and other shuttle services in large parking facilities such as long term parking in airports, stadium parking, malls, etc. where spaces may be located a long distance from facility, destination or entry.

502.2.5 Access Points. Differentiate and provide a distance between vehicle entrances and exits into the parking areas to control traffic flow, reduce vehicle conflicts and confusion, and enhance wayfinding.

502.2.6 Speed Reduction. Provide speed bumps at intervals of no more than 100 feet, bold street bed signage, ribbed tactile indicators, and other graphics such as stripping, strategically located in parking lot to maintain slow speed to reduce hazards and conflicts between pedestrians and vehicles. Where pedestrian and recreation routes conflict with vehicle speed bumps, provide an inclusive route either around or through a portion of it.

502.2.7 Barriers. Provide a physical means of separating pedestrians from car, bicycle/ recreational lane and traffic. This may be accomplished by providing a raised area or edge (with cuts or ramps as necessary to allow perpendicular crossing), detectable warnings, bollards, railing, planters, landscape elements such as trees, and shrubs.

502.2.8 Emergency Communications. Provide emergency alarms in isolated areas and distances from entry complying with Section 702.2 and two-way communication complying with Section 708.

502.2.9 Lighting. Lighting levels should be higher at inclusive parking spaces, rest areas, bicycle racks, carriage/stroller/cart storage. Provide separate signage lighting. Provide general lighting throughout.

502.2.10 Rest Areas. In large uncovered parking areas, provide weather protected rest areas such as shelters with benches complying with Section 903. Provide higher illumination level and provide emergency communications complying with Section 702.2 and two way communication complying with Section 708.

502.2.10 Advisory. General lighting may be in conflict with environmentally sensitive recommendations, since it is suggested to eliminate general lot lighting to reduce energy consumption. As an alternative it is recommended to provide lighting limited to pedestrian routes and at key location such as intersections or potential conflicts between vehicle, pedestrian and recreational lanes and where security is a concern.

502.2.11 Signage. In large parking facilities it is critical to provide a simple indication of wayfinding for both locating the entrance of the building and to locate the inclusive spaces. Level, compass direction, and zone should be made easier to identifying and locate by identify each area within the facility with a unique color, level number and compass direction. Signage should be located overhead as well as mounted on wall and floor surfaces mounted. Provide large scale properly lighted signage for distance reading from a moving vehicle located at key points. Include pictograms.

502.2.11.1 Locations. Signage should be located at key points including facility entrances, reference points or landmarks, bicycle parking, shelters, bathrooms, drinking fountains, telephones, rest areas, etc. Provide directional signage for vehicle pedestrian and recreational use. Consider orientation maps.

502.2.12 Pedestrian Wayfinding. Provide pedestrian multisensory wayfinding system that complies with Section 714.2.1 for visual, Section 714.2.2 for Tactile and Section 714.2.3 for Auditory. Provide landscape elements complying with Section 714.3, architectural elements complying with Section 714.4. Refer to Section 714 Wayfinding for a complete list of recommendations including hierarchy, consistency, site entry, exterior routes, configuration and exterior entrances.

502.2.13 Wheel Stops. Provide wheel stops to prevent vehicle from conflicting with adjacent route or signage. Locate edge of bumper that touches wheel 30 inches (765 mm) from edge of sidewalk or pedestrian route edge. Do not use stops if they conflict with snow removal.

502.3 Bicycle / Scooter / Tricycle / Handcycle / Tandem Parking

502.3.1 General. Bicycle/scooter/tricycle/ handcycle/tandem parking should comply with Section 502.3.

502.3.1 Advisory
There are two general types of parking: Class I and Class II. Each parking space must be usable without moving another cycle. The number of required bicycle parking spaces and waivers as well as permitted bicycle parking are dispersed throughout the NYC Zoning Resolution under the particular building use and occupancy classification: Residential uses are under Sections 25 - 80 through 25 - 86; Commercial uses are under Sections 36 - 70 through 36 - 76; and Manufacturing uses are under Section 44 - 60. See DOT's website: www.nyc.gov/dot for additional information under their "Bicyclists" page and specifically "Bicycle Parking." Also, see the "Active Design Guidelines: Promoting Physical Activity and Health in Design" (see section 105.3). See NYC Department of City Planning (2008) Zoning Resolution, for Bicycle Parking .

502.3.1.1 Class 1 Facilities. Class 1 parking facilities should be secure and weather protected area for long-term parking that includes lockers or controlled access areas where bicycles can be stored. These facilities are generally used for residents, employees, commuters and others. They are usually indoors.

502.3.1.2 Class 2 Facilities. Class 2 parking facilities should be designed for short-term storage use for shoppers, customers, messengers, visitors, and other uses. These facilities are usually outdoors and open to the public.

502.3.2 Locations. Parking should be located in close proximity and with a direct route to the primary entrance(s), rest room and other amenities in a secure weather protected area and if provided, within close proximity of a security booth. Parking spaces should be located on the same zoning lot as the use served.

502.3.2 Advisory. A Bicycle-share program allows short term use of public bicycles. Docking locations should be numerous and accommodate anticipated peak usage (e.g. rush hours). They may be provided with electronic card readers, computerized bike stands and purpose designed bicycles.

502.3.2.1 Interior Locations. Interior parking locations may consist of placement in an interior area or within a separate room. A dedicated room(s) should be provided with optional amenities complying with Section 502.3.14.

502.3.2.2 Exterior Locations. Exterior parking locations should be away from areas of congestion and, if possible, adjacent to spaces where visitors can wait, e.g. plazas or shelters. Class 2 facilities should be well lighted and highly visible. Avoid conflict with public transportation stops, fire hydrants, standpipes, street trees, street signs, parking meters, utility access, doors, transformer vaults, subway grates, etc. Provide easy to use, secure parking that does not conflict with vehicle or pedestrian routes. Locate parking under a roof, overhang, or provide a shelter complying with Section 402.6. Provide weather protection and proper drainage for exterior locations. Provide parking at key features (e.g. transit stops).

502.3.3 Number of Scooter Spaces. Provide at least one space for scooter parking but not less than 5 percent of the total spaces provided in each parking location. Increase this percentage to accommodate the users for certain types of facilities (e.g. senior centers).

502.3.4 Floor/Wall/Ceiling Storage. Parking facilities may comprise storage on the floor, wall or ceiling, stacked on racks, hung on hooks or brackets and individual lockers.

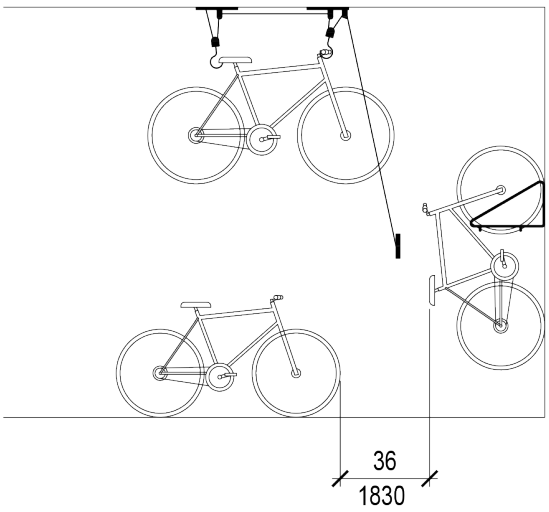
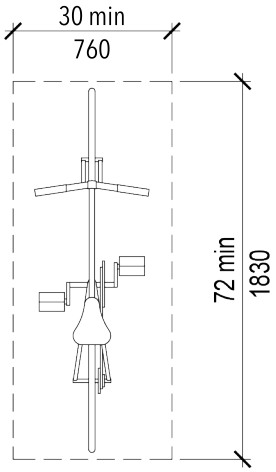
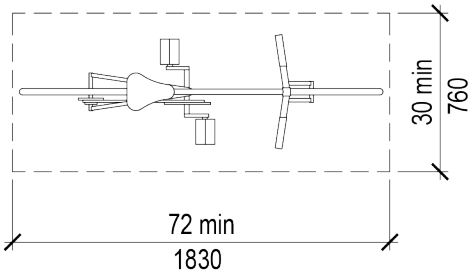


Fig. 502.3.4
Floor, Wall / Ceiling Storage

502.3.5 Standard Bicycle Space Dimensions. Each bicycle parking space should be least 72 inches (1830 mm) minimum length and 30 inches (760 mm) minimum width or 15 square feet (1.4 m^2)minimum. Provide 36 inches (915 mm) between parallel bicycle racks and a 72 inch (1830 mm) wide aisle between bicycle rack areas. Some vertical parking systems (e.g. wall, ceiling, double stack) are often a more efficient use of space but have different spacing requirements.



(a)
Vertical



(b)
Horizontal

Fig. 502.3.5
Standard Bicycle Space Dimensions

502.3.6 Other Parking Space Dimensions. Parking spaces for scooters, tricycles, handcycles and tandem cycles should comply with Section 502.3.5.

502.3.6.1 Scooter Space Dimensions. The inclusive space should accommodate a range of mobility devices including scooters. The space size should have a minimum width of 36 inches (915 mm) and a minimum length of 72 inches (1830 mm). The space provides additional maneuvering space to accommodate those riders that have diminished physical dexterity. It allows sufficient maneuvering clearance for seated transfer.

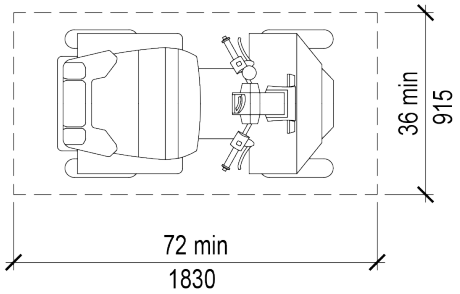


Fig. 502.3.6.1
Scooter Space Dimensions

502.3.6.2 Tricycle Space Dimensions. Each tricycle space dimensions should be 72 inches (1830 mm) minimum in length and 42 inches (1067 mm) minimum in width or 21 square feet (2 m^2) minimum.

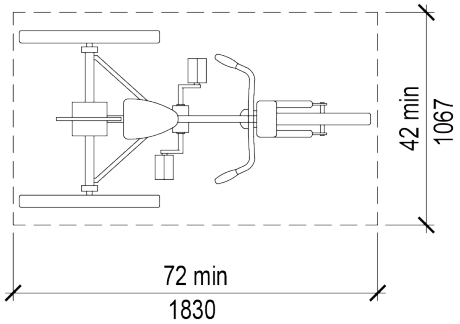


Fig. 502.3.6.2
Tricycle Space Dimensions

502.3.6.3 Handcycle Space Dimensions. Each handcycle space dimensions should be 86 inches (2185 mm) minimum in length and 42 inches (1067 mm) minimum in width or 25 square feet (2.3 m^2) minimum.

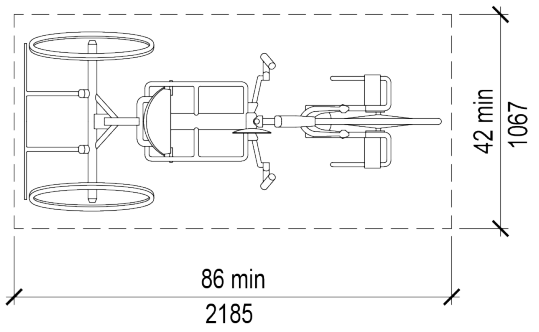


Fig. 502.3.6.3
Handcycle Space Dimensions

502.3.6.4 Tandem Bicycle Space Dimensions. Each tandem bicycle space dimension should be 96 inches (2440 mm) minimum in length and 30 inches (760 mm) minimum in width or 20 square feet (1.86 m^2) minimum.

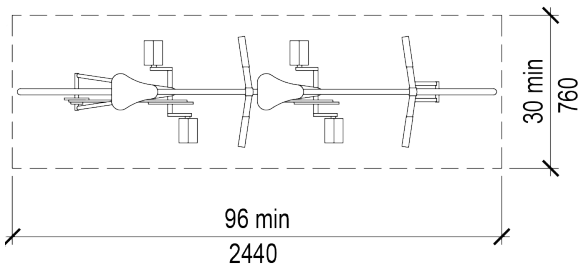


Fig. 502.3.6.4
Tandem Bicycle Space Dimensions

502.3.7 Signage. Inclusive spaces and access aisles should be marked to discourage parking in them. Aisles should be marked with lines. Markings should be 45 degree diagonals 1 inch (25.4 mm) wide stripes in blue at 12 inches (305 mm) on center. Provide free standing or wall mounted signage with the international symbol with a scooter and tricycle image and a "Bicycle Parking" sign outside of each parking area.

502.3.7.1 Commercial Districts and Garage Signage. Bicycle parking in commercial districts and vehicle parking garages should be clearly visible and obvious from the public right-of-way and directional signage should be provided. Contact information with names and telephone numbers should be provided if parking is unattended.

502.3.7.2 Class 2 Facilities Signage. Class 2 facilities should have additional signage clarifying that building management is not liable for theft or damage to bicycles, scooters and tricycles.

502.3.8 Aisle. Inclusive parking spaces located within an enclosed area or room should have an aisle a minimum of 36 inches (860 mm) in width and 72 inches (1830 mm) minimum in length. An aisle should provide maneuvering clearance for parking and retrieving. It should also allow a rider to mount and dismount and maneuvering for the inclusive space(s).

502.3.9 Floor Surfaces. Floor surfaces should comply with Section 302 and have surface slopes not steeper than 1:48. Drainage should be provided to prevent accumulation of water. Aisles should be the same level as the parking spaces they serve. Avoid drainage grates, manholes, and any other potential obstructions or hazards, including vegetation.

502.3.10 Emergency Communications. Provide emergency alarms in isolated areas and distances from entry complying with Section 702.2 and two way communication complying with Section 708.

502.3.11 Lighting. Parking space lighting levels should be higher than ambient lighting. Provide separate signage lighting. Provide adequate general lighting for both usage and security.

502.3.12 Security. Security may be self provided (e.g. chain with lock, loop, etc) or automatic. Automatic locks should comply with Section 309 operable parts. All facilities should have racks that are permanently secured. U-racks or similar are often preferred for outdoor bicycle parking because they are standardized, cost effective, allow securing of both the frame and wheels of a bicycle, and can accommodate two bicycles.

502.3.12.1 Class 1 Security. Class 1 facilities offer the highest level of security for bicycle parking. Dedicated rooms and fenced-off or enclosed areas in residential or office buildings can be limited to bicycle owners and management. Facility may be accessed with magnetic key card, key, or other electronic or manual means. Provide security camera and increase surveillance level by locating adjacent to a security booth or facility. Provide motion detectors, automatic lighting, video recording, two way communication, emergency alarm; self-closing and self-locking doors.

502.3.13 Seating. Provide seating complying with Section 903.

502.3.14 Amenities. Amenities include a water fountain complying with Section 602.3; bottle filler complying with Section 602.8; a waste receptacle complying with Section 906, emergency alarm complying with Section 702. Provide secure lockers for personal items (helmet, gloves, water battle, parts, tools, lubricants, etc.) complying with Section 803.6. Provide an electric outlet for each scooter space complying with Section 308. Large facilities or where appropriate consider a unisex restroom complying with Section 603.1.1 or 603.1.2 that may be used as a changing area; an adjustable height cycle repair stand with task lighting; tools; air compressor; secure individual cycle lockers; water bottle vending machine; an area to wash a bike with both hot and cold water; paper towel, soap and rubber glove dispensers.

502.4 Carriage , Stroller, Cart Storage. Carriage, stroller, cart storage should be included either as part of the Bicycle Parking, or as a separate storage facility specifically for carriage, stroller and cart. It should comply with Sections 502.3.1, 502.3.2, 502.3.9, 502.3.10, 502.3.11, 502.3.12, 502.3.13 (include seating for children), and 502.3.14 (water fountain and waste receptacle).

503 Passenger Loading Zones.

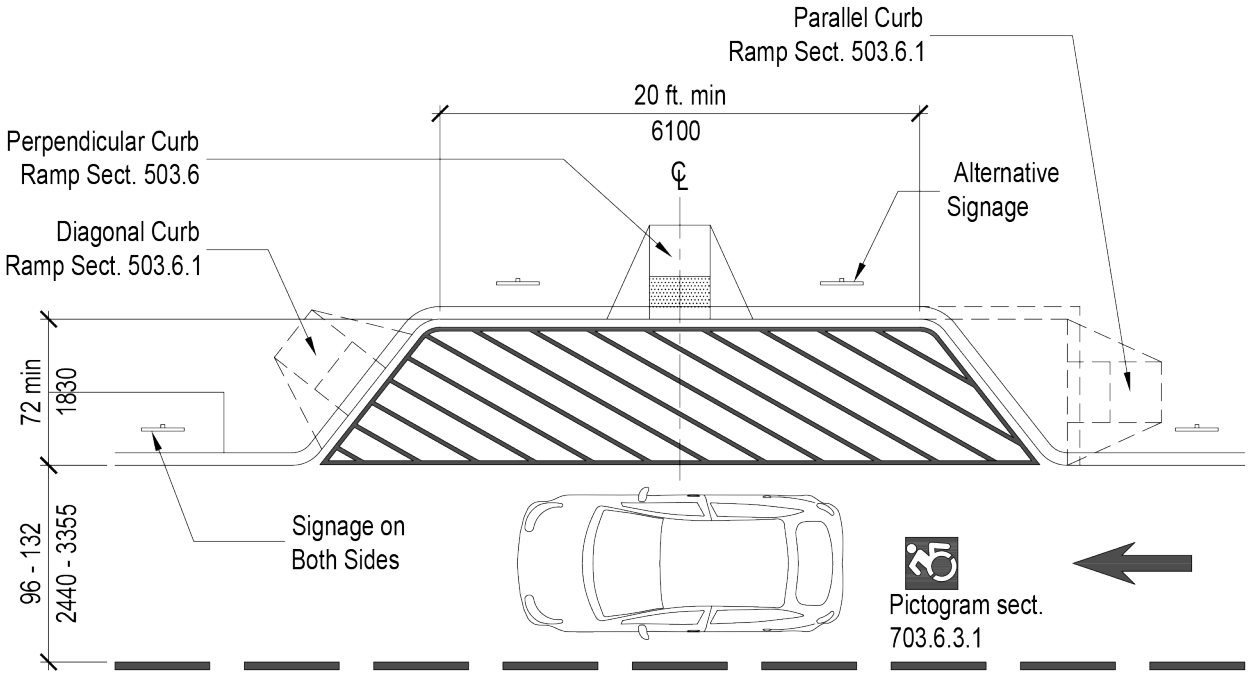
503.1 General. Passenger loading zones should comply with Section 503. Vehicles entering and exiting the loading zones should not create a conflict with through traffic. Loading zones should be sized to accommodate peak usage periods.

503.1.1 Locations. Locate loading zone in close proximity and with direct routes to entrances and other features. Locate away from areas of congestion and if possible, adjacent to spaces where visitors can wait, (e.g. plazas or shelters.) Avoid conflict with public transportation stops, fire hydrants, standpipes, street trees, street signs, parking meters, utility access, doors, transformer vaults, subway grates, etc.

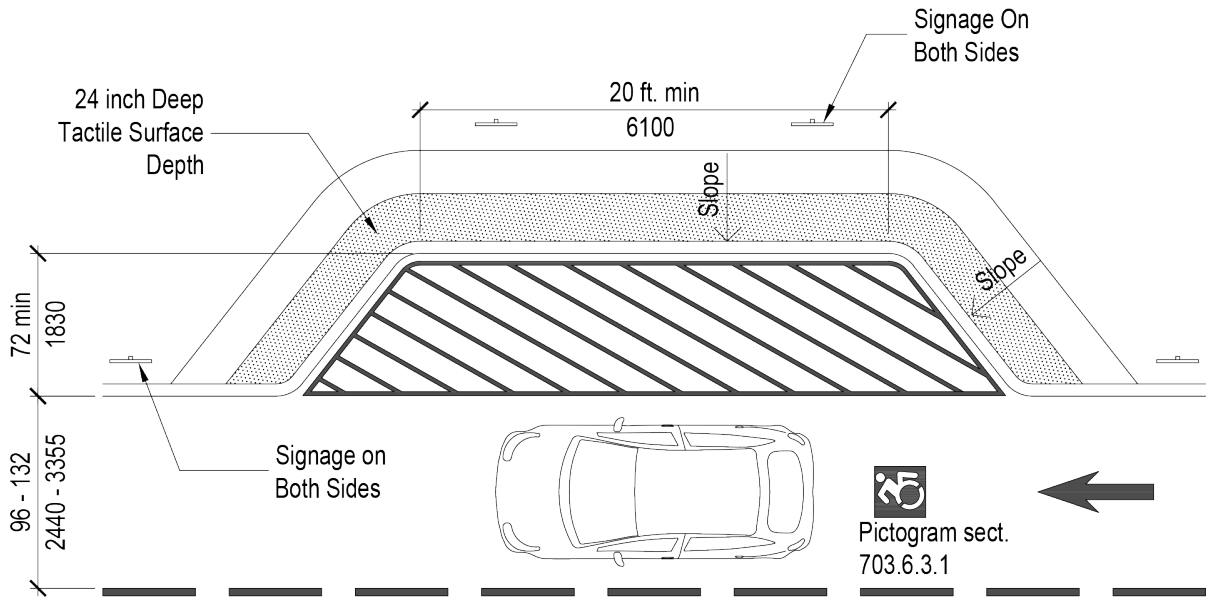
503.2 Vehicle Pull-up Space Size. Passenger loading zones should provide a vehicle pull-up space 96 inches (2440 mm) to 132 inches (3355 mm) in width and 20 feet (6100 mm) minimum in length. A 96 inch (2440 mm) wide pull-up space should only be considered where existing conditions do not allow the wider width.

503.3 Access Aisle. Passenger loading zones should have an adjacent access aisle complying with Section 503.3.

503.3 Advisory. It is important that the access aisle and route are outside of the vehicular route. Due to the limited parking and congestion in the City an alternative was considered that designates one or two on-street parking spaces as a passenger drop-off. This would require direct access to the sidewalk level without entering the street bed. It is not considered a viable solution due to mobility device access, difficulty of vehicle entering and exiting without going in reverse, and enforcement to keep the space clear of illegally parked vehicles. There is also the possibility of passengers being dropped off improperly on the street side rather than the sidewalk side, especially for vehicles with side perpendicular ramps. This not only raises serious passenger safety issues, but may result in street blockage during drop-off.



(a)
Passenger Loading Zone with Alternate Curb Cut Locations



(b)
Passenger Loading Zone with a Continuous Ramped Periphery

Fig. 503
Passenger Loading Zone

503.3.1 Location. Access aisles should adjoin a route. Access aisles should not overlap the vehicular way.

503.3.2 Width. Access aisles serving vehicle pull-up spaces should be 72 inches (1830 mm) to 96 inches (2440 mm) in width.

503.3.3 Length. Access aisles should be 20 feet (6100 mm) minimum in length.

503.3.4 Marking. Access aisles should be marked with lines to discourage parking in them. Markings should be 45 degree diagonal 4 inch (100 mm) wide stripes in blue at 24 inches (610 mm) on center. Provide the words “Passenger Loading Zone” at the entry of the vehicle pull-up space. Provide immediately above these words, the international symbol of accessibility centered in the pull-up space width in a blue box 24 inches (610 mm) wide and 24 inches (610 mm) long as shown in Fig. 503.3 Marking within the box should be in white. The international symbol of accessibility should comply with Section 703.6.3.1.

503.4 Floor Surfaces. Vehicle pull-up spaces and access aisles serving them should comply with Section 302 and should have slopes not steeper then 1:48. Access aisles should be at the same level as the vehicle pull-up space they serve. Avoid drainage grates, manholes, and any other potential obstructions or hazards, including vegetation. Access aisles should not conflict with local sidewalk clearances and adjacent clearances for improvements and existing objects such as public transportation entrances or stops, fire hydrants, street trees, cellar hatchways, benches, telephone booths, mail boxes, street lights, street signs, parking meters, sewers, transformer vaults, subway and other types of grates, curbs and obstructions.

503.4.1 Alternate Sidewalk Access Aisle. Consider direct access to sidewalk adjacent to vehicle pull-up space where space does not permit location of an access aisle in street bed.

503.4.1 Advisory. Normally direct sidewalk access is not allowed, since the drop-off should occur in an access aisle in the road bed. This requires a curb ramp to navigate the curb height. A curb ramp is not practical on narrow sidewalks since it will create a perpendicular slope across the width of the pedestrian route. An alternative may be to place curb ramps at the ends of the access aisle.

503.5 Vertical Clearance. Vehicle pull-up spaces, access aisles serving them, and vehicular route from an entrance to the passenger loading zone, and from the passenger loading zone to a vehicular exit serving them, should provide a vertical clearance of 114 inches (2895 mm).

503.5 Advisory. Vertical clearance has been increased from the standard 98 inches to 114 inches to accommodate high top vans and paratransit vehicles and other large vehicles.

503.6 Perpendicular Curb Ramps. A perpendicular curb ramp should be centered on the length of the zone to navigate the elevation change from road bed to sidewalk level and should comply with Section 406. Width of ramp should comply with Section 406.4.

503.6.1 Parallel or Diagonal Curb Ramps. Parallel or diagonal curb ramps may be considered for the ends of the access aisle, but may require railings to address drop-offs if flares cannot be provided. Width of ramp should comply with Section 406.4.

503.6.2 Continuous Sloped Periphery. Continuous sloped periphery may be considered in lieu of separate ramps that allow use of the entire loading zone periphery as a continuous curb ramp. Comply with Section 406 curb ramps for scope, tactile warning and other details.

503.7 Above Grade Identification. Provide signs including the International Symbol of Accessibility complying with Section 703.6.3.1 identifying the loading zone. Such signs should be 60 inches (1525 mm) minimum above the floor loading zone, measured to the bottom of the sign. Centerline the signage at the head of the space. As per *MUTCD* 2009, Section 2A-19, laterally offset from curb 12 inches (305 mm).

503.8 Pedestrian Wayfinding. Provide pedestrian multisensory wayfinding system that complies with Section 714.2.1 for Visual, Section 714.2.2 for Tactile and Section 714.2.3 for Auditory. Provide landscape elements complying with Section 714.3, architectural elements complying with Section 714.4. Refer to Section 714 Wayfinding for a complete list of recommendations including hierarchy, consistency, site entry, exterior routes, configuration and exterior entrances.

503.9 Weather Protection. Provide weather protection along the adjacent sidewalk for the entire length of the loading zone. Weather protection may include roofed areas, overhangs, shelters, building drive through, etc.. A minimum sidewalk clear width of 8'-0" should be maintained or per DOT regulations. Shelter should comply with Section 402.6.

503.10 Lighting. Lighting levels for passenger loading zones should be higher than adjacent areas.

504 Stairways

504.1 General. Stairs should comply with 504.

504.1 Advisory. Stairways should be wide enough to anticipate peak load demand that may exceed code egress requirements. Stairways should be kept out of the direct path of travel, but located on primary routes, near entrances and elevators and obvious locations. See Section 105.3, *Active Design Guidelines*, that promotes increased physical activity through stair usage.

504.2 Treads and Risers. All steps on a flight of stairs should have a uniform riser height and uniform tread depth. Risers should be 4 inches (100 mm) minimum and 7 inches (180 mm) maximum in height. Treads should be 11 inches (280 mm) minimum and 14 inches (355 mm) maximum in depth. Stairways should have no more than 10 risers between landings. This should not apply to required exit stairs.

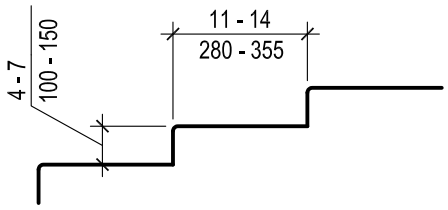


Fig. 504.2
Tread Depth and Riser Heights

504.2 Advisory. Avoid conflicts with the code. Note that *2014 NYC Building Code* makes exceptions for riser and tread dimensions for some residential occupancies.

504.2.1 Width. All steps on a flight of stairs should have a uniform minimum clear width of 48 inches (1219 mm) between handrails. *2014 NYCBC,* Section 1005.1 may require a large minimum egress width. *2014 NYCBC* Section 1007.3 requires 48 inches minimum, with exceptions. *2014 NYCBC*, Section 1009.1, requires 44 inches minimum, with exceptions. Width should anticipate the expected volume during peak period usage.

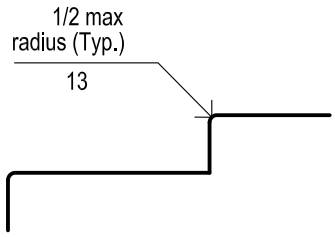
504.2.1 Advisory. Care should be taken to avoid code conflicts (see *2014 NYCBC,* Sections 1009.1, 1007.3 and 1005.1). Wider stairs are encouraged to accommodate two-way traffic and increase usability. Consider wide open communicating non-egress stairs between two floors (e.g., 72 inches or greater). Note that the *2014 NYCBC* minimum stair width exceptions for some residential occupancies.

504.2.2 Top and Bottom Tread. Top and bottom tread of each stair flight and landings to be distinguished.

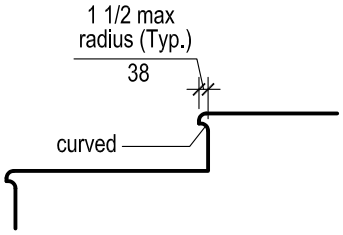
504.3 Safety Hazards. Open risers, single steps, spiral stairs, winding or curved stairways and any stair that is not uniform in width and height are safety hazards and are not recommended. Identify potential hazards with both tactile and visual warnings including color, contrast and texture.

504.4 Tread Surface. Stair treads should comply with Section 302 and should have a slope not steeper than 1:48. Avoid glare from reflective surfaces. Tread should be sloped towards nosing to prevent water and ice accumulation.

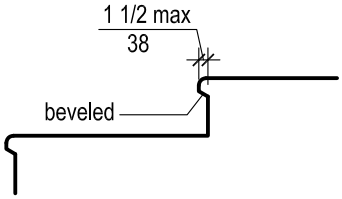
504.5 Nosings. The radius of the curvature at the leading edge of the tread should be 1/2 inch (13 mm) maximum. Nosings that project beyond risers should have the underside of the leading edge curved or beveled. Risers should be permitted to slope under the tread at an angle of 30 degrees maximum from vertical. The permitted projection of the nosing should be 1 ½ inches (38 mm) maximum over the tread or floor below. The leading 2 inches (51 mm) of the tread should have visual contrast of dark-on-light or light-on-dark from the remainder of the tread complying with Section 302.10. Consider the use of an abrasive strip where there is a potential slip hazard.



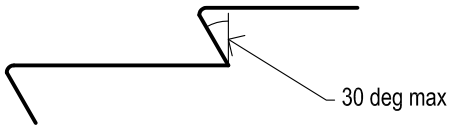
(a)
Vertical Riser



(b)
Curved Nosing



(c)
Beveled Nosing



(d)
Angled Riser

Fig. 504.5
Tread and Riser Profiles

504.6 Handrails. Stairs should have dual height handrails complying with Section 505 on both sides of stairs.

504.7 Weather Conditions. Stairs subject to water conditions should comply with Section 504.7.

504.7.1 Wet Conditions. Stair treads and landings subject to wet conditions should be sloped towards nosing and drained to prevent the accumulation of water and ice.

504.7.2 Weather Protection. Provide weather protection for exterior stairs. Where possible, locate under overhangs or provide climate-protected areas.

504.7.3 Snow/Ice Accumulation. Stairs subject to snow/ice accumulation should be provided with an automatic ice melt system.

504.8 Lighting. Provide lighting in accordance with 504.8.

504.8.1 Lighting. Lighting level should be provided as per Section 504.8.1.

504.8.1.1 Interior Luminance Level. Lighting facilities system should be capable of providing 10 foot-candles (108 lux) of luminance measured at the center of tread surfaces and on landing surfaces within 24 inches (610 mm) of step nosings. Lighting source should come from overhead. Illuminate treads evenly, reduce glare and avoid strong shadows. Light fixtures should be indirect or shielded. Provide 100-200 lux wherever the visitor is required to read text.

504.8.1.2 Exterior Luminance Level. Lighting system should provide same standard as required for interior applications. The source of illumination should provide color rendering which is not deficient in the blue spectrum. Fixture should be placed so that light patterns intersect at 84 inches (2100 mm) above the ground. Provide 100-200 lux wherever the visitor is required to read text.

504.8.2 Lighting Controls. If provided, occupancy-sensing automatic controls should activate the stairway lighting so the luminance level required by Section 504.8.1 is provided on the entrance landing, each stair flight adjacent to the entrance landing, and on the landings above and below the entrance landing prior to any step being used.

504.9 Stair Level Identification. Stair level identification signs in tactile characters complying with Section 703.3 should be located at each floor level landing in all enclosed stairways. Signs should be located adjacent to the door leading from the stairwell into the corridor to identify the floor level. The exit door discharging to the outside or to the level of exit discharge should have a tactile sign stating "EXIT." All exit path signs should be photo luminescent materials, containing raised characters and Braille complying with Sections 703.3 and 703.4. The signs should be washable, non-toxic, non-radioactive, and if subjected to fire must be self-extinguishing when the flame is removed. Provide stair level identification in Braille on railing in accordance with Section 505.10.4.

504.9.1 Supplemental Signage. Provide supplemental signage as per Section 703.

504.10 Stair Landings. Stair landings should be as wide as the stair that it serves at a clear depth of 72 inches minimum. Landings to be based on anticipated volume during peak periods and are required to meet or exceed minimum local code requirements. Landings serving two stair runs or a u-type stair should be provided with a clear floor space complying with Section 305.

504.10 Advisory. A 72 x72 inch landing should accommodate most user configurations including a rest area for those who have difficulty navigating the stairs and to avoid a conflict with two-way traffic. It will also accommodate a portable wheelchair lift for emergency situations and under some installations the use of an inclined platform lift. Consider providing seating complying with Section 903 at landings of large stair assemblies. The increased depth of the 72-inch landing may be problematic or not feasible in some existing buildings.

504.11 Area of Rescue Assistance. Provide an area of rescue assistance adjacent to fire stairs or within fire stairs and distributed throughout a building or facility for those that may be cut off from means of egress or cannot navigate a stair. The entire building should be sprinkled in addition to areas of rescue assistance. An area of rescue assistance should accommodate a minimum of two clear floor spaces complying with Section 305 and an additional space for every 100 occupants that are served by the area. Area of Rescue Assistance sign and directional signage to them should be illuminated and photo luminescent. Provide a bench complying with Section 903.3 Areas of rescue assistance should be protected by a smoke proof enclosure with a minimum fire rating of two hours for all surfaces including floor, walls, ceilings and doors. The area of rescue assistance may be located adjacent to fire stairs and should be a separate vestibule. Additional locations should be considered. Do not conflict with building code requirements. See *2014 NYCBC* Section 1007.6 for minimum requirements for size, separation, two-way communications, instructions and identification. Also, see *2014 NYCBC* Section 1007.8.

504.11 Advisory. Nothing contained in this section regarding an area of rescue assistance is intended to reduce or conflict with code requirements. In addition to *2014 NYCBC* Section 1007.6 these are relevant: 709, 903.3.1.1, 903.3.1.2, 1007.2, 1007.3, 1007.4, 1015.1, 1019.1, and 1011.2. The level of safety could be increased and to provide whatever is necessary and viable to help occupants survive until help can reach them. Some, including people with disabilities, the elderly, or those who are incapable of evacuating, should at least have an area that can protect them within a short distance from where they are located and on an inclusive route. The area of rescue assistance should function even under catastrophic circumstances, including an explosion or a seismic event. Spatial requirements for multiple occupant areas of rescue assistance may be difficult to achieve in existing buildings.

504.11.1 Communication Elements. Provide detectable warning complying with Section 705, located adjacent and directly in front of route side of door; visual and tactile signals complying with Section 703; symbols complying with Sections 703.6.3.1, 703.6.3.2, 703.6.3.3 and 703.6.3.4; two-way communications complying with Section 708 (see *2014 NYCBC* 1007.6.3), including two-way visual; emergency assistance alarm complying with Section 702.2 and an Information/Navigation Reference Point System complying with Section 708.7. Visual, tactile and audible signage requires identification and instruction (see *2014 NYCBC* 1007.6.4 and 1007.6.5).

504.11.2 Safety Equipment. Provide within the area of refuge, fire extinguisher, independent/portable air supply with face masks, independent signaling devices including an air horn, bell or whistles and other non-electric devices that will produce enough noise to locate a trapped occupant. Provide emergency lighting, flashlights and chemical flares. Consider providing first-aid kits.

504.12 Detectable Warnings. Raised strip detectable warnings should be provided on each landing and located adjacent to the beginning and end of each stair flight and at the exit discharge point and should comply with Section 705. The detectable warning should be as wide as the stair and exit discharge width and 24 inches (610 mm) in depth. Provide supplemental signage as per Section 504.9.1 at main exit discharge points. Detectable warning material should be fireproof.

504.13 Audible and Visual Signaling System. Provide audible signaling systems, such as a standard recording, with evacuation and emergency instructions, under fire service control to help direct people along the best possible route during an evacuation and to provide other instructions during an emergency. Alarms should comply with Section 702. Provide directional embedded floor lights along emergency egress route as per Chapter 7.

504.14 Communications. Provide two-way communication at all critical points and in all remote areas in accordance with Section 708, and specifically with Section 708.5 for two-way visual communications. Consider the use of 708.7 Information/navigation reference point system.

505 Handrails

505.1 General. Handrails should comply with Section 505.

505.1 Advisory. Handrails benefit everyone from the elderly to children; especially people with diminished dexterity, mobility, balance and strength. Dual handrail systems provide dedicated handrails for children's use. They have been used effectively in the NYC schools for many years. Handrails can also be used as part of a comprehensive wayfinding system providing both general and guidance to specific spaces.

505.2 Location. Dual handrails should be provided on both sides of stairs and ramps, but are not limited to these applications.

EXCEPTION: Aisle stairs and aisle ramps provided with a handrail either at the side or within the aisle width.

505.2.1 Supplemental Locations. Handrail locations are not limited to just stairs and ramps, they may be used along corridors, balconies and parapets, elevators, along guardrails, pathways and various exterior applications, as a means of wayfinding, as a cuing device, as well as providing support for these who need it.

1. It is recommended that children's facilities contain handrails in corridors to provide a cueing device that assist supervision, group control and wayfinding. Handrails and other amenities, scale the facility down contributing to the children's comfort.

2. Handrails should be considered both internally and externally to assist in wayfinding along routes, not just to support people as they navigate a level change.

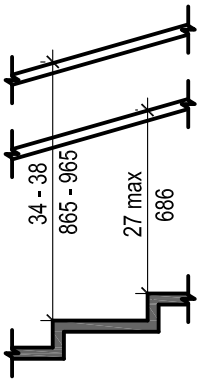
3. Handrails should be continuous from a flight of stairs or ramp along a route to specific locations or as a general wayfinding system for a building or complex. Handrail system provides a wayfinding system for people with visual disabilities as well as others for general guidance.

505.2.1 Advisory. Note that many senior residences include handrails on at least one side of corridors. Continuity of handrails from stairways to specific locations as a wayfinding system may be difficult, since stairs are often separated from corridors or lobbies by partitions. Contemporary design philosophy is to make facilities (e.g. hospitals, schools, and residences) feel less institutional, so care should be taken regarding integration and aesthetics of the handrail system. It may be possible to integrate the handrails as moldings to reduce the visual impact.

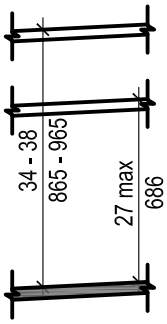
505.3 Continuity. Handrails should be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs or ramps should be continuous between flights or runs. Other handrails should comply with Sections 505.10 and 307.

EXCEPTION: Handrails in aisles serving seating.

505.4 Height. Handrail heights should comply with Section 505.4.1 and 505.4.2.



(a)



(b)

Fig. 505.4
Dual Handrail Heights

505.4.1 Upper Adult Handrail Height. Top of gripping surfaces of the upper handrails should be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum vertically above stair nosing, ramp surface or walking surface.

505.4.2 Lower Child Handrail Height. Top of the gripping surfaces of the lower handrails should be 27 inches (690 mm) maximum vertically above stair nosing, ramp surface, or walking surface. Sufficient vertical clearance between upper and lower handrails, 9 inches (230 mm) minimum, should be provided to help prevent entrapment.

505.5 Clearance. Clearance between handrail gripping surface and adjacent surface should be 1-1/2 inches (38 mm) minimum.

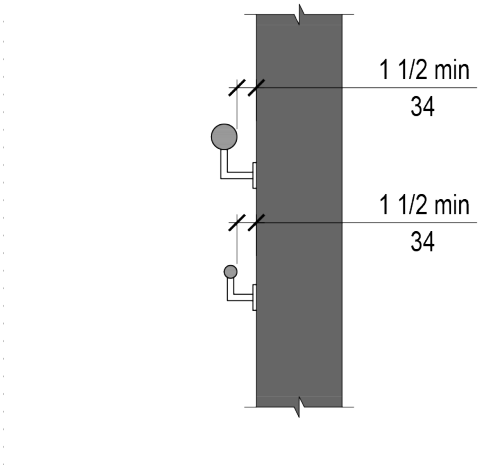


Fig. 505.5
Handrail Clearance

505.5 Advisory. Where handrails are affixed to a wall, consider increasing the contrast to enhance visibility for appropriate building types (e.g. institutional).

505.6 Gripping surfaces. Gripping surfaces should be continuous, without interruption by newel posts, other construction elements, or obstructions.

EXCEPTIONS:

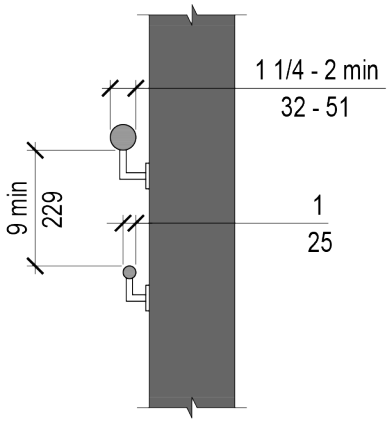
1. Handrail brackets or balusters attached to the bottom surface of the handrail should not be considered obstructions, provided they comply with the following criteria:

a. No more than 20 percent of the handrail length is obstructed.

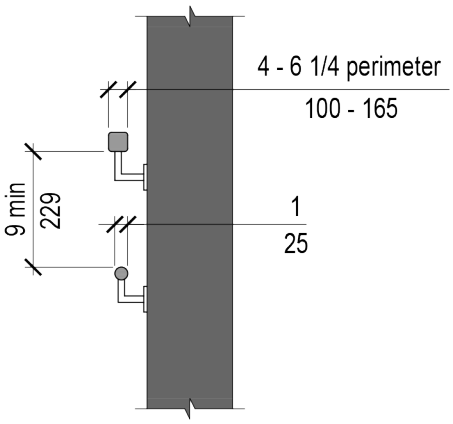
b. Horizontal projections beyond the sides of the handrail occur 1-1/2 inches (38 mm) minimum below the bottom of the handrail, and provided that for each ½ inch (13 mm) of additional handrail perimeter dimension above 4 inches (100 mm), the vertical clearance dimension of 1-1/2 inches (38 mm) can be reduced by 1/8 inch (3.2 mm), and edges should be rounded.

2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottom of handrail gripping surfaces should be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.

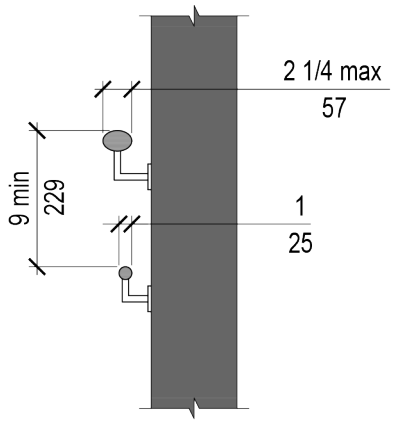
505.7 Cross Section. Handrails should have a cross Section complying with Section 505.7.1 or 505.7.2.



(a)
Diameters



(b)
Perimeters



(c)
Non-Circular Widths

Fig. 505.7
Handrail Cross Sections

505.7.1 Adult Circular Cross Section. Handrails designed for adult use should have a circular cross section with an outside diameter of 1-1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.

505.7.1.1 Children's Circular Cross Section. Handrails designed for children's use should have a circular cross section with an outside diameter of 1 inch (25.4 mm) maximum.

505.7.2 Adult Non-circular Cross Section. Adult handrails with a non-circular cross section should have a perimeter dimension of 4 inches (100 mm) minimum and 6-1/2 inches (160 mm) maximum and a cross-section dimension of 2 1/4 inches (57 mm) maximum.

505.7.2.1 Children's Non-circular Cross Section. Children's handrails should not have a non circular cross-section and should have a maximum perimeter dimension of 3 1/4 inches (82.6 mm).

505.8 Surfaces. Handrails, and any wall or other surfaces adjacent to them, should be free of any sharp or abrasive elements. Edges should be eased.

505.9 Fittings. Handrails should not rotate within their fittings.

505.10 Handrail Extensions. Handrails should extend beyond and in the same direction of stair flights and ramp runs in accordance with Section 505.10.

EXCEPTIONS:

1. Continuous handrails at the inside turn of stairs and ramps.

2. Extensions are not required for handrails seating where the handrails are discontinuous to provide access to seating and to permit crossovers within the aisle.

3. In alterations, full extensions of handrails should not be required where such extensions would be hazardous due to plan configuration.

505.10 Advisory. The typical extension for a free standing handrail shows a variable height return to the vertical support. This may be confusing regarding the minimum height or configuration of the return. The primary reason for the return is to prevent a hazardous condition where a handrail end juts out into space. The code solution is often considered too restrictive since it limits the end condition for this type of application.

505.10.1 Top and Bottom Extension at Ramps. Ramp handrails should extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. Extensions should return to the wall, vertical support, guard, or floor, or should be continuous to the handrail of an adjacent ramp. Handrail return to vertical support should be a maximum of 27 inches above grade.

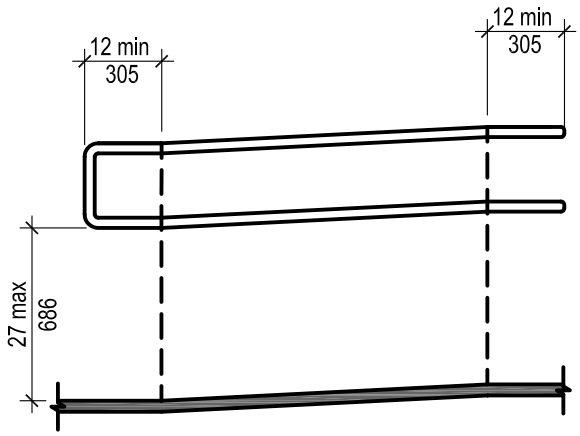


Fig. 505.10.1
Top and Bottom Handrail Extensions at Ramps

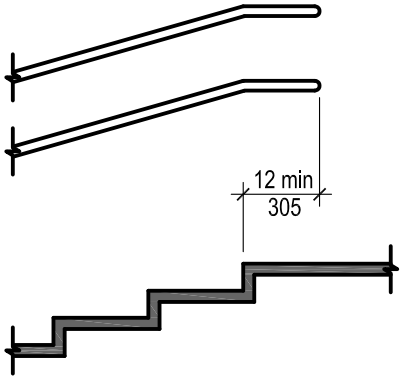


Fig. 505.10.2
Top Handrail Extensions at Stair

505.10.1 Advisory. A minimum return that is code compliant appears to be 1 1/2 inch space between the top and bottom portions of the extension. It is recommended to provide a 9 inch minimum space to prevent hand entrapment.

505.10.2 Top Extension at Stairs. At the top of a stair flight, handrails should extend horizontally above the landing for 12 inches (305 mm) minimum beginning directly above the landing nosing. Extensions should return to wall, vertical support, guard, or the landing surface, or should be continuous to the handrail of an adjacent stair flight. Handrail return to vertical support should be a maximum of 27 inches above grade.

505.10.3 Bottom Extension at Stairs. At the bottom of a stair flight, handrails should extend at the slope of the stair flight for a horizontal distance equal to one tread depth beyond the bottom tread nosing. Extensions should return to a wall, guard, or the landing surface, or should be continuous to the handrail of an adjacent stair flight. Handrail return to vertical support should be a maximum of 27 inches above grade.

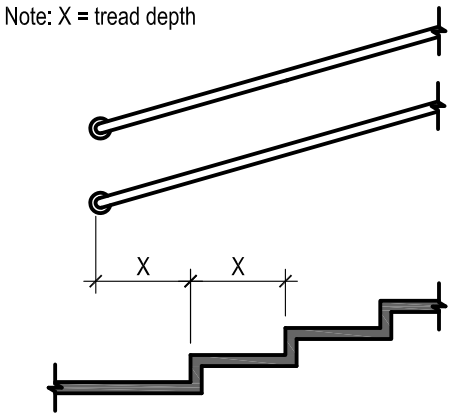


Fig. 505.10.3
Bottom Handrail Extensions at Stair

505.10.4 Location Identification. Location identification should be provided on the top surface of the handrail extension in both tactile characters and Braille in accordance with Section 703. Handrails located in close proximity to an exit door discharging to the outside or to the level of exit discharge should be provided with the word "EXIT," with one or two directions such as: "straight ahead", "behind"; "turn left", "turn right." Consider a directional arrow.

505.10.4 Advisory. Location identification using visual and tactile means, located on the handrail extensions, provides wayfinding and warns the user of potentially hazardous conditions.

505.10.5 Audible Signage. Consider an audible sign system with an activator located on the handrail end face for recorded messages. Consider an Information/ Navigation Reference Point System complying with Section 708.7.

506 Windows

506 Advisory. Automatic operation should be available for all types of windows to accommodate user needs and preferences. Automation may increase cost and raise maintenance issues but it useful for many people. It should be provided in buildings where manual operation is difficult or not feasible (e.g., institutional facilities) so occupants may have some control of their environment. Manual window operation should comply with Section 309. This could be accomplished relatively easily using recessed or projected handles for a double hung or sliding windows and with proper ergonometric designed levers for casement, awning and jalousie windows. It is also recognized that not all parts of a window can be made to comply with Section 309 such as the upper sash of a double hung window or other components of the window that are beyond the reach ranges of Section 308. Manual integrated hand cranks or hand crank kits can resolve this problem. A pole extension such as those used for skylights and traditionally used by schools to operate double hung windows.

506 Advisory Cont'd.
It may be no-tech, but it works for many people. In senior housing where occupants can have difficulty operating windows, consider enhanced balances for double hung windows to increase safety and usability. The same rationale should apply to window cleaning. For certain types of windows such as tilt-in double hung and casement, cleaning can be accomplished by a wide range of users. Tilt-in windows may pose a potential hazard to people unaware of how the mechanism operates or without sufficient strength to manipulate the sash. Locking devices are sometimes used to restrict access to the tilt-in feature to maintenance personnel. Other types of windows should permit easy cleaning of both the interior and exterior. Window cleaning operation should comply with Section 309. Mechanism should be intuitive, simple, lightweight, durable, safe and within reach ranges complying with Section 308.

506.1 Manual Windows. Manually operated windows should include projected, double hung, sliding, combination, casement, awning, jalousie, pivoted, reversible and other. All windows containing operable components should comply with reach ranges as specified in Section 308 and Section 309 operable parts.

506.1.1 Handles. Handles should be recessed projected or pop-out and should comply with Section 506.1.1.

506.1.1.1 Projected. It is recommended that projected handles should be the full width of window where practical and project 1-1/2 inches (38 mm) minimum from face of frame. Open handles should be 4 inches (102 mm) minimum in length and provide 1-1/2 inches (38 mm) minimum space from face.

506.1.1.2 Recessed. Recessed handles may only be viable for only some types of windows Recessed handles should be a minimum of 4 inches (102 mm) in length, recessed 3/4 inch (19 mm) minimum in depth and 1 inch (25 mm) minimum in height. Pop-out recessed handles should be easy to operate and comply with 506.1.1.

506.1.2 Operation. Manual window operation should provide a clear floor space complying with Section 506.1.8, operable parts placed within one or more of the reach ranges specified in Section 308. Operable parts should be operable with one hand and should not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts should be 5.0 pounds (22.2 N) maximum.

506.1.3 Cranks. Rotating crank mechanisms should open clockwise that allows various size rotation arms and accepts various sizes and shapes of rotating termination knobs to accommodate user needs and preferences. Integrated and easy installation hand crank kits allow manual operation beyond the reach ranges specified in Section 308 and for windows that are beyond even a standing position operation. Cranks may be used for a variety of window types including double hung windows.

506.1.4 Pole Extension. Pole extensions should be considered for some upper window sashes allowing them to be operable. It is recommended to provide operable upper sashes even though they are beyond the reach ranges. Poles may not be usable for some people.

506.1.5 Locking Mechanisms. Locking mechanisms should be provided for operable windows located within reach ranges as per Section 308. All operable parts must comply as per Section 309. Locking mechanisms may be placed in a variety of locations to increase usability and safety. Childproofing should be built into the mechanism. See Section 309.5 regarding operation.

506.1.5.1 Lever. Levers should be 4 inches (102 mm) minimum in length with easy to replace longer arms, projecting 1-1/2 inches (38 mm) minimum from frame face. Provide rotating end that can be replaced with a variety of sizes and shapes to increase usability.

506.1.6 Window Coverings. Window coverings should comply with Section 308 – Reach Ranges and Section 309 – Operable parts. Shutters should contain handles complying with Section 309. See Section 309 Childproofing.

506.1.6 Advisory. Glare is a serious concern. This can be addressed with glazing, window treatments and architectural elements (e.g., building configuration, overhangs, horizontal louvered overhangs, light shelves, vertical louvers, awnings, mesh and clerestories). Consider a system that maintains a balance of natural and artificial light, accommodates the sun's daily movement, cloud cover, sun's seasonal positions, and reflected sunlight from adjacent buildings surfaces. To conserve energy, day light can be combined with artificial lighting controls (photocells) to turn off light fixtures when there is adequate day light illumination.

506.1.7 Temporary Air Conditioners and Fan Installations. These temporary units should be placed in such a way that they will meet the requirements in Section 308 and 309. Provide childproofing and attachment clips that prevent accidental drop-out.

506.1.8 Maneuvering Clearances. Provide a clear floor space complying with Section 305, for manual window operation and cranks.

506.1.9 Emergency Escape and Rescue Openings. The *2014 NYCBC*, Section 1025.3, requires a height of emergency escape and rescue openings at 36 inches (914 mm) maximum above the floor.

506.1.9 Advisory. Emergency escape and rescue opening are intended for use by rescue/fire personnel to assist occupants in an emergency. Some occupants may use these openings unassisted (e.g. locations at a basement level). The question of sill height is a complex one. Too low a sill height can make occupants feel uncomfortable, is potentially dangerous for children if windows are operable (although NYC requires child guards) and may interfere with installation of heating and air conditioning units under the window. On the other hand, providing a low enough sill height, so that a seated person (e.g. person in a wheelchair) can see out is important. Some have found that a sill height in the range of 28 inches to 32 inches works well in residential occupancies.

506.2 Automatic Windows. Where possible provide automatic window operation. All windows beyond the reach ranges as per Section 309 should be automatic and should comply with Section 506.2. Automatic operation should be provided with manual back-up.

EXCEPTION. Security windows designed to be operated by security personnel or others such as bank personnel should not be required to comply with Section 506.2.

506.2.1 Control Switches. Controls to automatic window operation should be located adjacent to the window. The control switches should be located within the reach ranges as per Section 308 and should comply with Section 309 Operable parts.

EXCEPTION. Where clear floor space complying with Section 305 is not possible adjacent to windows, controls should be clustered remotely within the room. Switches should be clustered for multiple windows with a clear floor space complying with Section 305.

506.3 Skylights, Roof Windows and Solar Ducts. Skylights, roof windows and solar ducts should be automatic operation, with manual back-up by pole extension or hand crank.

506.3.1 Manual Operation. Manual operation as the only means of operation is not recommended if it is limited to the use of a pole extension that is not usable by many people.

506.3.2 Automatic Operation. The control switches should be located within the reach ranges as per Section 308 and should comply with Section 309, within close proximity of the unit and/or clustered in a control location. Provide a clear floor space complying with Section 305.

506.4 Glazing. Glazing should reduce glare and, coated to control direct sunlight on surfaces.

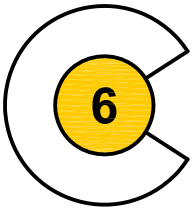
506.4 Advisory. There is a wide variety of glazing options, that includes light transmission levels, tinting, filters with various spectrum transmission, which accommodate a wide range of individual preferences and a variety of facilities. Thermal gain and loss should also be considered since it will affect comfort levels. The USGBC LEED-NC Reference Guide is a good cross reference for these issues.

506.5 Interior Windows. Windows that are strictly for interior use such as ticket booths, bank teller windows, security windows, reception windows or other windows that are not located on the exterior envelope of the building should comply with Sections 506.1 and 506.2.

506.5.1 Security Glazing. Security glazing should comply with Section 904.6.

506.6 Windows In Doors. Windows within doors should comply with Section 404.2.10, Vision Lights.

506.7 Marking of Transparent Doors and Fixed Adjacent Transparent Sidelights. Refer to Section 404.5 for recommendation for marking as per the *2014 NYCBC* Section BC 2410.



Plumbing Elements and Facilities

600 Introduction. Chapter 6 includes drinking fountains (and bottle-filling stations), toilet and bathing rooms, water closets, bidets, toilet compartments, urinals, lavatories and sinks, bathtubs, showers, bathing compartments, wet rooms, grab bars, shower seats, washing machines/clothes dryers, saunas and steam rooms.

The high/low drinking fountain arrangement addresses various statures, positions and sizes of people. In some building classifications, such as nursery schools, an additional spout height is recommended for young children. Bottle filler spouts to fill a ten-inch bottle minimum should be provided. Separate accommodations are provided for service animals and domesticated animals. Drinking fountains should be grouped with other amenities to increase overall convenience and usability.

Toilet and bathing rooms should provide a range of choices that address needs and preferences. In larger facilities, a variety of compartments should be provided, including those specifically designed for children's use. These may also accommodate people of short stature. Public facilities should be as intuitively automatic as possible to increase usability and to reduce physical contact for sanitary reasons. Inclusive compartments are not limited to those who use mobility devices. They can be used by a parent with a child, those who need an assistant or a person who finds standard configurations confining or do not provide adequate accommodations.

Because inclusive stalls are also used for cleaning, dressing, medicating and other uses, consider a variety of dispensers and a lavatory. Ambulatory stalls may be required by some but preferred by others, such as the elderly or those with diminished dexterity and strength. They make it easier to raise or lower oneself and for lateral support by use of the closely spaced parallel grab bars. Dual-height toilet seats, bidet seats, baby-changing tables, conveniently located controls, remote controls, paper toilet seat cover and other types of dispensers (e.g. liquid sanitizer and paper towels), shelves and other accessories increase usability. Consider single-occupant (unisex) restrooms and bathrooms for individual and family usage. Consider at least one adjustable height lavatory in multiple-occupant restrooms for those who find that fixed units are not accommodating. Consider a work station. Alarms should be provided for safety and security.

Bathtubs are not usable by everyone and for many are hazardous, but are included because options should not be restricted to showers. Walk-in bathtubs are a safer alternative, allowing easy enter and exit and usage. Multipurpose bathing compartments are recommended. Reconfiguration is easy to accomplish without damage. "Adaptable" here means accommodating a roll-in shower, bathtub with seat, walk-in bathtub, or a smaller transfer shower with the remaining space that can be used in multiple ways (e.g., for combining a transfer shower and walk-in bathtub, a lavatory, dressing area, storage, sauna compartment, steam compartment). A wet room is a bathroom that contains an area designated for shower bathing that is open to the rest of the room. It is not within the ability of the visitor or occupant to instantly reconfigure the space, rather, it provides options for owners to address anticipated usage and fluctuations in the market (e.g. a hotel that changes inclusive room location distribution or decides to increase the percentage of roll-in showers). Dual grab bars and sizing to accommodate children and people of short stature are recommended. Shower seats provide convenience and enhance safety. Dwelling unit bathrooms are covered in Chapter 10.

Front-loading washing machines and clothes dryers should have convenient controls and raised openings at a height that everyone can use. Consider models with sloped faces and adjustable height bases.

Standard saunas and steam rooms are defined. Transfer compartments are introduced to allow installation in small spaces and increase the multipurpose bathing compartment options.

601 General

601.1 Scope. The provisions of Chapter 6 should apply where recommended by the scoping provisions adopted by the administrative authority.

601.1 Advisory. The composition of the components should create an inclusive environment. Nothing contained in these guidelines is intended to fall below minimum NYC code requirements. Chapter 6 applies to all classifications of buildings except dwelling units, which are covered under Chapter 10. Recommendations may not apply equally to all classifications, subgroups, and size of buildings; for example, a large multiple occupant bathroom may not be appropriate for a small building. An inclusive toilet compartment helps resolve this. Chapters 6 and 10 contain some cross-referencing. Chapter 10 differs because it accommodates the needs of the current and future occupants of a dwelling unit.

602 Drinking Fountains

602.1 General. Drinking fountains should comply with Sections 602 and 307. Two drinking fountains minimum are required by code, adult standing and adult seated/child. The supplemental child unit is intended for facilities primarily for the very young. Drinking fountains should be grouped with other amenities such as public telephones and restrooms, to make them easier to locate.

602.1 Advisory. The typical adult standing unit and the seated unit should be sufficient for most applications, with the seated adult unit accommodating children. But this is not adequate in facilities for the very young, such as nursery schools. An installation with three ganged units may be considered excessive for one location. To limit the installation to two units only, there are two recommendations to address this: 1, provide a children's fountain in a separate location in close proximity to the children's facility with a 30 inch spout height; 2, lower the adult seated unit to a maximum of 30 inches. The problem with the 30 inch spout height for seated adults is that it must also meet the 27 inch knee clearance resulting in a 3 inch height to accommodate the unit, also the seated adult is forced to bend to drink.

602.1 Advisory Cont'd.
The seated adult may be accommodated by providing a variable height water flow that will increase the height of the water to reduce bending. This may cause some water splattering, requiring a larger receptor and a backsplash. Drinking fountains are not permitted in public restrooms because of sanitary reasons.

602.2 Clear Floor Space. Provide a clear floor space for drinking fountains complying with Section 602.2. Clear floor spaces are permitted to overlap. Each clear floor space should be centered on the unit.

602.2 Advisory. The clear floor space for adult standing units takes into account space for bending but also people who use mobility devices such as walkers or crutches. The adult seated/child unit takes into account adults that use mobility devices with their legs in a raised position and complying with Section 306.3 while accommodating standing children. The supplemental child unit for young children, is provided with parallel clear floor space that is based on the minimum code clear floor space to account for children's smaller mobility devices. Some children may require larger devices that approach adult sizes and will thus use the seated adult unit. Be careful regarding units that may contain an arm or other protruding object that creates an obstruction (see Sec. 307).

602.2.1 Adult/Children Standing. Provide a clear floor space 36 inches (915 mm) in width and 36 inches (915 mm) in depth measured from the centerline of the face of the unit.

602.2.2 Adult Seated. Provide a clear floor space 60 inches (1525 mm) in width and 36 inches (915 mm), positioned for a forward approach. Provide knee and toe space complying with Section 306.

602.2.3 Children Seated. Provide a clear floor space 48 inches (1220 mm) in width and 30 inches (760 mm) in depth measured from the face of the unit positioned for a forward approach.

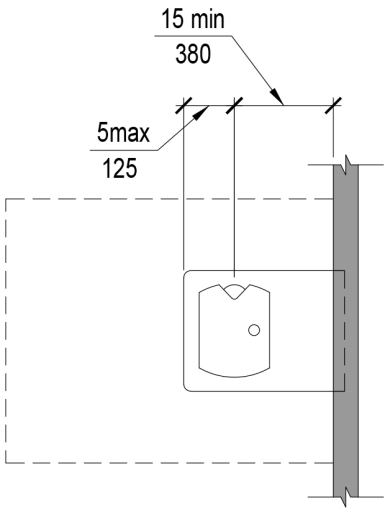


Fig. 602.2.3
Clear Floor Space
Children Seated Forward Approach

602.3 Operable Parts. Operable parts should comply with Section 308 and 309.

602.4 Spout Outlet Height. Spout outlet height should comply with Section 602.4.

602.4 Advisory. The ability and extent that one bends to comfortably drink is based on individual needs and preferences. Some may not have the ability to bend at all and will require a cup as per Section 602.7. This may only be practical for interior installations. As per NYC Local Law 55 of 2010 and the NYC Plumbing Code PC 410 drinking fountains are required by Table 403.1 to have both a bubbler and a faucet for filling containers that are at least 10 inches in height. See *IDG* Section 602.8 Bottle Fillers.

602.4.1 Adult Standing. Spout outlet for drinking fountain for standing adults should be 38 inches (965 mm) minimum and 43 inches (1090 mm) maximum above the floor, but the recommended height is 42 inches (1070 mm).

602.4.2 Adult Seated. Spout outlets for adult seated drinking fountains should be 36 inches (915 mm) maximum above the finish floor.

602.4.3 Supplemental Child. Spout outlet for drinking fountain for children should be 30 inches (760 mm) maximum above the floor.

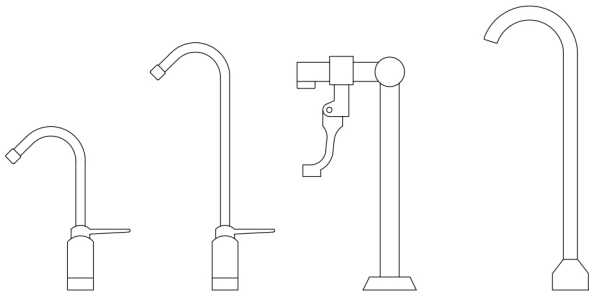
602.4.4 Supplemental Animal Spout. Consider a supplemental spout for service animals and pets. Outdoor locations should include parks, playgrounds, outdoor stadiums and other types of facilities that can maintain sanitary conditions and do not conflict with people. Receptors may pose a disease transmission threat for animals so just a spout with a drain is recommended.

602.5 Spout Location. The spout should be located 15 inches (380 mm) minimum from the vertical support and 5 inches (125 mm) maximum from the front edge of the drinking fountain, including bumpers. Where only a parallel approach is provided, the spout should be located 3-1/2 inches (89 mm) maximum from the front edge of the drinking fountain including bumpers.

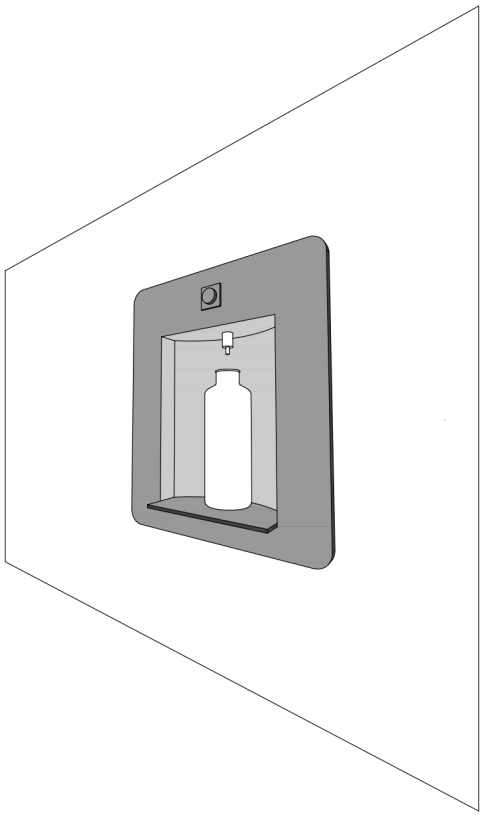
602.6 Water Flow. The spout should provide a flow of water 4 inches (102 mm) minimum in height. The angle of the water stream from spouts within 3 inches (76 mm) of the front of the drinking fountain should be 30 degrees maximum, and from spouts between 3 inches (76 mm) and 5 inches (125 mm) from the front of the drinking fountain should be 15 degrees maximum, measured horizontally relative to the face of the drinking fountain. Hand operated metering faucets should remain open for ten seconds minimum.

602.7 Cup Dispenser. Drinking fountain locations should be provided with a cup dispenser complying with Section 308 and 309.

602.8 Bottle Fillers. A bottle filler faucet should be provided for each drinking fountain along with bubbler spouts. The bottle filler faucet may be located above or below the unit for filling containers that are at least 10 inches in height. Faucets that are below must fall within the reach ranges as per Section 308 for seated positions and should not obstruct knee clearance (and designed to avoid being used as an animal spout). Faucets that are located above should accommodate both seated and standing position reach ranges. Bottle filler stations may be recessed and should be automatic.



(a)
Faucet Types



(b)
Automatic Bottle Filler Station

Fig. 602.8
Bottle Fillers

602.8.1 Clear Floor Space. A clear floor space positioned for a forward or side approach, should comply with Section 305.

602.8.2 Controls. Controls should be automatic or hand operated. Hand operated controls should comply with section 309.

602.9 Combined Units. Code requires at least two drinking fountains where drinking fountains are provided. In lieu of a separate unit for seated and standing positions a combined unit is permitted.

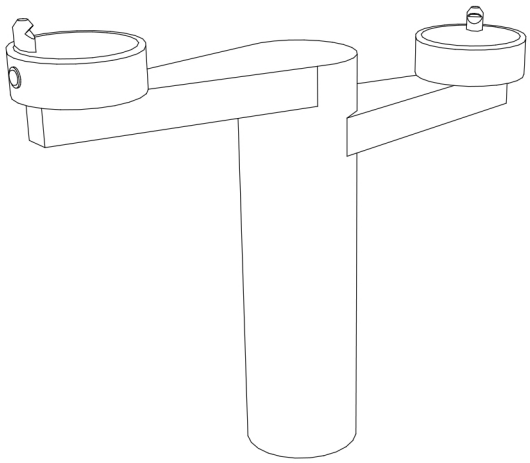
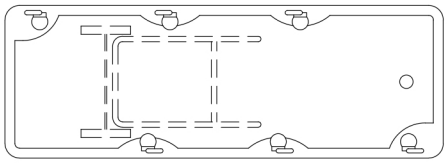
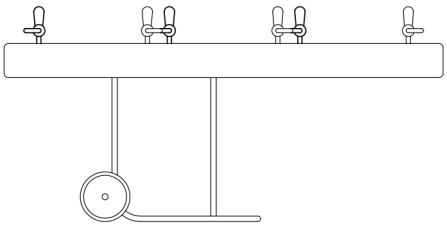


Fig. 602.9
Combined Units

602.9.1 Portable Multiple Drinking Fountains. These type of units may be separately dedicated for adult usage and another for children's usage. Typically units are used as water stations at events.



(a)
Plan



(b)
Elevation

Fig. 602.9.1
Example of Portable Multiple Drinking Fountain Unit

603 Toilet and Bathing Rooms

603.1 General. Toilet and bathing rooms should comply with Section 603 and should be as automatic to the fullest extent possible to increase usability and to reduce physical contact for sanitary reasons.

603.1. Advisory. Automatic operation should be provided to the maximum extent possible to reduce contamination. It should be provided for all components but especially for locations that have the highest concentrations of bacteria such as door handles, buttons, knobs, faucets, soap dispensers, towel dispensers, toilet and urinal flushometers, bidet controls, any type of dispenser and control operating mechanism. This is very important for people with compromised immune systems, children and the elderly. People who are blind must use their hands to manually locate and operate devices and may be exposed to unsanitary conditions and are at greater risk of contamination.

603.1.1 Single Occupant (Unisex/Family) Toilet Room. Single occupant toilet rooms should consist of a water closet, grab bars, lavatory with work surface (see Section 606.2.1), dispensers (see Section 604.7 for types), floor drain, mirror, automatic door and lock (see Section 404.3.6), coat hooks, shelf, baby changing table, emergency alarms, air dryer, bench trash receptacle, and accessories complying with Sections 302, 303, 309, 310, 404, 603, 604, 606, 609, 903 and 906. The water closet should not be enclosed in a separate compartment. Bidet mechanism should comply with Section 604.2.6. Grab bars should comply with Section 604.5, 604.11, and 609. Consider a dual height continuous grab bar for adults, children and people of short stature, complying with Section 609. Include a stool for children to use adult toilet and see Section 604.4 regarding water closet height and children's usage. Door maneuvering clearance should comply with Section 603.2 & 604.11.3. Provide hands free automatic/ adjustable task lighting for water closet, lavatory and work surfaces with automatic shut-off.

603.1.2 Single Occupant (Unisex/Family) Bathroom. Single occupant bathrooms should comply with Section 603.1.1 and should contain a inclusive bathing compartment complying with Section 608, and changing area complying with Section 603.8

603.1.1 and 603.1.2 Advisory. Single occupant restrooms and bathrooms should be inclusive, intuitive and automatic to the fullest extent possible. You should be able to use a toilet facility without your hands touching anything. They are recommended where space does not permit both an inclusive male and female facility, as well as to supplement a facility, providing another option for occupants. They function as a family restroom since they allow a parent(s) with child privacy, especially with a child of a different gender where a typical restroom creates a conflict. They may present a viable solution for an existing building where modification or expansion of the restrooms or bathrooms is not feasible. Some people prefer a single occupant facility for privacy, especially for those that require mobility devices, those that require assistance and others with limited dexterity. Refer to the *2014 NYCBC*, Section 1109.2 Exception 3, and 1109.2.1 for required number, and additional requirements. As per the code, in assembly and mercantile occupancies, an accessible unisex toilet room shall be provided where an aggregate of six or more male and female water closets is required. Other requirements relevant to unisex toilet rooms may be found in Section 1109.2.1 of the code. Another approach is to provide a unisex toilet room wherever a multiple toilet room is provided to allow the option of privacy when needed or preferred.

603.1.3 Multiple Occupant Rest Rooms. Multiple occupant rest rooms should be as automatic as possible and consist of at least one adult inclusive water closet, an ambulatory compartment, and one inclusive urinal (male); and a supplemental inclusive child water closet, a supplemental child ambulatory compartment. In addition the restroom should be provided with dispensers, floor drain(s), bench, trash receptacles, mirror, coat hooks, shelves, baby changing table, emergency alarm, air hand dryer, lighting, and accessories complying with Sections 302, 303, 309, 310, 603, 604, 605, 606, 609, 702 903 and 906. Provide disposable toilet seat covers, waste receptacle(s), antibacterial liquid dispenser and sealed cleaning wipes.

603.1.3 Advisory. Consider an inclusive or ambulatory compartment in lieu of a standard compartment. The minimum number of fixture distribution between the sexes is based on the percentage of each sex anticipated in the occupant load as per the *2014 NYC Plumbing Code,* Section PC 403 and Table 403.1. Assembly and Business classifications are adjusted to increase the female fixture count. A different distribution of the sexes for any classification requires statistical data approved by the Commissioner as per Section PC 403.3. Consider increasing the total fixture count for convenience. The full range of children's components may not be appropriate for all classifications of buildings, such as an office environment.

603.1.3.1 Entry. Entry doors are recommended to be automatic and should comply with Section 404.3. Consider a separate entry and exit for large heavily used facilities. Consider a paper tissue or hand sanitizer dispenser on the inside face or adjacent to exit door for handle or push plate contamination. Consider alternative type entrances that eliminate doors in large public facilities (e.g., airports and stadiums). This includes a variety of maze type entrances (e.g., angles, semicircles and free form configurations) with a 72 inches (1830 mm) minimum clear width for maze route and door opening. Consider a free-standing single panel, t-shaped partition and other configurations to obstruct direct sight lines into restroom opening to eliminate the need for a door.

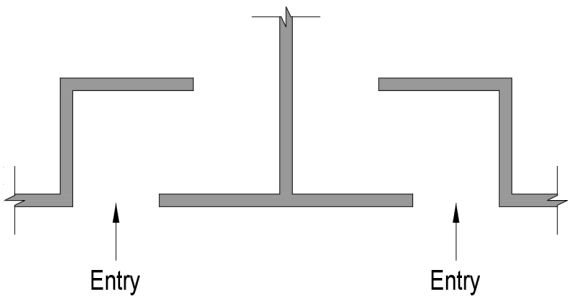


Fig. 603.1.3.1
Example of Doorless Entry

603.1.4 Multiple Occupant Bathrooms. Multiple occupant bathrooms should contain at least one inclusive roll-in shower with changing area, in addition to the requirements of 603.1.3, and comply with Sections 608 and 610.

603.1.4.1 Entry. Entry doors are recommended to be automatic and should comply with Section 404.3 Consider alternative types of entrances complying with 603.1.3.1. For manually operated doors consider a paper tissue or hand sanitizer dispenser on the inside face of manual entry doors, to protect occupant from contaminated handle or push plate. Provide a waste receptacle within close proximity to dispose of contaminated tissues. Provide liquid hand sanitizer within close proximity of both the interior and exterior sides of the entry door.

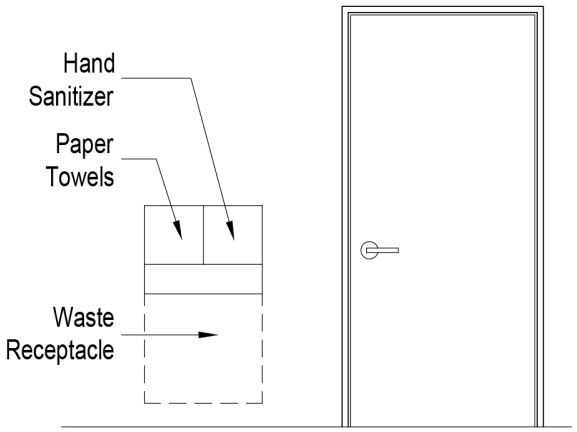


Fig. 603.1.4.1
Manually Operated Entry Door
Contamination Reduction

603.2 Clearances. Clearances should comply with Section 603.2.

603.2.1 Turning Space. A turning space 72 inches (1800 mm) in diameter complying with Section 304 should be provided within the room.

603.2.2 Overlap. Clear floor space, clearance at fixtures, and turning space should be permitted to overlap.

603.2.3 Door Swing. Doors should not swing into the clear floor space or clearance for any fixture.

EXCEPTION: In single occupant (unisex/ family) restrooms and bathrooms, doors may swing into the turning space where a clear floor space complying with Section 305.3 is provided within the room beyond the arc of the door swing.

603.2.4 Permitted Obstructions. The space between permitted obstruction and any other projecting object should be 1 1/2 inches (38 mm) minimum. Permitted obstructions include toilet tissue and paper seat cover and other dispensers, mirrors, grab bars, hand dryer, towel racks, emergency alarm, remote flush button, and waste receptacles. HVAC components are not permitted obstructions.

603.2.4.1 Circulation Width. Consider a 72 inch (1830 mm) minimum circulation width in large facilities such as airport and assembly space bathrooms and a 42 inch (1070 mm) minimum circulation width in small facilities.

603.3 Mirrors. Mirrors should comply with Section 603.3.

603.3.1 Partial Height Mirrors. Partial height mirrors with a tilt mechanism, located above the lavatories, sinks or counters should be mounted with the bottom edge of the reflecting surface 40 inches (1015 mm) maximum above the floor. Where adjustable tilt mirrors are provided, provide reach ranges complying with Sect. 308.

603.3.2 Full Length Mirrors. Full-length mirrors with a tilt mechanism, 24 inches (610 mm) minimum in width and 60 inches (1525 mm) minimum in height should be unobstructed and mounted with the bottom edge of the reflecting surface 18 inches (458 mm) above the floor. Provide a clear floor space centered on width of mirror complying with Section 305.

603.4 Coat Hooks and Shelves. Coat hooks should be located within reach ranges complying with Section 308. Coat hooks should be located on the back of doors and/or on the wall on hinge side of door for single use rest rooms. Hooks should be provided in changing areas and adjacent to bathing compartments. Coat hooks are used for a variety of purposes including medical devices, and bags with handles to keep them off the floor and for easy access. Provide a shelf to avoid placing personal items on the floor. Shelves for adults should be 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the floor. Shelves for children should be 20 inches (510 mm) minimum and 36 inches (915 mm) maximum above the floor. Shelves are recommended to be recessed if they protrude more than 4 inches (102 mm).

603.5 Emergency Alarm. Provide an emergency alarm complying with Section 702 that is both audible and visual in bathing compartments, ambulatory compartments, shower compartments, single occupant (unisex) restrooms and single occupant (unisex) bathrooms.

603.5 Advisory. Emergency alarms are intended primarily for institutional facilities such as hospitals and health care facilities, but are also recommended for other classifications. Bathrooms in isolated or remote locations and areas where security is a concern, should always contain emergency alarms. Water overflow alarms are highly recommended.

603.5.1 Upper Remote Flush Control Locations. A push button redundant to standard open side control should be located on closest side wall adjacent to the water closet and aligned with the front face of the water closet 48 inches (1220 mm) above the floor for adult accessible and ambulatory compartments. Consider locating 36 inches (915 mm) above the floor for children's accessible and ambulatory compartments, aligned with remote flush control. Button should be 2 inches (50 mm) minimum in diameter and should comply with Section 702.2.1.

603.5.1.1 Lower Remote Flush Control Locations. A push button redundant to standard open side control should be located for adults 19.5 inches (495 mm) aff minimum complying with Section 308.3, for minimum side reach ranges. Consider children's location 16 inches (406 mm) aff, aligned with vertical grab bar complying with Table 308.4.

603.5.2 Visual/Audible Alarm Locations. Visual/audible alarm locations should comply with Section 702.2.7.

603.6 Lighting. Provide adequate lighting for each toilet compartment in addition to general lighting for the entire room. Consider automatic/adjustable task lighting in compartments and for lavatory and work surfaces with automatic shut-off.

603.7 Baby Changing Station. Baby changing station should comply with Section 308 and 309. Provide a front approach clear floor space complying with Section 305 and 306. Top of surface should be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum in height above the floor, 36 inches (915 mm) minimum in length and 24 inches (610 mm) maximum in depth. Provide task lighting.

603.8 Changing Area. A changing area is recommended in single occupant (unisex) bathrooms and multiple occupant bathrooms. The bathing compartment may be used as a changing area if space is extremely limited. Provide hooks and towel rack complying with Section 1011.17. Provide seating complying with 1011.13. Provide grab bars complying with Section 609.

603.8 Advisory. The bathing compartment may be used as a changing area but is only recommended when there are no other options. Use immediately after bathing may create a wet/dry conflict, but it is still a viable alternative.

603.8.1 Permanent Seating. Built in benches and other seating should be provided and comply with Section 903.

603.8.2 Portable Seating. Provide storage location for portable seating when not in use.

603.8.3 Lighting. Provide a light fixture within the changing area and perhaps task lighting.

603.9 Waste Receptacles. Waste receptacles complying with Section 906.1 thru 906.7 should be provided in the room, either open or with an automatic operation lid due to contamination (See Section 906). Do not locate waste receptacles in w.c stalls due to health hazards. Provide a waste receptacle within close proximity of the door to dispose of waste tissues used to manually operate the door as per Section 603.1.4.1. Avoid placement in any required maneuvering clearances.

603.10 Dispensers. Dispensers should comply with Section 604.7.

603.11 Portable or Temporary Facilities. Portable or temporary facilities should comply with Section 603.

603.11 Advisory. Exterior portable facilities may range from a single occupant unisex unit to a multiple occupant bathroom facility. Both interior and exterior temporary facilities should comply with Chapter 6. Portable or temporary, does not mean that it will be used differently than a permanent facility. Refer to the *2014 NYC Building Code*, Section E105.1. for portable toilets and bathrooms.

604 Water Closets and Toilet Compartments.

604.1 General. Water closets and toilet compartments should comply with Section 604. See *2014 NYCBC* Section 1109 for minimum code requirements).

604.1.1 Adult Inclusive Compartment. Adult inclusive compartments should comply with Section 604.8. Provide a minimum of one compartment for each toilet room**.**

604.1.2 Adult Ambulatory Compartment. Adult ambulatory compartment should comply with Section 604.9. Provide a minimum of one compartment in each toilet room.

604.1.3 Supplemental Children's Inclusive Compartment. Supplemental children's inclusive compartments should comply with Section 604.10.

604.1.3.1 Supplemental People of Short Stature Inclusive Compartment. Supplemental people of short stature inclusive compartments should comply with Section 604.1.3.

604.1.4 Supplemental Children's Ambulatory Compartment. Supplemental children's ambulatory compartment should comply with Section 604.11.

604.1.4.1 Supplemental People of Short Stature Ambulatory Compartment. Supplemental people of short stature ambulatory compartment should comply with Section 604.1.4.

604.1.5 Single Occupant (Unisex/Family) Rest Room and Bathroom. Single occupant (unisex/family) rest rooms and bathrooms should comply with Section 604.1.1.

604.1.5 Advisory. As per the *2014 NYC Building Code*, Section 1109.2.1, assembly and mercantile occupancies, a unisex toilet room shall be provided when the aggregate of six or more male and female water closets are required.

604.1.6 Standard Adult Compartment. Standard adult compartments are defined by the *NYC Plumbing Code*, Section 405.3.1 Water Closets, Urinals, Lavatories and Bidets. Both the accessible and ambulatory compartment may be used in lieu of the standard compartment.

604.1.7 Supplemental Standard Child Compartment. The smallest allowable compartment should be used. As per the *NYC Plumbing Code* Section PC 405.3.1, compartments shall not be less than 30 inches wide (760 mm) and 60 inches deep (1525 mm). Both the inclusive and ambulatory child compartments may be used in lieu of the standard child compartment.

604.1.8 Supplemental People of Short Stature Compartment. Supplemental people of short stature compartment should comply with Section 604.1.7.

604.2 Water Closet Locations. Water closets should be located with a wall or partition to the rear and one side, complying with Section 604.2.

604.2.1 Adult Water Closet Location. The centerline of the water closet should be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the sidewall or partition.

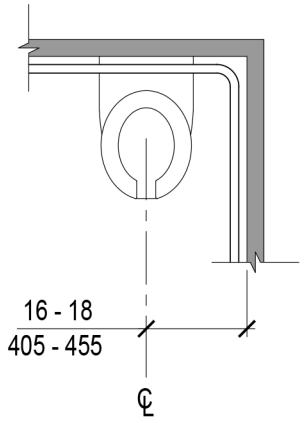


Fig. 604.2.1
Adult Water Closet Location

604.2.2 Adult Ambulatory Water Closet Location. The centerline of the water closet should be 17 inches (430 mm) minimum to 19 inches (485 mm) maximum from the sidewall of the partition.

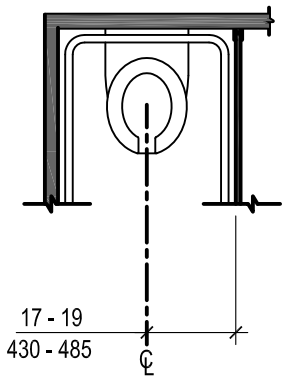


Fig. 604.2.2
Ambulatory Water Closet

604.2.3 Children's Water Closet Locations. The centerline of the water closet for children should be from the sidewall of the partition. Children ages 9 through 12, 15 inches (380 mm) to 18 inches (455 mm). Children ages 5 through 8, 12 inches (305 mm) to 15 inches (380 mm). Children 3 and 4, 12 inches (305 mm).

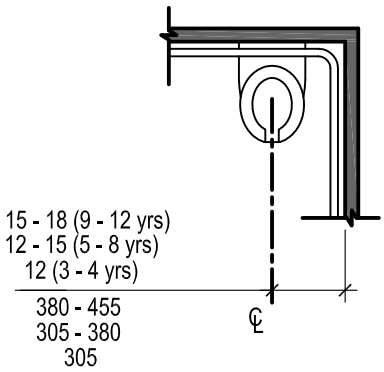


Fig. 604.2.3
Children's Water Closet

604.2.3 Advisory. Children's dimensions were obtained from the *2010 ADA Standards*, Section 604.9 Advisory Specifications for Water Closets Serving Children Ages 3 through 12.

604.2.4 Children's Ambulatory Water Closet Location. The children's ambulatory water closet location should comply with Section 604.2.3.

604.2.4.1 People of Short Stature Ambulatory Water Closet. People of short stature ambulatory water closets should comply with Section 604.2.3 for children ages 9 through 12.

604.2.5 Single Occupant Restroom and Bathroom Water Closet Location. Single occupant restrooms, bathrooms, and water closets should comply with 604.2.1 for facilities intended primarily for adults. If the facility is intended primarily for children the water closet should comply with Section 604.2.3. If the facility is intended for all, comply with Section 604.2.1.

604.2.6 Bidets. Bidets are suggested for hygienic purposes and for people with limited dexterity. Conventional bidet usage requires transfer from water closet to bidet. Due to conflict with maneuvering clearances, it is suggested that the bidet mechanism should be incorporated into the water closet seat, to eliminate a separate bidet fixture. Mechanism should be automatic and may be integrated or independent of the seat.

604.2.6 Advisory. Bidets are not as commonly used in the U.S. as they are in Europe and Japan. Bidet mechanisms require less dexterity, provides more independence for some users, and are hygienically superior to the use of toilet tissue alone. Features may include but are not limited to: self cleaning; sanitizing; deodorizing; single or multiple spray heads or wands; warm water supply; warm air drying; heated seat with temperature control; and various remote control configurations. Bidet water closet seats that are used in lieu of a standard water closet seat should comply with seat heights.

604.2.6.1 Supplemental Standard Bidet Fixture. If a standard bidet fixture is used, it may be placed adjacent to the clear floor space of the water closet. Bidet location controls and amenities should comply with Section 1011.8. If the bidet is located in a single use restroom or bathroom it should comply with Section 604.2.1 for facilities intended primarily for adults and it should contain a portable platform or step for use by children. If the facility is intended primarily for children, it should comply with Section 604.2.3.

604.3 Clearance. Clearance for adult accessible, child accessible and single occupant (unisex) restrooms and single occupant (unisex) bathrooms should comply with Section 604.3.

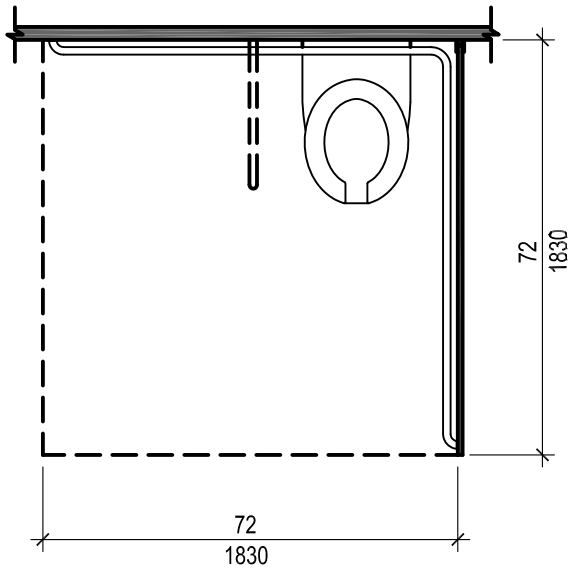


Fig. 604.3
Clearance for Water Closet in Adult and Single Occupant Restroom/Bathroom

604.3.1 Adult Size. In adult inclusive, and single occupant (unisex) restrooms and single occupant (unisex) bathrooms, provide a clearance around the water closet 72 inches (1800 mm), measured perpendicular from the sidewall, and 72 inches (1800 mm) measured from the rear wall. Ambulatory compartments should comply with Section 604.9.2.

604.3.2 Children's Size. In children's inclusive compartment, provide a clearance around the water closet 60 inches (1525 mm) minimum, measured perpendicular from the sidewall, and 60 inches (1525 mm) minimum measured from the rear wall. Ambulatory compartments should comply with Section 604.11.2.

604.3.2.1 People of Short Stature Size. For people of short stature, provide clearance complying with Section 604.3.2.

604.3.3 Overlap. The required clearance around the water closet should be permitted to overlap other fixture clearances, associated grab bars, dispensers, receptacles, coat hooks, shelves, and the turning space. No other fixtures or partitions should be within the required water closet clearance. Obstructions complying with Section 603.2.4 may be permitted.

604.4 Water Closet Seat Height. The height of the water closet seats should comply with Section 604.4. Seats should not be sprung to a return position.

604.4 Advisory. An automatic adjustable height toilet would accommodate and expand the height ranges for both adults and children. This concept is developing and should be considered. Currently, a viable manual solution is to utilize a dual height seat or an elevated seat insert. If a seat insert is provided a wall storage unit should be provided. If a young child must use an adult wc, provide a pull down seat or seat insert with a properly proportioned opening and a stool. If a child exceeds the upper height range for children, they could use the adult facility. Sanitary concerns regarding dual height seats or seat inserts can be addressed with disposable plastic seat covers, liquid hand sanitizer, sealed sanitary wipes and paper towel dispensers. Also, see Section 604.7.2 Other Dispensers. Sanitizers and covers make the use of the elevated seat options viable because it addresses cleanliness and disease transmission concerns. Another alternative is the installation of a raised floor to reduce the floor to top of wc seat, but this creates other non-compliant conditions.

604.4.1 Adult Water Closet Seat Heights. The height of the water closet seats for inclusive and ambulatory water closets should be 17 inches (432 mm) minimum and 19 inches (482 mm) maximum above the floor, measured to the top of the seat.

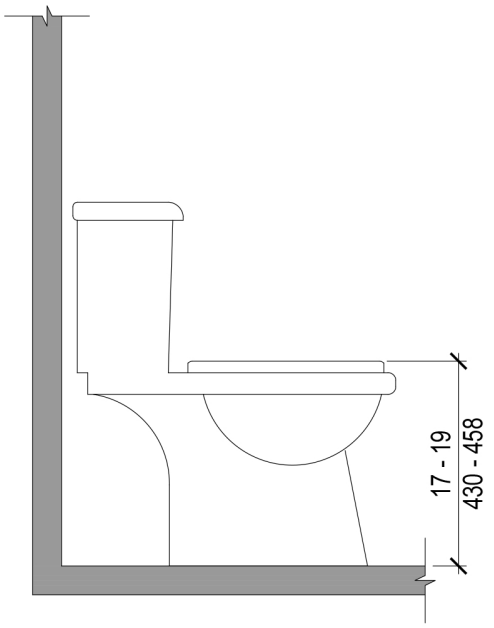
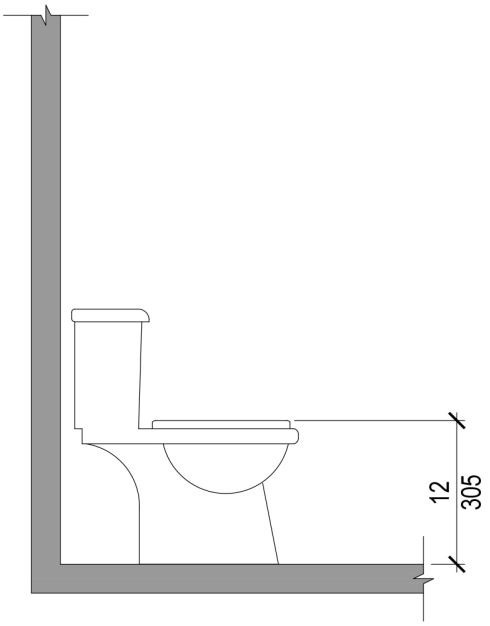
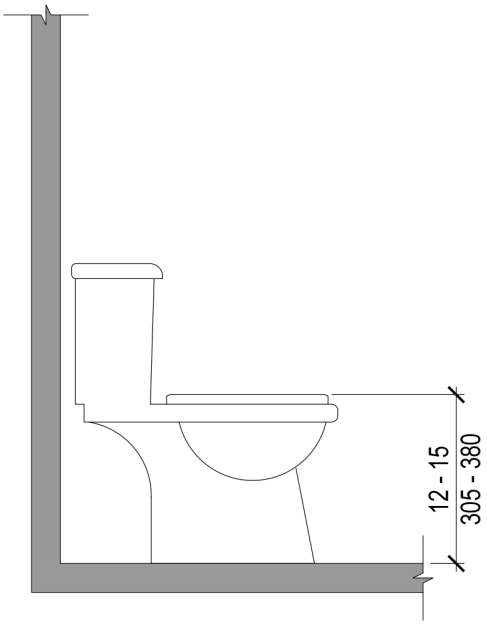


Fig. 604.4.1
Adult Water Closet Seat Height

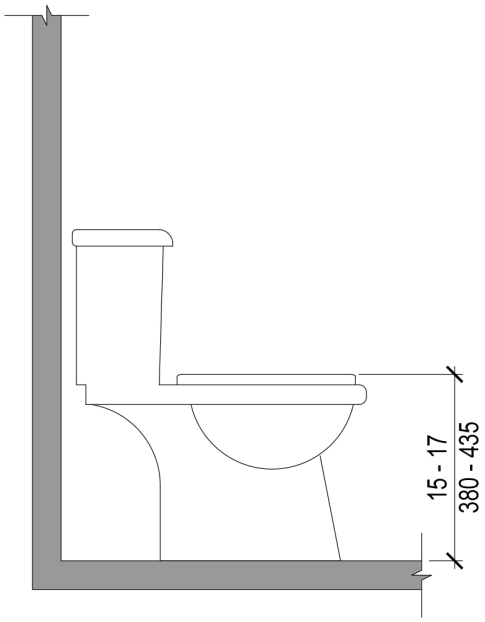
604.4.2 Child Water Closet Seat Heights. The height of water closet seats should be 11 inches (280 mm) to 12 inches (305 mm) for children ages 3 and 4. The height of water closet seats should be 12 inches (305 mm) to 15 inches (380 mm) for children ages 5 to 8. The height of water closet seat should be 15 inches (380 mm) to 17 inches (432 mm) for children ages 9 to 12. Seat and opening should be proportioned to the anticipated age group usage to provide proper surface and support.



(a)
3 - 4 Years Old



(b)
5 - 8 Years Old



(c)
9 - 12 Years Old

Fig. 604.4.2
Child Water Closet Seat Heights

604.4.2 Advisory. Children's dimensions were obtained from the *2010 ADA Standards*,Section 604.9 Advisory Specifications for Water Closets Serving Children Ages 3 through 12.

604.4.3 People of Short Stature Water Closet Seat Height. The height of water closet seats should be 15 inches (380 mm) to 17 inches (432 mm) for people of short stature.

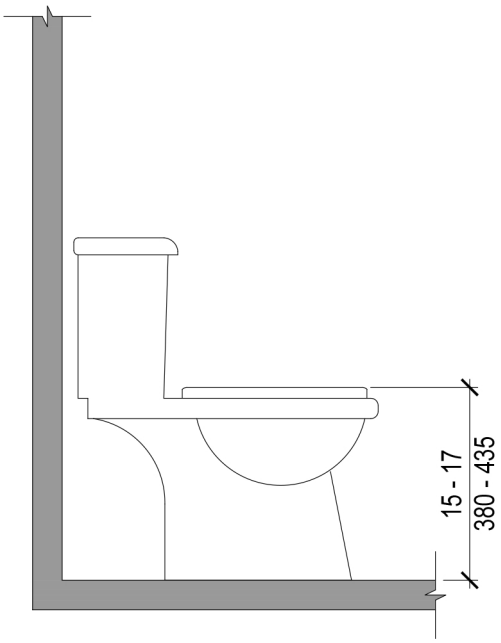


Fig. 604.4.3
People of Short Stature
Water Closet Seat Height

604.5 Grab Bars. Grab bars for water closets should comply with 604.5, Section 609 and as applicable, Sections 604.8, 604.9, 604,.10, 604.11, and 604.12. Consider grab bars for all water closets.

604.5 Advisory. Refer to the particular compartment type for grab bar requirements including Sections 604.8.6, 604.9.4, 604.10.5, and 604.11.4. Refer to Section 609.4 for height, cross Section, spacing, surface, fittings, installation and structural strength. A continuous grab bar system requires 90° elbows, Tee's, termination plates, and other components, similar to piping or a brass rail system. But there is a conflict with spacing above the horizontal bar (see *A117.1),* Section 609.3) A continuous bar assembly is a stronger solution that allows smooth transition between components, avoids an excessive number of terminations provides more attachment options, gripping surface and is more aesthetically acceptable than a jumble of separate components.

604.5.1 Horizontal Wall Grab Bars. Comply with Section 609 and refer to the specific compartment type in Section 604 for details. Horizontal grab bars are recommended to be continuous. Horizontal grab bars are not recommended on walls or panels 12 inches (305 mm) or less.

604.5.2 Vertical Wall Grab Bars. Comply with Section 609 and refer to the specific compartment type in Section 604 for details. Vertical grab bar should extend to 60 inches (1525 mm) above the finished floor. The center line of the bar should be located between 39 inches (990 mm) and 41 inches (1040 mm) from the rear wall. Controls, dispensers, switches or any other elements should not conflict with grab bars.

604.5.3 Supplemental Swing-up Grab Bars. Swing-up grab bars may supplement, but should not be used in lieu of the fixed grab bars. Swing-up grab bars should be located on open side of the water closet with a clearance of 18 inches (455 mm) minimum from the centerline of the water closet to any sidewall or obstruction. Swing-up grab bars should be installed with the centerline of the grab bar 15 3/4 inches (400 mm) from the centerline of the water closet. Swing-up grab bars should be 28 inches (710 mm) minimum in length, measured from the wall to the end of the horizontal portion of the grab bar. When in up position, protrusion into the clear floor space should be limited to 4-1/2 inches (115 mm) maximum as per Section 307.2 Protrusion Limits, Exception #1.

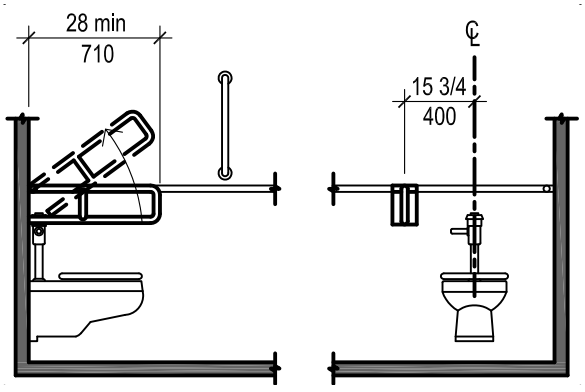


Fig. 604.5.3
Supplemental Swing-up Grab Bar

604.5.3 Advisory. The swing-up grab bar provides another option to address a user's specific needs and preferences. It allows a single occupant restroom and bathroom to be used as an ambulatory compartment to accommodate people who require the support. Due to the level action of a swing–up grab bar, a person applying their weight to the end will exert excessive pressure on the wall attachments. For this reason the unit must be anchored directly to the structure of the wall. The assembly should be strong enough to sustain an impact load (e.g. if someone slips). This may exceed the 250 pounds allowance as per 609.8. Impact loading requires strong anchors as well as a strong wall structure.

604.5.3.1 Height. Height of the top gripping rail surface of the swing-up grab bar should match the horizontal grab bar and should comply with Section 609.4.1. A swing-up unit may be hinged to the wall grab bar. Unit may also be placed below the horizontal grab bar but when arm is in horizontal position, the top gripping rail should match the horizontal wall grab bar. Another option is to terminate the horizontal grab bar a minimum of 1 1/2 inches to the left and right of the swing-up unit. This is not recommended but suggested because the split or gap in the horizontal grab bar may conflict with minimum horizontal grab bar code requirements and must be resolved with the administrative authority.

604.5.4 Child Swing-up Grab Bars. Child swing-up grab bars should comply with Section 604.5.3 and 609.

604.5.4.1 Height. Height should comply with Section 604.5.3.1 but should match the required height for children's horizontal grab bars complying with Section 609.4.2.

604.5.5 People of Short Stature Swing-up Grab Bars. People of short stature swing-up grab bars should comply with Section 604.5.4. and Section 609.4.2 for children ages 9 to 12.

604.6 Automatic and Remote Flush Controls. Provide motion sensor flush controls and supplement with a remote flush control to allow override to flush while wc is occupied. Remote flush controls should be provided for the inclusive, ambulatory compartments and single occupant toilet and bathing rooms. The primary flush control should consist of a button that is located on the nearest side wall, aligned with the front face of the water closet. Position the button for adults, 1 1/2 inch (38 mm) minimum to 7 1/2 inches maximum and for children 1 1/2 (38 mm) minimum to 4 1/2 inches (115 mm) below the bottom face of the grab bar. The button should be 2 inches (50 mm) minimum in diameter. Consider a second automatic control for the open side of the water closet in an inclusive compartment and on both side walls in an ambulatory compartment. Wiring should be concealed. Consider visual, tactile, and auditory characteristics complying with Section 309.6, 309.7 and 309.8.

604.6 Advisory. Remote flush controls are recommended for use from the seated position for people with limited dexterity. This allows flushing the water closet while in use. It can be accomplished with a wall mounted flush control or even with a phone app. Water conservation is always recommended, but people use the water closet in a variety of ways and may need to flush more than once. A motion sensor flushes only after one vacates the water closet. Remote flush controls are recommended for the inclusive and ambulatory compartments.

604.7 Toilet Paper Dispensers. Toilet paper dispensers with unrestricted supply should comply with Section 304 and 309.4 and should be 7 inches (180 mm) to 9 inches (230 mm) in front of the wc measured to the dispenser centerline. The outlet should be 19 1/2 inches (495 mm) to 30 inches (760 mm) above finish floor for adults. Face of dispenser should not project beyond 3 1/2 inches (90 mm) from wall face on either side of a partition to avoid knee conflict. Provide automatic hands-free activation for public and high use restrooms, but this may be appropriate for all restrooms and bathrooms to reduce contamination.

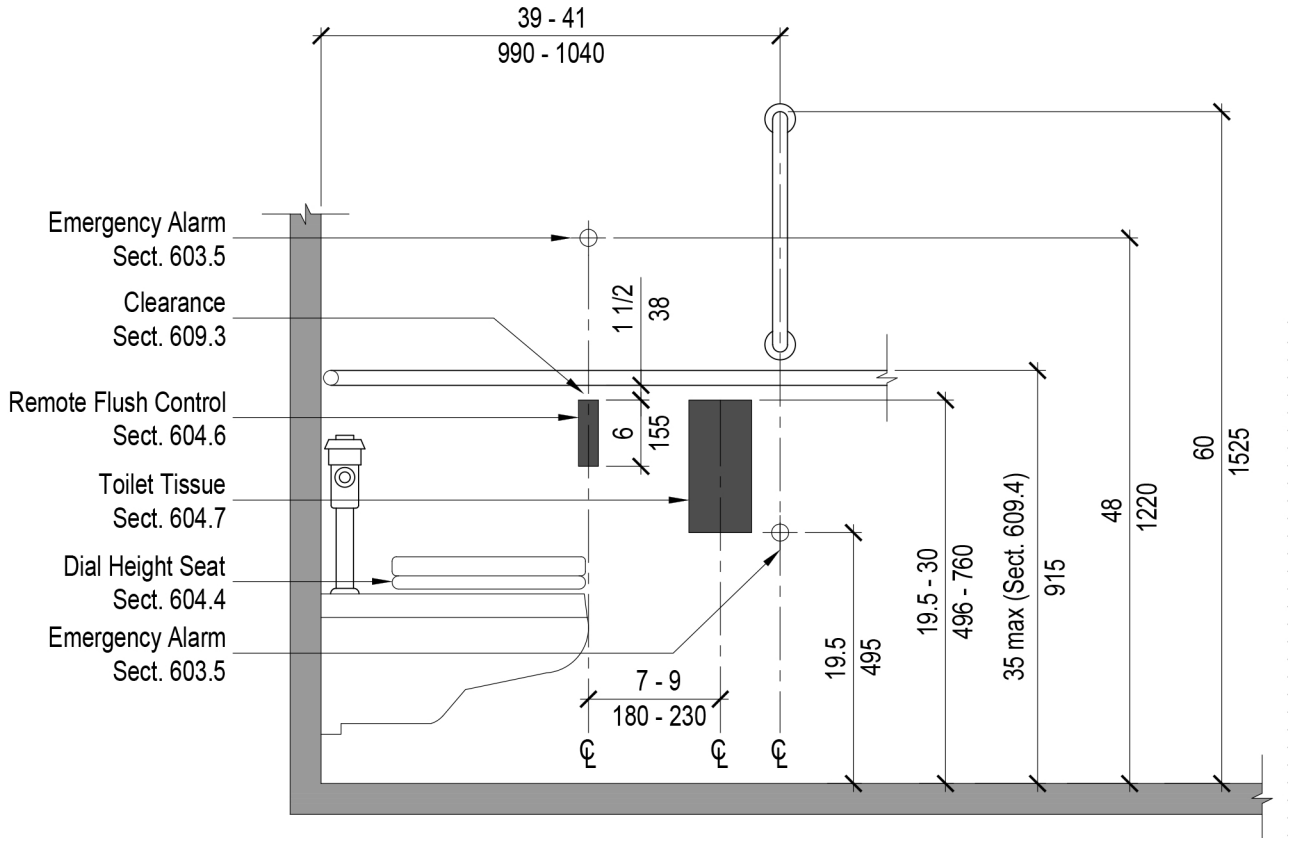
604.7.1 Children's Toilet Paper Dispensers. The outlet for children should comply with Section 308.4. Ages 9 thru 12, should be 17 to 19 inches (430 to 485 mm) aff. The outlet of the dispenser for children ages 5 thru 8, should be 14 to 17 inches (355 to 430 mm) aff. The outlet of the dispenser for children ages 3 and 4, should be 14 inches (355 mm) aff.

604.7.1 Advisory. Children's dimensions were obtained from the *2010 ADA Standards*,Section 604.9 Advisory Specifications for Water Closets Serving Children Ages 3 through 12.

604.7.1.1 People Of Short Stature Toilet Paper Dispensers. The outlet for people of short stature should be 17-19 inches (430-485 mm) above finish floor.

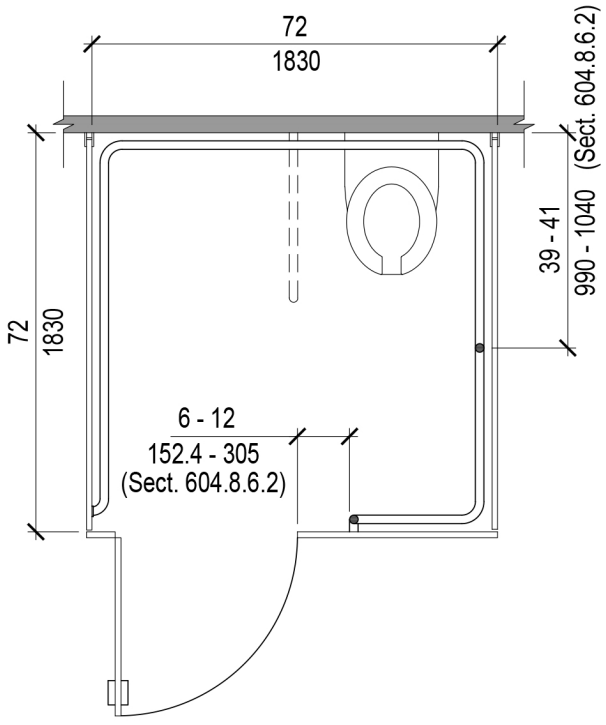
604.7.2 Other Dispensers. Other dispensers include water closet seat covers, automatic liquid sanitizer or sealed wipes, automatic soap, sanitary napkins, automatic paper towels/tissues, sealed alcohol pads, automatic powder, disposable gloves, plastic waste bags, masks. Automatic operation is recommended (e.g., soap, paper towels, powder, liquid sanitizer, dryer) for sanitary reasons and easy hands-free use. Within compartments locate dispensers forward of vertical grab bar away from water closet, above the horizontal grab bar with dispenser outlet a maximum of 48 inches above finish floor (See also Section 309.3.3 for height). Supplies can be used for personal hygiene and cleaning water closet for use.

604.8 Adult Compartment.



(a)
Elevation

604.8. Advisory. Adult inclusive compartments may be used in lieu of code accessible compartments because they exceed accessibility requirements. See *2014 NYCBC,* Section 1109 and specifically Section 1109.2 for minimum scoping requirements.



(b)
Plan

Fig. 604.8
Adult Compartment

604.8.1 General. Adult inclusive compartments should comply with Section 604.8.

604.8.1 Advisory. The adult compartment is based on the turning space complying with Section 304. Anyone can use it and many people prefer this compartment. It accommodates people with or without mobility devices, people who require an assistant, parent with child, etc. Greater flexibility is provided for approach, transfer sequence and accommodating the various levels of dexterity of the individual. It also takes into account a range of activities that the compartment may be used for, such as cleaning, dressing, adjusting personal devices, medication, etc. It allows a variety of uses and positions intended or not, depending on the needs or preferences of the individual. Consider a sink in the compartment complying with Section 606. If only a single adult accessible compartment is provided it will accommodate all, including children, with some additional features, such as a portable step and appropriate grab bars. It can function similar to a single occupant restroom.

604.8.2 Size. The recommended size is 72 inches (1800 mm) in width and 72 inches (1800 mm) in depth.

604.8.3 Doors. Toilet compartment doors, including door hardware, should comply with Section 404.2.2 and 404.2.6. A door should have a clear opening width of 36 inches (915 mm) located either in the front partition, sidewall or partition, with the latch side as far as possible from the wc with the door swinging out. Where located in the front partition, the door opening should be 4 inches (100 mm) maximum from the sidewall or partition farthest from the water closet. Where located in the sidewall or partition, the door opening should be 4 inches (100 mm) maximum from the front partition. The door should be self-closing. A door pull complying with Section 404.2.6 should be placed on both sides of the door near the latch. The door should not swing into the compartment.

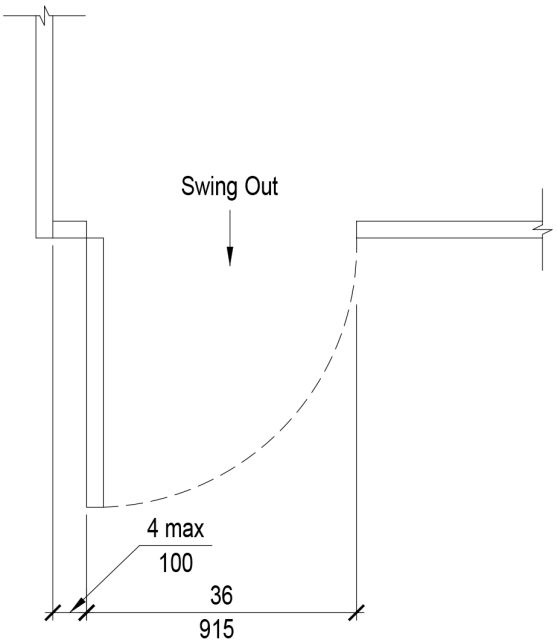


Fig. 604.8.3
Self - Closing Door

604.8.4 Approach. The compartment should be arranged for either left-hand or right-hand approach to the water closet.

604.8.5 Toe Clearance. Toe clearance is not required since a 72-inch compartment provides sufficient maneuvering clearance, but a 12 inch (305 mm) space above the floor should be provided for sanitary and cleaning purposes.

604.8.6 Grab Bars. Grab Bars should comply with Section 604.5 and Section 609.

604.8.6.1 Horizontal. Provide a continuous grab bar, height complying with Section 609.4.1, along all walls or panels of the compartment terminating into the walls a minimum of 11/2 inch (38 mm) on each side of the door opening. Horizontal grab bars are not required on wall 12 inches (305 mm) or less.

604.8.6.2 Vertical. Provide two vertical wall grab bars above the horizontal grab bars. One vertical grab bar should extend to 60 inches (1525 mm) above the finished floor with the center line of the bar located between 39 inches (990 mm) and 41 inches (1040 mm) from the rear wall. Provide a second vertical grab bar between 6 inches (152 mm) and 12 inches from the latch side of the door opening, (305 mm) extending to 60 inches (1525 mm) above finished floor.

604.8.6.3 Supplemental Swing-up Grab Bars. Swing-up grab bars may supplement, but should not be used in lieu of the fixed grab bars. Swing up grab bars should comply with Section 604.5.3.

604.8.7 Emergency Alarm. Provide emergency alarm complying with Section 603.5.

604.8.8 Toilet Tissue and Other Dispensers. Provide a dual toilet tissue dispenser unit complying with Section 604.7. Other dispensers (e.g., paper seat cover and hand sanitizer)should comply with Section 604.7.2.

604.8.9 Coat Hook and Shelf. A coat hook should be located on the back of the compartment door complying with Section 603.4. Provide a shelf complying with Section 603.4 to avoid placing personal items on the floor. Shelves are recommended to be recessed if they protrude more than 4 inches (102 mm).

604.8.10 Lighting. Lighting should comply with Section 603.6. Consider adjustable task lighting with motion detector/automatic timer.

604.8.11 Seat Height. Seat height should comply with Section 604.4.

604.8.12 Flush Controls. Flush controls should be automatic and comply with Section 604.6. Consider a second remote flush control provided on the open side of the water closet.

604.8.13. Water Closet Location. Water closet location should comply with Section 604.2.

604.8.14 Sink. Consider a sink with automatic controls complying with Section 606.

604.9 Adult Ambulatory Compartments

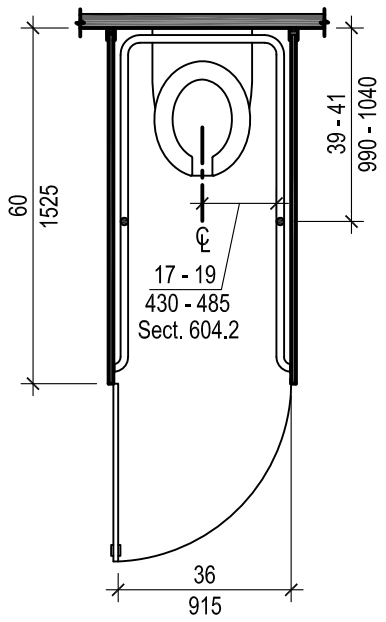


Fig. 604.9
Adult Ambulatory Compartment

604.9.1 General. Adult ambulatory compartments should comply with Section 604.9.

604.9.1 Advisory. Inclusive ambulatory compartments may be used in lieu of code ambulatory compartments because they exceed accessibility requirements. See *2014 NYCBC,* Section 1109 and specifically Section 1109.2.2 for minimum scoping requirements. Ambulatory compartments are provided for people who can ambulate (capable of walking or can move about on their own). Ambulatory does not define level of dexterity, strength, or range of movement. These are different for everyone and may vary at different times in their lives. The ambulatory compartment is narrow with grab bars on both sides and rear wall to allow an adult to support themselves and maneuver using both arms. It is a compartment that is not intended to accommodate a wheelchair but may be used by people with diminished abilities and those who use a mobility device (e.g., walker, cane or crutches) It is difficult to anticipate every conceivable sequence of movement, but the ambulatory compartment is more accommodating than other options for many users.

604.9.2 Size. The ambulatory compartment should be 60 inches (1525 mm) minimum to 72 inches (1830 mm) maximum in depth and 36 inches (915 mm) absolute in width.

604.9.3 Doors. Ambulatory compartment doors should have a clear opening width of 36 inches (915 mm), door hardware should comply with Section 404.2.2 Section 404.2.6. The approach to the latch side of the compartment door should be provided with a 48 inch (1220 mm) clearance between the door side of the compartment and any obstruction. The door should be self-closing. Doors pull on both sides of the door near the latch and should comply with Section 309.4. Compartment doors should not swing into the compartment.

604.9.4 Grab bars. Grab bars should comply with Section 604.5 and 609.

604.9.4.1 Horizontal. Provide a continuous grab bar, height complying with Section 609.4.1 along rear and side walls or panels of the compartment terminating into the walls 11/2 inch (38 mm) minimum from the front panel on each side of the door opening.

604.9.4.2 Vertical. Provide two vertical wall grab bars above the horizontal grab bars on both side walls or partitions, should extend to 60 inches (1525 mm) above the finished floor, with the center line of the bar located between 39 inches (990 mm) and 41 inches (1040 mm) from the rear wall.

604.9.5 Emergency Alarm. Provide an emergency alarm complying with Section 603.5.

604.9.6 Toilet Tissue and Other Dispensers. Provide a dual toilet tissue dispenser unit complying with Section 604.7. Other dispensers (e.g., paper seat cover and hand sanitizer)should comply with Section 604.7.2.

604.9.7 Coat Hook and Shelf. A coat hook should be located on the back of the compartment door complying with Section 603.4. If a shelf is provided it should be located on the rear wall. Provide a shelf complying with Section 603.4 to avoid placing personal items on the floor. Shelves are recommended to be recessed if they protrude more than 4 inches (102 mm).

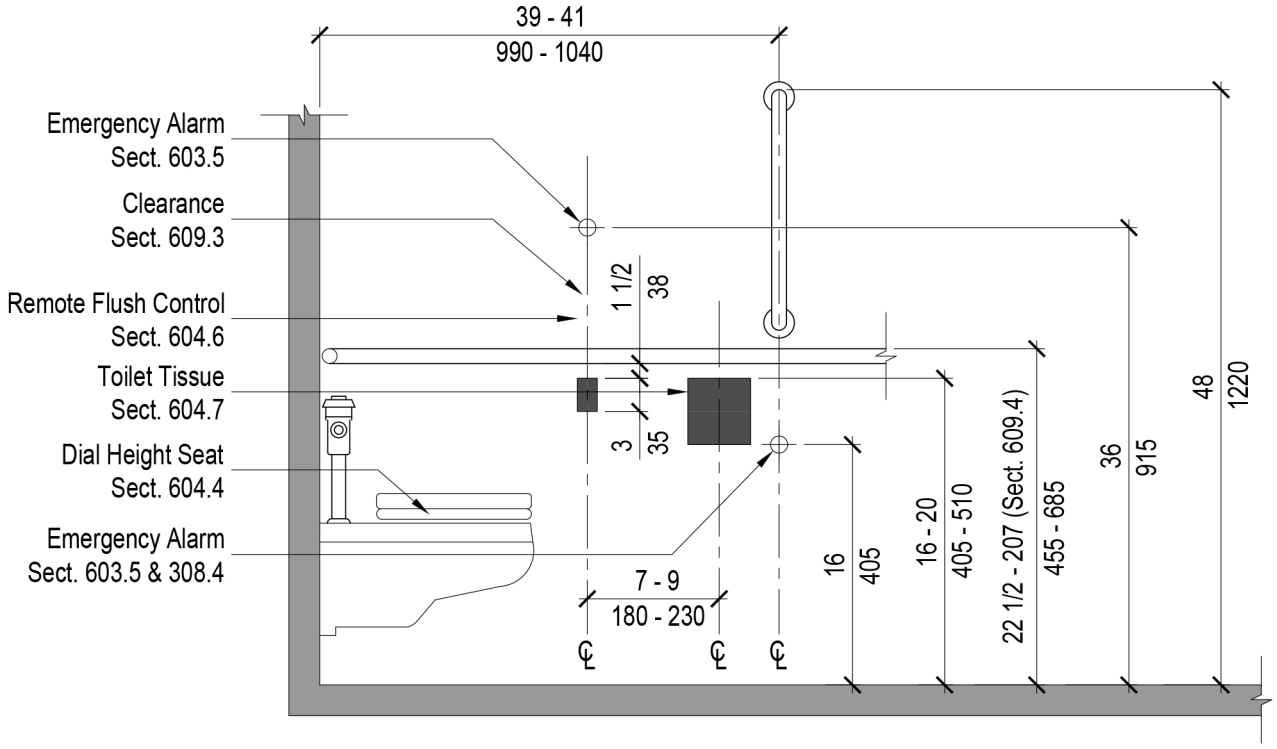
604.9.8 Lighting. Lighting should comply with Section 603.6. Consider adjustable task lighting with motion detector/automatic timer.

604.9.9 Seat Height. Seat height should comply with Section 604.4.

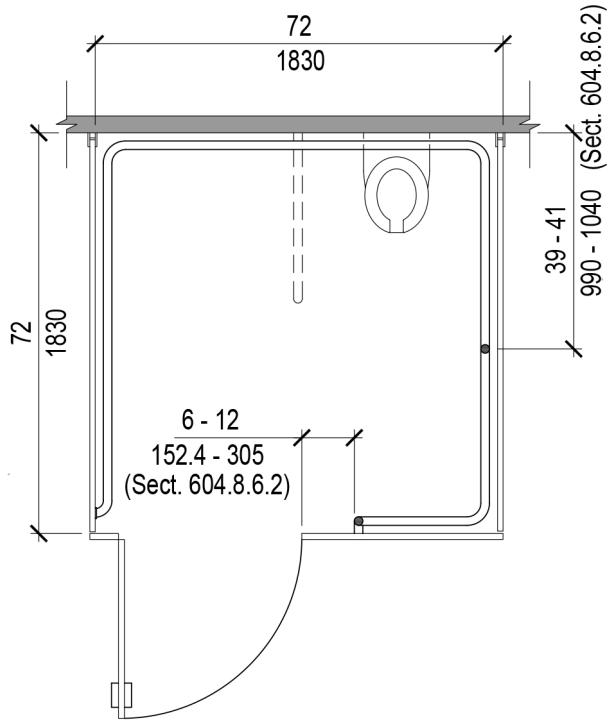
604.9.10 Flush Controls. Flush controls should comply with Section 604.6. and should be provided on both side walls of the compartment.

604.9.11 Water Closet Location. The water closet location should comply with Section 604.2.2.

604.10 Supplemental Children's and People of Short Stature Inclusive Compartment.



(a)
Elevation



(b)
Plan

Fig. 604.10
Supplemental Children's and People of Short Stature Inclusive Compartment.

604.10.1 General. Supplemental children's inclusive compartments should comply with Section 604.10.

604.10.2 Size. The recommended size is 72 inches (1800 mm) in width and 72 inches (1800 mm) in depth.

604.10.2 Advisory. The supplemental children's inclusive compartment is based on the code minimum 60 inch turning circle that accommodates a smaller occupant. The 60 inch turning circle takes into account children's mobility devices and children who require an assistant while allowing greater flexibility regarding approach, transfer sequence and accommodating various levels of dexterity of the individual. It also takes into account a range of activities that the compartment may be used for such as dressing or adjusting personal devices, cleaning, etc. in various ways and positions intended or not, depending on the needs or preferences of the child.

604.10.2.1 Toe Clearance. Provide a 12 inch (305 mm) space above the floor for sanitary and cleaning purposes.

604.10.3 Doors. Toilet compartment doors should have a clear opening width of 36 inches (915 mm), door hardware should comply with Section 404.2.2 and Section 404.2.6. A door should be located either in the front partition, sidewall or partition, with the latch side as far as possible from the water closet with the door swinging out. Where located in the front partition, the door opening should be 4 inches (100 mm) maximum from the sidewall or partition farthest from the water closet. Where located in the sidewall or partition, the door opening should be 4 inches (100 mm) maximum from the front partition. The door should be self-closing. A door pull complying with Section 404.2.6 should be provided on both sides of the door near the latch. Compartment doors should not swing into the compartment.

604.10.4 Seat Height. Seat height should comply with Section 604.4.

604.10.5 Grab Bars. Grab bars for water closets should comply with Section 609 for children and Section 604.5.

604.10.5.1 Horizontal. Provide a continuous grab bar, height complying with Section 609.4.2, along all walls or panels of the compartment terminating into the walls a minimum of 1 1/2 inches (38 mm) on each side of the door opening.

604.10.5.2 Vertical. Provide two vertical wall grab bars above the horizontal grab bars. One vertical grab bar should extend to 48 inches (1220 mm) above the floor, with the center line of the bar located between 39 inches (990 mm) and 41 inches (1040 mm) from the rear wall. If water closet depth is less than standard adult unit, locate the center of the bar 6 inches (150 mm) from the face of the water closet. Provide a second vertical grab bar between 6 inches (150 mm) and 12 inches (300 mm) from the latch side of the door opening, 24 inches (610 mm) in length.

604.10.5.3 Swing-up Grab Bar. Provide a swing-up grab bar complying with 604.5.4.

604.10.6 Flush Controls. Flush controls should be automatic and comply with 604.6. Consider a second flush control provided on the open side of the water closet.

604.10.7 Toilet Tissue and Other Dispensers. Provide a dual toilet tissue dispenser unit complying with Section 604.7.1. Other dispensers (e.g., paper seat cover and hand sanitizer dispensers) should comply with Section 604.7.2.

604.10.8 Water Closet Location. Water Closet location should comply with Sections 604.2.3.

604.10.9 Emergency Alarm. Emergency alarm should comply with Section 603.5.

604.10.10 Lighting. Lighting should comply with Section 603.6. Consider adjustable task lighting with motion detector/automatic timer.

604.10.11 Coat Hooks and Shelves. Coat hooks and shelves should comply with Section 603.4 for children reach ranges. Provide a shelf to avoid placing personal items on the floor. Shelves are recommended to be recessed if they protrude more than 4 inches (102 mm).

604.10.11 Sink. Consider a sink complying with Section 606.

604.11 Supplemental Children's and People of Short Stature Ambulatory Compartment

604.11.1 General. Supplemental children's ambulatory compartments should comply with Section 604.9.

604.11.2 Size. The compartment should be 60 inches (1525 mm) minimum to 72 inches (1830 mm) maximum in depth and 32 inches (815 mm) in width.

604.11.3 Doors. Toilet compartment doors, including hardware, should have a clear opening of 32 inches (815 mm) and comply with Section 404.2.6. The approach to the latch side of the compartment door and the clearance between the door side of the compartment and any obstruction should be 48 inches (1220 mm). The door should be self-closing. Doors pull on both sides of the door near the latch and should comply with Section 309.4. Compartment doors should not swing into the compartment.

604.11.4 Grab bars. Grab bars should comply with Section 604.5 and 609 for children. Handrails are not required on the door side of the compartment.

604.11.4.1 Horizontal. Provide a continuous grab bar, height complying with Section 609.4.2, along rear and side walls or panels of the compartment terminating into the walls 1 1/2 inches (38 mm) minimum from the front panel on each side of the door opening.

604.11.4.2 Vertical. Provide two vertical wall grab bars above the horizontal grab bars on both side walls or partitions, should be 48 inches (1220 mm) above the finished floor, with the center line of the bar located between 39 inches (990 mm) and 41 inches (1040 mm) from the rear wall. If water closet depth is less than standard adult unit, locate the center of the bar 6 inches (150 mm) from the face of the water closet.

604.11.5 Emergency Alarm. Provide an emergency alarm complying with Section 603.5.

604.11.6 Toilet Tissue and Other Dispensers. Provide a dual toilet tissue dispenser unit complying with Section 604.7. Other dispensers (e.g., paper seat cover, hand sanitizer dispensers)should comply with Section 604.7.2.

604.11.7 Coat Hook and Shelf. A coat hook should be located on the back of the compartment door complying with Section 603.4. for children's reach range. Provide a shelf to avoid placing personal items on the floor. Shelves are recommended to be recessed if they protrude more than 4 inches (102 mm).

604.11.8 Lighting. Lighting should comply with Section 603.6. Consider adjustable task lighting with motion detector/automatic timer.

604.11.9 Seat Height. Seat height should comply with Section 604.4.3.

604.11.10 Flush Controls. Flush controls should be automatic and comply with Section 604.6 and should be provided on both side walls of the compartment.

604.11.11 Water Closet Location. Water closet location should comply with Section 604.2.4

604.12 Single Occupant (Unisex/Family) Rest Rooms and Bathrooms.

604.12.1 General. Single occupant rest rooms and bathrooms should comply with Section 603.1.1 and Section 603.1.2 and not contain a separate water closet compartment but should comply with Section 604.8. If a separate unisex facility is not provided for children, the adult unisex facility should contain a portable platform or step for use by children. If the facility is intended primarily for children, the water closet should comply with Section 604.10. People of short stature should be accommodated by compliance with Section 604.10.

604.12.1 Advisory. Please refer to Section 603.1.1 for additional details. Inclusive single occupant rooms may be used in lieu of accessible unisex rooms because they exceed accessibility requirements. See *2014 NYCBC*, Section 1109 and specifically Section 1109.2.1 for minimum scoping requirements.

605 Urinals

605.1 General. Urinals should comply with 605.

605.1 Advisory. See *2014 NYCBC*, Section 1109.2 for minimum scoping requirements.

605.2 Height and Depth. Urinals for adults should be the stall type or should be the wall hung type with the rim at 17 inches (430 mm) maximum above finish floor. Adult and children's urinals should be 13-1/2 inches (345 mm) minimum in depth from outer face of the urinal rim to finished wall surface.

605.2 Advisory. Rim height was based on the toilet seat height in the *2010 ADA Standards*, Section 604.9 Advisory Specifications.

605.2.1 Height for Ages 3-4. Wall hung type urinals for children 3 through 4 should have the rim 11-12 inches (280-305 mm) maximum aff.

605.2.2 Height for Ages 5-8. Wall hung type urinals for children 5 through 8 should have the rim 12-15 inches (305-308 mm) maximum aff.

605.2.3 Height for Ages 9-12 Wall hung type urinals for children 9 and 12 should have the rim 15-17 inches (380-430 mm) maximum aff.

605.2.3 Height for People of Short Stature. Wall hung type urinals for people of short stature should have the rim 15-17 inches (380-430 mm) maximum aff.

605.3 Clear Floor Space. A clear floor space complying with Section 305.7.2, positioned for forward approach, should be provided.

605.4 Flush Controls. Flush controls should be automatic. Consider manual override button adjacent to automatic unit. Button should be 2 inches (51 mm) in diameter.

605.5 Privacy Partitions. Privacy partitions located adjacent to each side of the clear floor space should extend 36 inches (915 mm) minimum in depth, 72 inches (1800 mm) minimum in height above finish floor, with a toe clearance of 12 inches (305 mm) maximum. Children's toe clearance should be reduced accordingly. Maximize privacy between adjacent users.

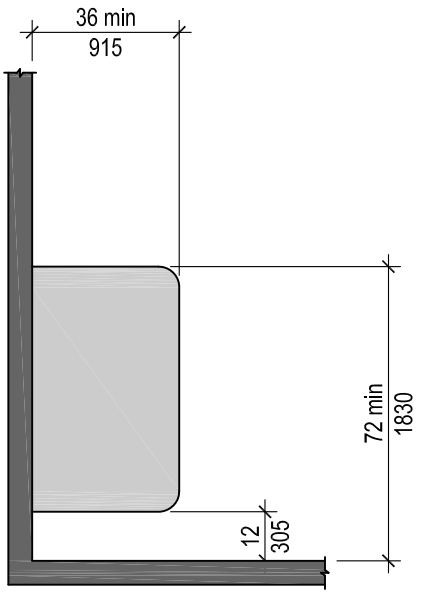


Fig. 605.5
Urinal Privacy Partition

605.5 Advisory. Privacy at urinals is an old issue. Dignity and respect are important aspects of inclusive design and should be primary concerns. The increase in the depth of the partition is an alternative to the use of a water closet compartment. Urinals are not usable by all and are not preferred by many for a variety of reasons. Urinals will continue to be included in bathroom designs because of fixture requirements embedded in codes, based on old preconceived usage rational. Suggested minimum depth is 36 inches, 72 inches high with a 12 inch (305 mm) space from the floor to the bottom of the partition. Consider enclosed urinal stalls as an alternative.

605.6 Grab Bars. Consider a horizontal bar immediately above the flush control with a minimum 1-1/2 inch (40 mm) clearance, extending the width of the urinal. Also, consider vertical grab bars on both sides located 36 inches (915 mm) minimum to 60 inches (1525 mm) above the finished floor.

606 Lavatories and Sinks

606.1 General. Lavatories and sinks should comply with Section 606. Provide at least one adjustable height unit . Also, consider placing multiple lavatories at different heights, especially for children. Provide at least one work space, preferably that is part of the countertop adjacent to a sink.

606.1 Advisory. See *2014 NYCBC*, Section 1109.3 for minimum scoping requirements.

606.2 Clear Floor Space. A clear floor space complying with Section 305.3, positioned for forward approach, should be provided. Knee and toe clearance complying with Section 306 should be provided. The dip of the overflow should not be considered in determining knee and toe clearances.

606.2.1 Work Surface. Provide a work surface that is part of the lavatory countertop or adjacent to a lavatory that is 36 inches (915 mm) minimum in width. A clear floor space, positioned for a forward approach to the work surface, should be provided. Knee and toe clearance should comply with Section 306. The clear floor space should be centered on the work surface. The surface should comply with Section 902 and be 34 inches (865 mm) maximum above the floor. Provide at least one work surface no higher than the maximum.

606.2.2 Clear Floor Space for Children. A knee clearance of 24 inches (610 mm) minimum above the floor should be permitted at lavatories and sinks used primarily by children ages 6 through 12 where the rim or counter surface is 31 inches (785 mm) maximum above the floor. A parallel approach may be used for very young children up to 5 years old.

606.2.3 Clear Floor Space for People of Short Stature. Clear space should comply with Section 606.2.2 children ages 6-12.

606.3 Height. The front of lavatories and sinks should be 34 inches (865 mm) maximum above the floor, measured to the higher of the rim or counter surface.

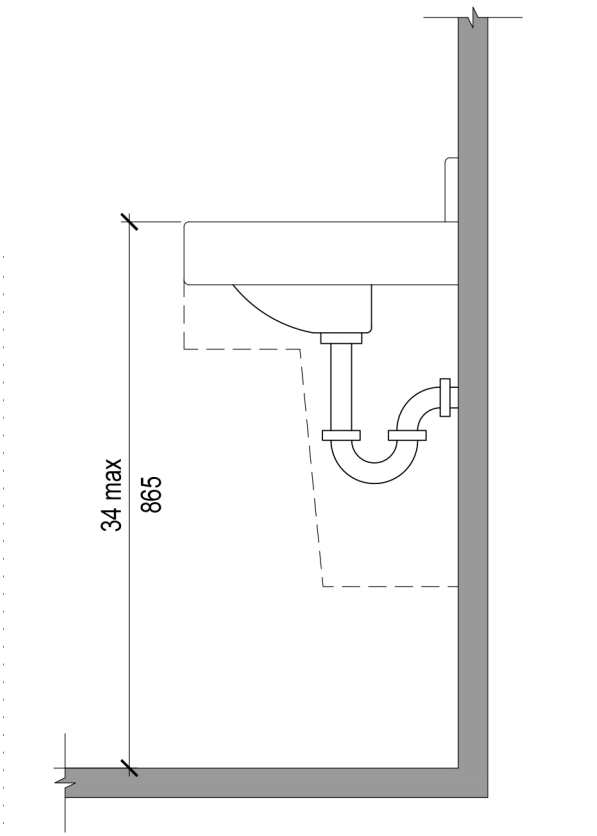


Fig. 606.3
Height of Lavatories and Sinks

606.3 Advisory. Based on *Architectural Graphic Standards,* Anthropometric Data for Children the recommended lavatory and sink height for ages 6-12 standing is 23-27 inches and 5 or younger, 19 inches. Ages 6-12 seated is 19-23 inches and 5 or younger 17 1/2 inches. Height for a person of short stature is based on a height for 12 year old child standing.

606.3.1 Height for Children. Height for children 6 to 12 should be 31 inches (785 mm) maximum, but 27 inches (685 mm) is recommended and for children less than 5 years old, 22-1/2 inches (572 mm) maximum, but 19 inches (482 mm) is recommended. Provide children's knee clearance complying with Section 306.3.6 and toe clearance complying with Section 306.2.6.

606.3.2 Height for People of Short Stature. Height for people of short stature should be 31 inches (785 mm) maximum but 27 inches (685 mm) is recommended.

606.4 Faucets. Faucets should comply with Section 309. Automatic operation is strongly recommended. Hand-operated metering faucets should remain open for 10 seconds minimum. Provide a pressure balanced anti-scalding valve that balances the drop in cold water pressure if other fixtures are used to avoid a surge in hot water. A thermostatic mixing valve mixes cold and hot water automatically to a set temperature. Valves that utilize both pressure and a temperature are recommended.

606.4.1 Basin Location. The interior edge of the rim of the lavatory basin should be located 3 1/2 inches (90 mm) maximum from the front edge of the fixture or countertop.

606.5 Lavatories with Enhanced Reach Range. Where enhanced reach range is required at lavatories, faucet and soap dispenser controls should have a reach depth of 11 inches (280 mm) maximum or, if automatic, should be activated within a reach depth of 11 inches (280 mm) maximum. Water and soap flow should be provided with a reach depth of 11 inches (280 mm) maximum.

606.5 Advisory. Enhanced reach range translates to placement of the controls and outlets closer to the user. Automatic controls near or on the front face of the lavatory will increase the number of user scenarios. This may include temperature and flow rate.

606.6 Exposed Pipes and Surfaces. Water supply and drainpipes under lavatories and sinks should be insulated or otherwise configured to protect against contact. There should be no sharp or abrasive surfaces under lavatories and sinks.

606.7 Operable Parts for Adults. Operable parts on dispensers (see Section 604.7.2), hand dryers and other equipment should comply with Section 308 and Section 309.

606.7.1 Operable Parts for Children. Operable parts on towel dispensers and hand dryers for children should comply with Section 308.4 and Section 309.4.

606.7.2 Operable Parts for People of Short Stature. Operable parts for people of short stature should comply with Section 606.7.1.

606.8 Other Dispensers. A variety of dispensers types are provided in Section 604.7.2. that may be part of the lavatory configuration complying with Section 606.5. Automatic hands-free dispensers are recommended for easy use and sanitary reasons.

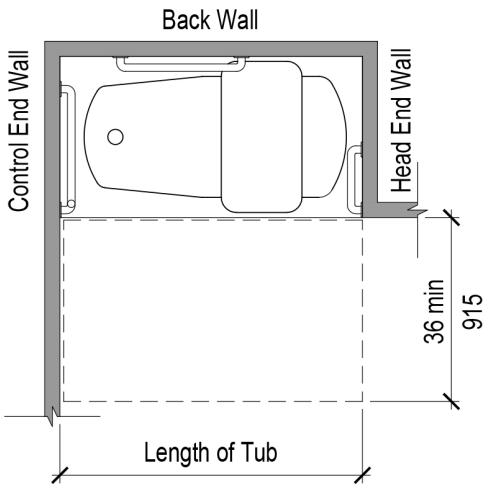
606.9 Lighting. Provide automatic/adjustable task lighting for each lavatory and work surface with automatic shut-off.

607 Bathtubs

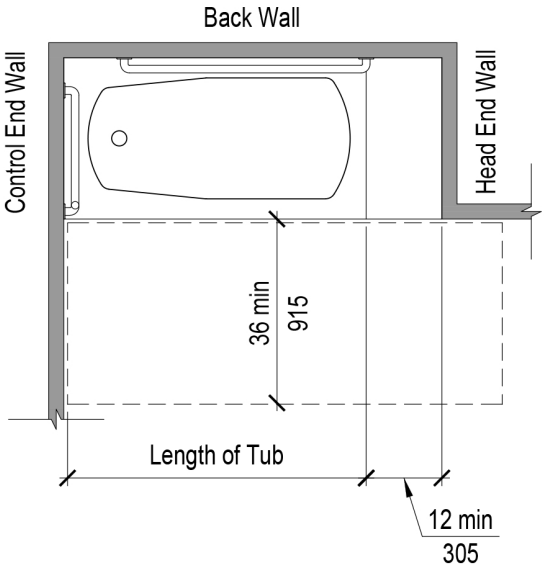
607.1 Standard Bathtub

607.1.1 General. Bathtubs should comply with Section 607.

607.1.2 Clearance. A clearance in front of bathtubs extending the length of the bathtub and 36 inches (915 mm) minimum in depth should be provided. Where a permanent seat is provided at the head of the bathtub, the clearance should extend 12 inches (305 mm) minimum beyond the wall at the head end of the bathtub.



(a)
Without Permanent Seat



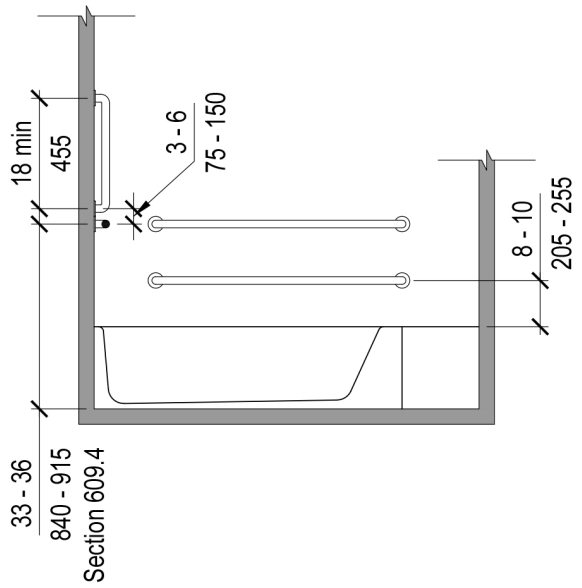
(b)
With Permanent Seat

Fig. 607.1.2
Clearance for Bathtubs

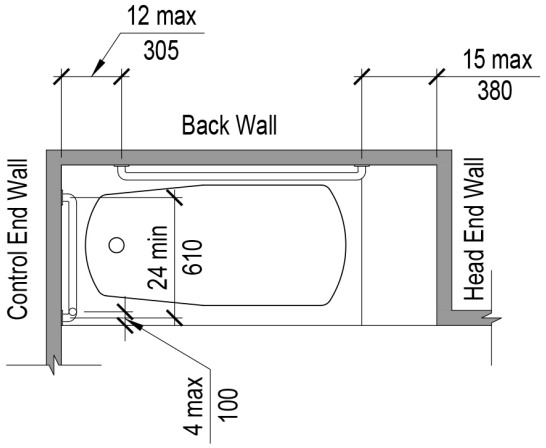
607.1.3 Seat. A permanent slip resistant seat at the head end of the bathtub or a removable in-tub seat should be provided. Seats should comply with Section 610. If necessary consider a powered-seat to raise and lower the user in and out of the tub.

607.1.4 Grab Bars. Grab bars should comply with Section 609 and should be provided in accordance with Section 607.1.4.1 or 607.1.4.2.

607.1.4.1 Bathtubs with Permanent Seats. For bathtubs with permanent seats, grab bars complying with Section 607.1.4.1 should be provided.



(a)
Elevation



(b)
Plan

Fig. 607.1.4.1
Grab Bars for Bathtubs with Permanent Seats

607.1.4.1.1 Back Wall. Two horizontal grab bars should be provided on the back wall, one complying with Section 609.4 and the other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar should be located 15 inches (380 mm) maximum from the head end wall and extend 12 inches (305 mm) maximum from the control end wall.

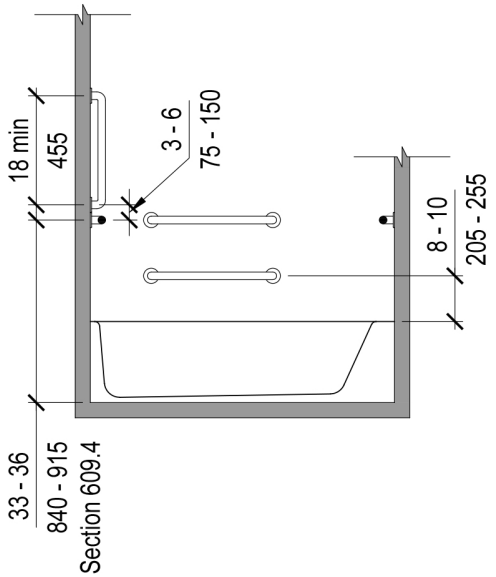
607.1.4.1.2 Control End Wall. Control end wall grab bars should comply with Section 607.1.4.1.2.

EXCEPTION: An L-shaped continuous grab bars of equivalent dimensions and positioning should be permitted to serve the function of separate vertical and horizontal grab bars.

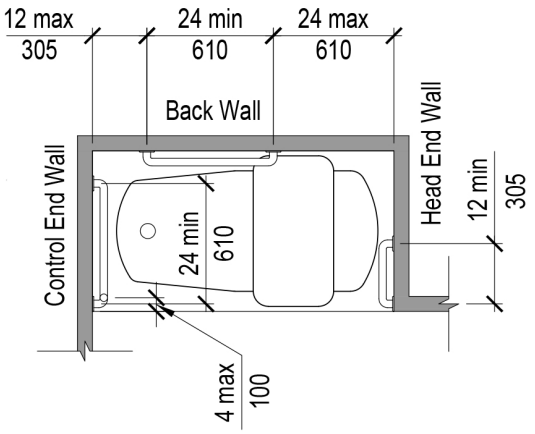
607.1.4.1.2.1 Horizontal Grab Bar. A horizontal grab bar 24 inches (610 mm) minimum in length should be provided on the control end wall beginning near the front edge of the bathtub and extending toward the inside corner of the bathtub.

607.1.4.1.2.2 Vertical Grab Bar. A vertical grab bar 18 inches (455 mm) minimum in length should be provided on the control end wall 3 inches (75 mm) minimum and 6 inches (150 mm) maximum above the horizontal grab bar, and 4 inches (100 mm) maximum inward from the front edge of the bathtub.

607.1.4.2 Bathtubs without Permanent Seats. For bathtubs without permanent seats, grab bars complying with Section 607.1.4.2 should be provided.



(a)
Elevation



(b)
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Fig. 607.1.4.2
Grab Bars for Bathtubs without Permanent Seats

607.1.4.2.1 Back Wall. Two horizontal grab bars should be provided on the back wall, one complying with Section 609.4 and the other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar should be 24 inches (610 mm) minimum in length, located 24 inches (610 mm) maximum from the head end wall and extend to 12 inches (305 mm) maximum from the control end wall.

607.1.4.2.2 Control End Wall. Control end wall grab bars should comply with Section 607.1.4.1.2.

607.1.4.2.3 Head End Wall. A horizontal grab bar 12 inches (305 mm) minimum in length should be provided on the head end wall at the front edge of the bathtub.

607.1.5 Controls. Controls, other than drain stoppers, should be provided on an end wall, located between the bathtub rim and grab bar, and between the open side of the bathtub and the centerline of the width of the bathtub. Controls should comply with Section 309.4.

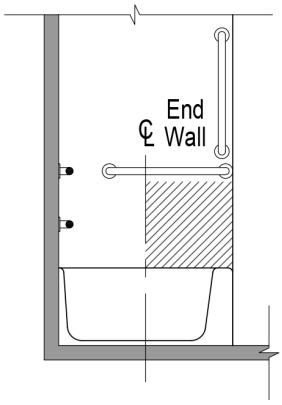


Fig. 607.1.5
Location of Bathtub Controls

607.1.6 Hand Shower. A hand shower with a hose 59 inches (1500 mm) minimum in length, that can be used as both a fixed shower head and as a hand shower, should be provided. The hand shower should have a control with a non positive shut-off feature. Where provided, an adjustable-height hand shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

607.1.7 Bathtub Enclosures. Enclosures for bathtubs should not obstruct controls, faucets, shower and spray units or obstruct transfer from wheelchairs onto bathtub seats or into bathtubs. Enclosures on bathtubs should not have tracks installed on the rim of the bathtub.

607.1.8 Water Temperature. Bathtubs should deliver water that is 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

607.1.9 Bathtub Walk-Through Cut-Out Door. Bathtub walk-through cut-out door may allow walk-in or enhance transfer entry for an existing standard bathtub. The cut-out may be either a lower entry cut out without door with reduced water level or an outswinging door with a water tight gasket door that allows for increased water levels above the threshold. Clear opening width should be 36 inches (915 mm) minimum. Center opening on face of bathtub. Door hardware should comply with Section 404.2.6.

607.1.10 Floor Waterproofing and Back-up Floor Drain. The room floor should be waterproof with a floor drain located within the room. Provide an automatic trap primer. The floor slope should not exceed 1:48.

607.1.11 Tactile Slip Resistant Bathtub and Floor Characteristics. Provide bathtub and floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

607.1.12 Emergency Alarm. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Provide a water detection alarm for overflow and floor flooding.

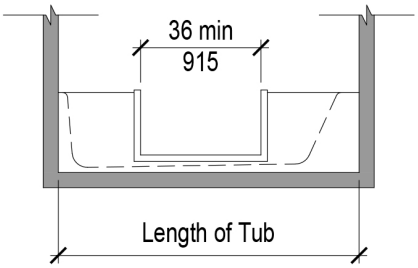


Fig. 607.1.9
Bathtub Walk-Through Cut-Out Door

607.1.9 Advisory. Cut-out doors may increase safety for some users and an alternative to replacing the bathtub. Since it is a modification there are threshold height limitations. This is a less expensive alternative to replacing the unit and modifications to the surrounding enclosure, but it may be considered a compromise solution for some.

607.1.12.1 Push Button Locations. A waterproof push button should be located within control area or immediately outside shower compartment complying with 702.2.

607.1.13 Illumination. Illumination should be provided within the bathing compartment. Fixture should be water resistant. Controls should be located immediately outside of the bathing compartment. Provide automatic lighting controls.

607.1.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche within shower compartments for bathing products and toiletries.

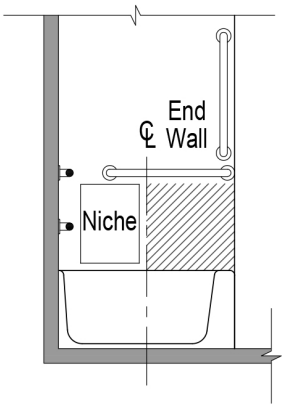


Fig. 607.1.14
Recessed Storage Niche

607.1.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located adjacent to the control location towards the interior of the compartment. Bottom of the niche should align with the bottom of the control location.

607.1.15 Other features. Other features may include hydrotherapy, chromotherapy, audiotherapy, aromatherapy, whirlpool, bidet jets, air message/drying, in-line heater, neck rest, message jets, tub air drying, automatic cleaning, automatic sanitizing, heated seat, automatic purge cycle. Any jets should be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

607.2 Walk-in / Transfer Bathtubs

607.2.1 General. Walk-in / transfer bathtubs should comply with Section 607.3.

607.2.2 Size and Clearance. Size and clearance should complying with Section 607.3.2.

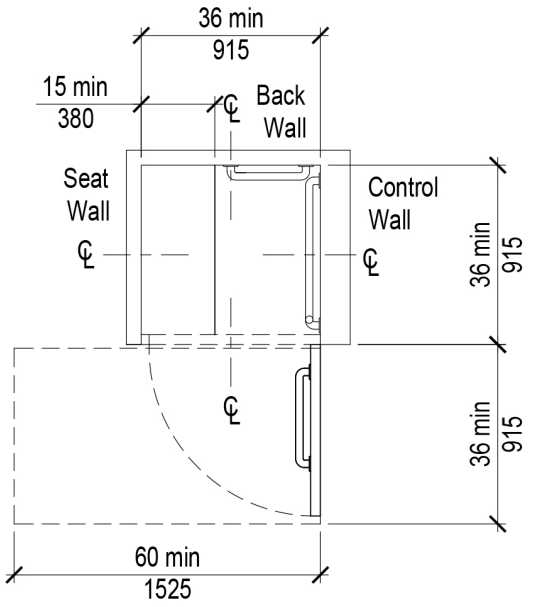


Fig. 607.2.2
Transfer Walk-in Bathtub Compartment Size and Clearance

607.2.2.1 Size. Walk-in/transfer bathtubs should have a clear inside dimension of 36 inches (915 mm) minimum in width and 36 inches (915 mm) minimum in depth, measured at the center point of opposing sides.

607.2.2.2 Clearance. A clearance of 60 inches (1525 mm) minimum in length measure perpendicular from the control wall and 36 inches (915 mm) minimum in depth should be provided adjacent to the door opening of the compartment.

607.2.3 Seat. A fixed anti-slip seat complying with Section 610 should be provided. The seat height should be 17 inches (430 mm) minimum to 19 inches (485 mm) maximum above both the floor of the bathroom and the floor surface of the tub. Consider an adjustable height seat and/or laterally sliding seat with a locking devise that allows for easy transfer. Space below the seat may be angled for better feet placement to assist rising from seat within the compartment.

607.2.3.1 Armrests. Armrests should be provide for stability to assist one to sit and to rise from the seat. Armrests should comply with Section 903.3.3 and should be folding or retractable.

607.2.4. Grab Bars. Grab bars should comply with section 607.2.4.

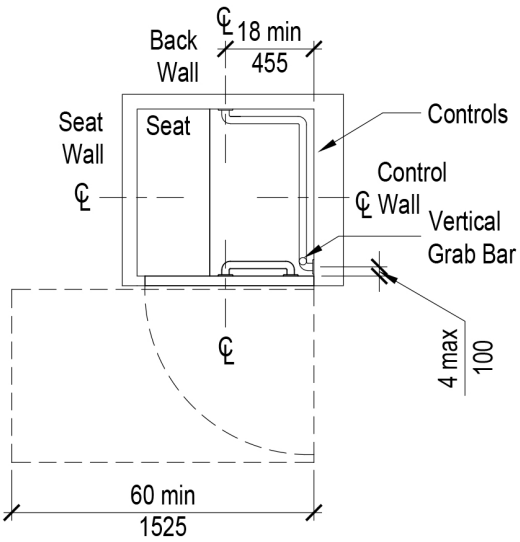


Fig. 607.2.4
Grab Bars & Control Location

607.2.4.1 Horizontal Grab Bars. Horizontal grab bars should be provided across the control wall and on the side walls to a point 18 inches from the control wall.

607.2.4.2 Vertical Grab Bars. Vertical grab bars 18 inches (455 mm) minimum in length should be provided on the control end wall 3 inches (75 mm) minimum and 6 inches maximum above the horizontal bar, and 4 inches (100 mm) maximum inward from both front edges of the interior of the compartment.

EXCEPTION: An L-shaped continuous grab bars of equivalent dimensions and positioning should be permitted to serve the function of separate vertical and horizontal grab bars.

607.2.5 Controls. Controls, should be provided on the end wall, located opposite the seat; at a height of 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the compartment floor surface. The controls should be located horizontally between the open side and the centerline of the width of the walk-in/ transfer bathtub. Controls should comply with Section 309.4.

607.2.6 Hand Showers. A hand shower with a hose 59 inches (1500 mm) minimum in length should be provided. The hand shower should have a control with a non positive shut-off feature. Where provided the unit should not obstruct the use of the grab bars.

607.2.7 Threshold. Threshold should be 1/2 inch (13 mm) maximum in height in accordance with Section 303 and should be beveled, rounded, or vertical.

607.2.7.1 Enclosures. Enclosures should not obstruct controls or obstruct transfer from wheelchairs onto the seat.

607.2.8 Water Temperature. Bathtubs should deliver water that is 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

607.2.9 Door. An entry should have a clear opening width 36 inches (915 mm) minimum measured from the midpoint of the seat back height to the control end wall. The door should be outward opening. Provide a handle on the top of door that is operable on both the interior and exterior of the tub or a separate handle for each side. Door should allow immediate evacuation of the tub in case of an emergency. Door hardware should comply with Section 404.2.6.

607.2.10 Optional Floor Waterproofing and Back-up Floor Drain. Due to an emergency exit potential, the release of a full compartment may flood the bathroom. The room floor should be waterproof with a back-up floor drain that contains an automatic trap primer to maintain water seal to prevent sewer gases from escaping.

607.2.11 Tactile Slip Resistant Bathtub Seat and Floor Characteristics. Provide slip resistant bathtub seat and floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

607.2.12 Emergency Alarm. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Provide a water detection alarm for overflow and floor flooding.

607.2.12.1 Push Button Locations. A waterproof push button should be located within control area or immediately outside shower compartment complying with 702.2.

607.2.12.2 Automatic Purge. If water level exceeds the maximum height the tub should automatically purge. Provide an automatic purge timer to drain tub after a specified time usage to increase safety. Provide a multisensory alarm that is initiated upon automatic purge.

607.2.13 Illumination. Illumination should be provided within the bathing compartment. Fixture should be water resistant. Controls should be located immediately outside of the bathing compartment. Provide automatic lighting controls.

607.2.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

607.2.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located adjacent to the control location towards the interior of the compartment. Bottom of the niche should align with the bottom of the control location.

607.2.15 Other features. Other features may include hydrotherapy, chromotherapy, audiotherapy, aromatherapy, whirlpool, bidet jets, air message/drying, in-line heater, neck rest, message jets, tub air drying, automatic cleaning, automatic sanitizing, heated seat, automatic purge cycle. Any jets should have be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

608 Showers, Multipurpose Bathing Compartments and Wet Rooms

608.1 Showers

608.1.1 General. Showers, should comply with Section 608.1.

608.1.2 Shower Size, Clearance and Seat. Shower compartments should have sizes, clearances and seat complying with Section 608.1.2.

608.1.2.1 Transfer-Type Shower Compartments. Transfer-type shower compartments should comply with Section 608.2.1.

608.1.2.1.1 Size. Transfer-type shower compartments should have a clear inside dimension of 36 inches (915 mm) in width and 36 inches (915 mm) in depth, measured at the center point of opposing sides. An entry 36 inches (915 mm) minimum in width should be provided.

608.1.2.1.2 Clearance. A clearance of 60 inches (1525 mm) minimum in length measured perpendicular from the control wall, and 36 inches (915 mm) minimum in depth should be provided adjacent to the open face of the compartment.

608.1.2.1.3 Seat. A folding or non-folding seat complying with Section 610 should be provided on the wall opposite the control wall.

608.1.2.2 Standard Roll-in-type Shower Compartments. Standard roll-in-type shower compartments should comply with Section 608.2.2.

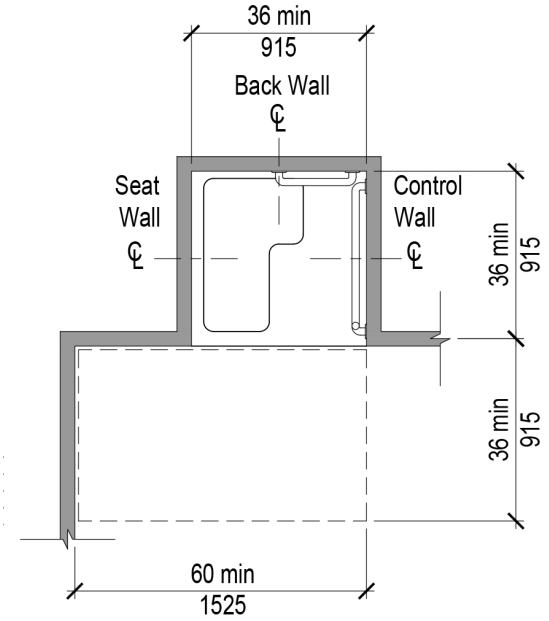


Fig. 608.1.2.1
Transfer-Type Shower Compartment Size & Clearance

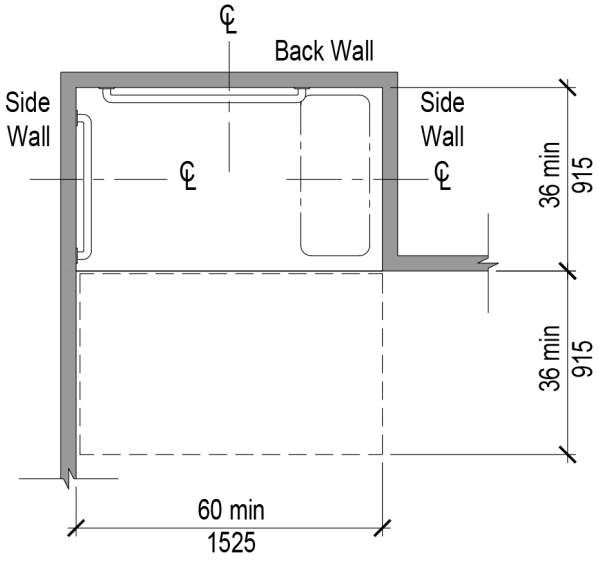


Fig. 608.1.2.2
Standard Roll-in-type Shower Compartments Size & Clearance

608.1.2.2.1 Size Standard roll-in-type shower compartments should have a clear inside dimension of 60 inches (1525 mm) minimum in width and 36 inches (915 mm) in depth, measured at the center point of opposing sides. An entry 60 inches (1525 mm) in width should be provided.

608.1.2.2.2 Clearance. A clearance of 60 inches (1525 mm) in length adjacent to the 60-inch (1525 mm) width of the open face of the shower compartment, and 36 inches (760 mm) minimum in depth, should be provided.

608.1.2.2.3 Seat. A folding seat complying with Section 610 should be provided on an end wall.

EXCEPTION: A fixed seat should be permitted where the seat does not overlap the minimum clear inside dimension recommended by Section 608.2.2.1.

608.1.2.3 Alternate Roll-in-type Shower Compartments. Alternate roll-in-type shower compartments should comply with Section 608.2.3.

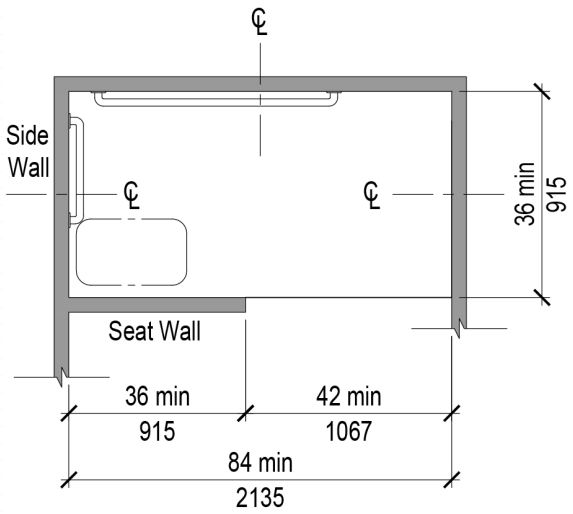


Fig. 608.1.2.3
Alternate Roll-in-Type Shower Compartment Size & Clearance

608.1.2.3.1 Size. Alternate roll-in shower compartments should have a clear inside dimension of 84 inches (2135 mm) in width, and 42 inches (1067 mm) in depth, measured at the center point of opposing sides. An entry 42 inches (1067 mm) minimum in width should be provided at one end of the 84-inch (2135 mm) of the compartment. A seat wall 36 inches (915 mm) minimum in length should be provided on the entry side of the compartment.

608.1.3 Grab Bars. Grab bars should comply with Section 609 and should be provided in accordance with Section 608.3. Where multiple grab bars are used, horizontal grab bars should be installed at the same height above the floor. Provide continuous grab bars where possible.

608.1.3.1 Transfer-Type Showers. Grab bars for transfer-type showers should comply with Section 608.3.1.

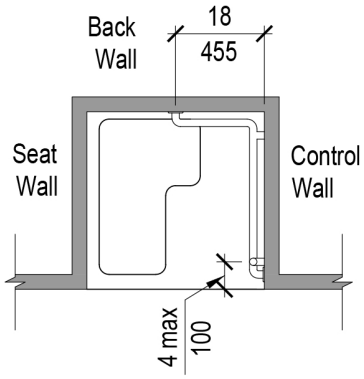


Fig. 608.1.3.1
Grab Bars in Transfer-Type Showers

608.1.3.1.1 Horizontal Grab Bars. Horizontal grab bars should be provided across the control wall and on the back wall to a point 18 inches (455 mm) from the control wall.

608.1.3.1.2 Vertical Grab Bar. A vertical grab bar 18 inches (455 mm) minimum in length should be provided on the control end wall 3 inches (75 mm) minimum and 6 inches (150 mm) maximum above the horizontal grab bar, and 4 inches (100 mm) maximum inward from the front edge of the shower.

EXCEPTION: An L-shaped continuous grab bars of equivalent dimensions and positioning should be permitted to serve the function of separate vertical and horizontal grab bars.

608.1.3.2 Standard Roll-in-Type Showers. In standard roll-in-type showers, a grab bar should be provided on the back wall beginning at the edge of the seat. The grab bar should not be provided above the seat. The back wall grab bar should extend the length of the wall. Where a side wall is provided opposite the seat, a grab bar should be provided on the side wall opposite the seat. The side wall grab bar should extend the length of the wall. Grab bars should be 6 inches (150 mm) maximum from the adjacent wall.

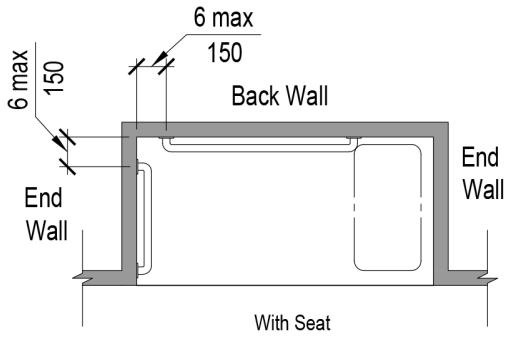


Fig. 608.1.3.2
Grab Bars in Standard Roll-in-Type Showers

608.1.3.3 Alternate Roll-in-Type Showers. In alternate roll-in-type showers, grab bars should be provided on the back wall, the end wall adjacent to the seat, and the side wall. Grab bars should not be provided above the seat. Grab bars should be 6 inches (150 mm) maximum from the adjacent wall.

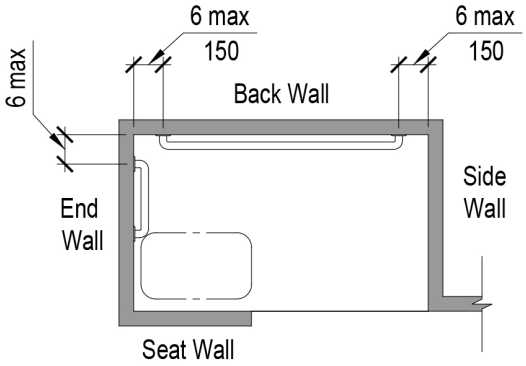


Fig. 608.1.3.3
Grab Bars in Alternate Roll-in-Type Showers

608.1.4 Controls and Hand Showers. Controls and hand showers should comply with Sections 608.4 and 309.4.

608.1.4.1 Transfer -Type Showers. In transfer-type showers, the controls and hand shower should be located:

1. On the control wall opposite the seat.

2. At a height of 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the shower floor.

3. 15 inches (380 mm) maximum, from the centerline of the control wall toward the shower opening.

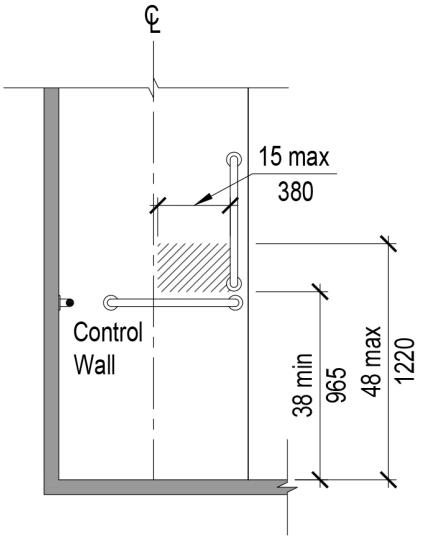


Fig. 608.1.4.1
Transfer-Type Shower
Control and Handshower Location

608.1.4.2 Standard Roll-in Showers. In standard roll-in showers, the controls and hand-held shower should be located on the back wall above the grab bar, 48 inches (1220 mm) maximum above the shower floor and 16 inches (405 mm) minimum and 27 inches (685 mm) maximum from the end wall behind the seat.

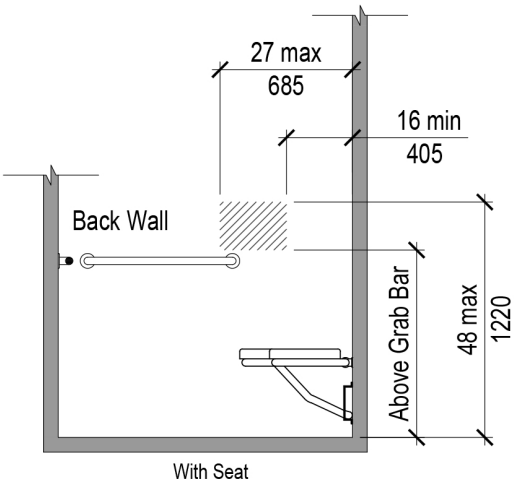
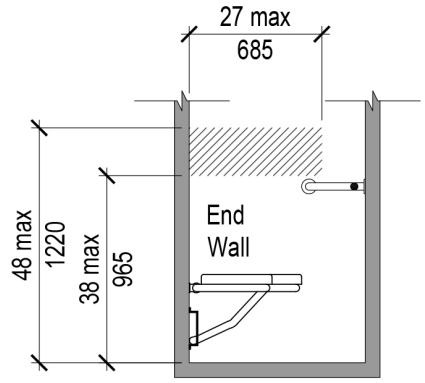
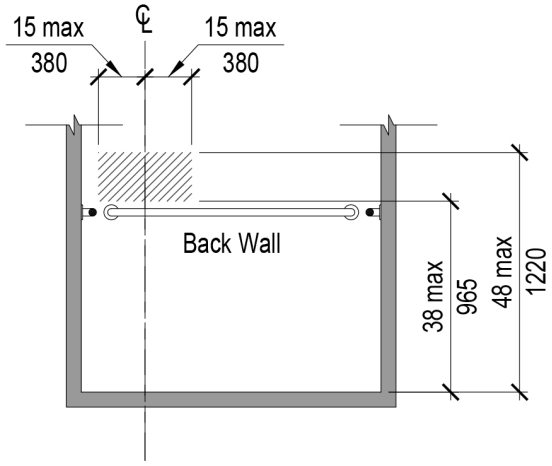


Fig. 608.1.4.2
Standard Roll-in Shower
Control and Handshower Location

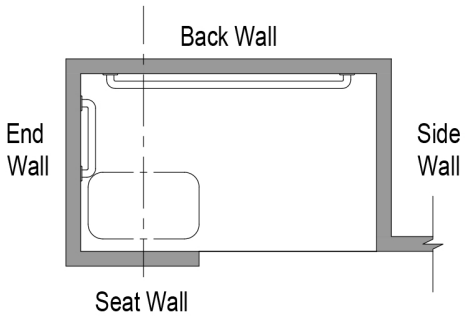
608.1.4.3 Alternate Roll-in Showers. In alternate roll-in showers, the controls and hand-held shower should be located 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the shower floor. In alternate roll-in showers with controls and hand-held shower located on the end wall adjacent to the seat, the controls and hand shower should be 27 inches (685 mm) maximum from the seat wall. In alternate roll-in showers with the controls on the back wall opposite the seat, the controls and hand shower should be located within 15 inches (380 mm) left or right, of the centerline of the seat.



(a)
End Wall
(Elevation)



(b)
Back Wall
(Elevation)



(c)
With Seat
(Plan)

Fig. 608.1.4.3
Alternate Roll-in Type Shower
Control and Handshower Location

608.1.5 Hand-Held Showers. A hand-held shower with a hose 59 inches (1500) minimum in length, that can be used both as a fixed shower head and as a hand shower, should be provided. The hand-held shower should have a control with a non-positive shut-off feature. Where provided, an adjustable-height hand-held shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

608.1.6 Thresholds. Thresholds should be flush. If this is not possible the thresholds in a roll-in-type shower compartment should be 1/2 inch (13 mm) maximum in height in accordance with Section 303. In transfer-type shower compartments, thresholds 1/2 inch (13 mm) maximum in height should be beveled, rounded, or vertical.

608.1.7 Shower Enclosures. Shower compartment enclosures for shower compartments should not obstruct controls or obstruct transfer from wheelchairs onto shower seats.

608.1.8 Water Temperature. Showers should deliver water that is 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

608.1.9 Door. An entry door should have a clear opening width 36 inches (915 mm) minimum The door should be outward opening. Provide a handle on both the interior and exterior. Door should be laminated safety glass in case of an emergency. Door hardware should comply with Section 404.2.6.

608.1.10 Optional Floor Waterproofing and Back-up Floor Drain. Due to accidental water overflow especially in public facilities, the room floor should be waterproof with a back-up floor drain that contains an automatic trap primer to maintain water seal to prevent sewer gases from escaping.

608.1.11 Tactile Slip Resistant Shower Seat and Floor Characteristics. Provide slip resistant shower seat and floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

608.1.12 Emergency Alarm. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Consider a water detection alarm for overflow and floor flooding.

608.1.12.1 Push Button Locations. A waterproof push button should be located within control area or immediately outside shower compartment complying with 702.2.

608.1.13 Illumination. Illumination should be provided within the bathing compartment. Fixture should be water resistant. Controls should be located immediately outside of the bathing compartment. Provide automatic lighting controls.

608.1.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

608.1.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located adjacent to the control location towards the interior of the compartment. Bottom of the niche should align with the bottom edge of the control location.

608.1.15 Other features. Other features may include hydrotherapy, chromotherapy, audiotherapy, aromatherapy, whirlpool, bidet jets, air message/drying, in-line heater, neck rest, message jets, tub air drying, automatic cleaning, automatic sanitizing, heated seat, automatic purge cycle. Any jets should have be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

608.2 Multipurpose Bathing Compartments.

608.2.1 General. Multipurpose bathing compartments should comply with Section 608.2.

608.2.2 Size, Clearance and Seat. Multipurpose bathing compartments should have size, clearance and seat complying with Section 608.2.2.

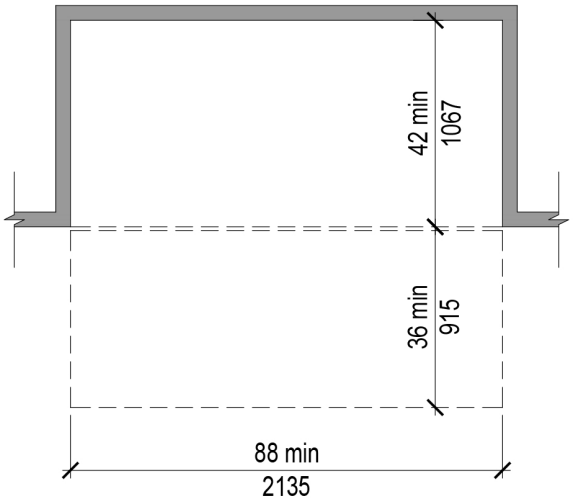


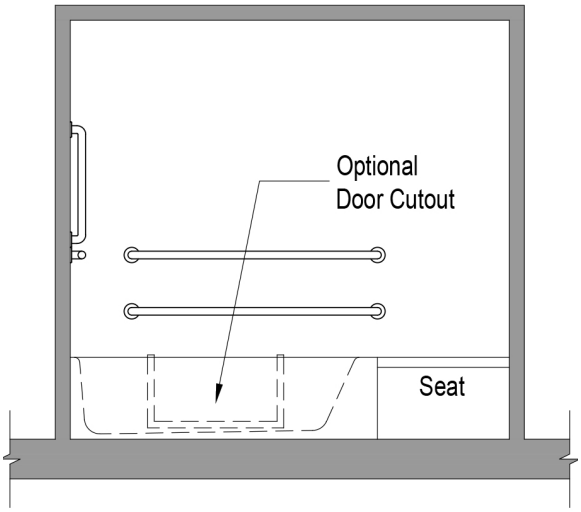
Fig. 608.2.2
Multipurpose Bathing Compartment Size and Clearance

608.2.2.1 Size. Multipurpose bathing compartments should have a clear inside dimension of 88 inches (2235 mm) minimum in width and 42 inches (1067 mm) minimum in depth, measured at the center point of opposing sides.

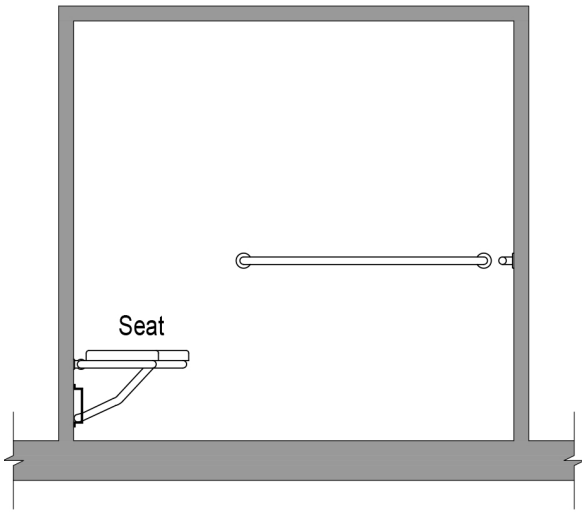
608.2.2.2 Clearance. Clearance should be provided as per the type of bathtub or shower type utilized. It is recommended to provide clearance for the entire multipurpose compartment, 88 inches (2235 mm) minimum in length adjacent to the 84 inch (2135 mm) width of the compartment, and 36 inches (760 mm) minimum in depth, should be provided. Additional clearance may be necessary depending on the type of component utilized. These clearances may extend beyond the length of the compartment.

608.2.2.3 Seat. A seat should be provided as per the type of bathtub, shower or other types of compartments utilized. Other seating, if provided, should comply with Section 903.

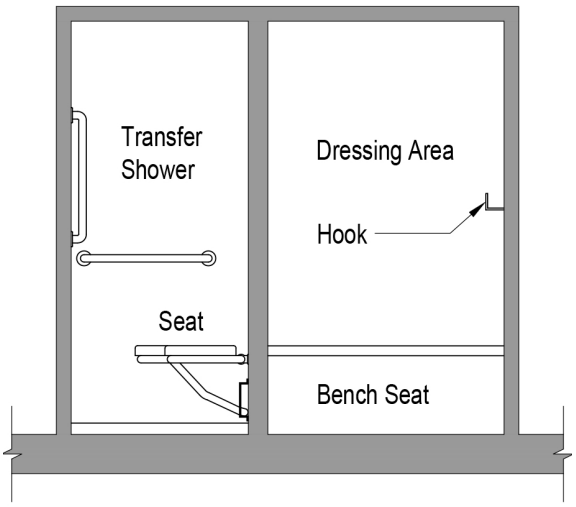
608.2.2.4 Variations. The multipurpose bathing compartment is dimensioned to accommodate bathtubs and shower types variations: Sections 606, lavatories and sinks; 607 standard bathtubs, walk-in bathtubs; 608 transfer, roll-in and alternate type showers. In addition the following may be considered: walk-in bathtub, lavatory, desk, transfer sauna, transfer steam compartment, seat, dressing compartment, countertop, storage, clothes hooks, medical equipment, laundry, ironing board, mirrors, and many other uses that can easily be accommodated by the multipurpose bathing compartment. As the need arises the compartment can be reconfigured and components substituted.



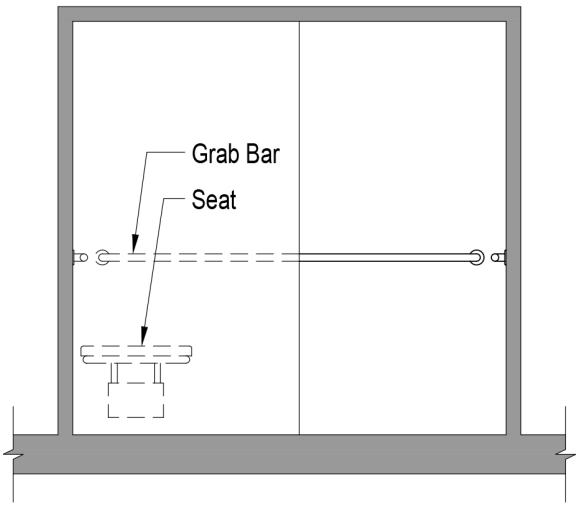
(a)
Standard Bathtub with Seat (Optional Cut-Out for Door)



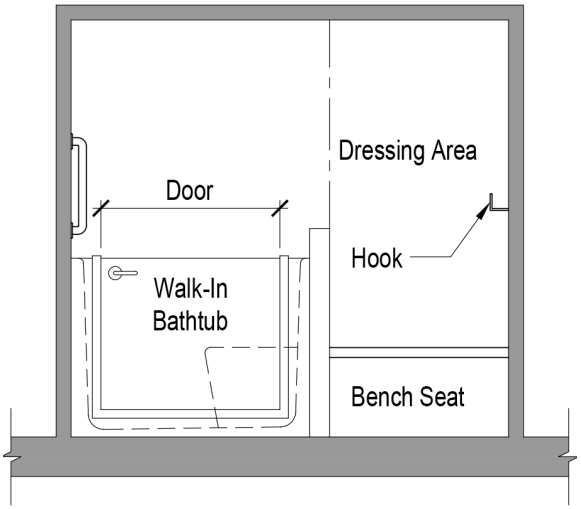
(b)
Roll-in Shower with Seat



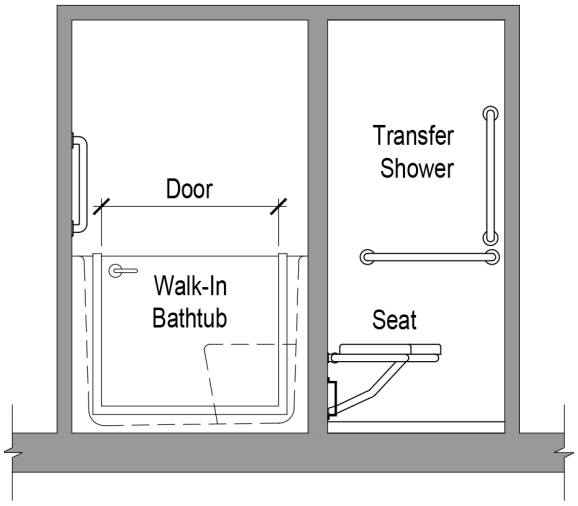
(d)
Transfer Shower and Dressing Area with Bench Seat



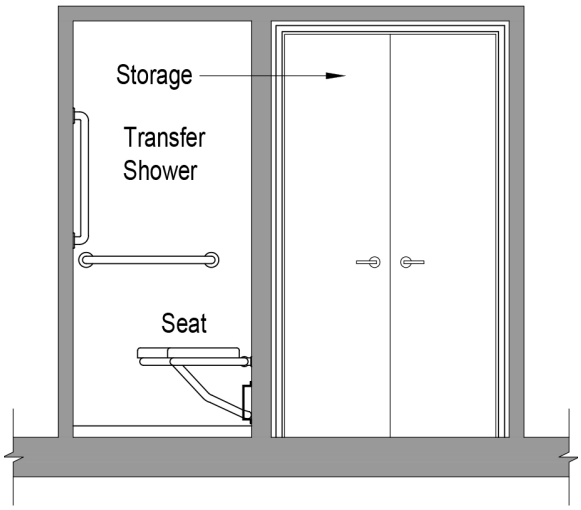
(c)
Alternate Roll-in Shower with Seat



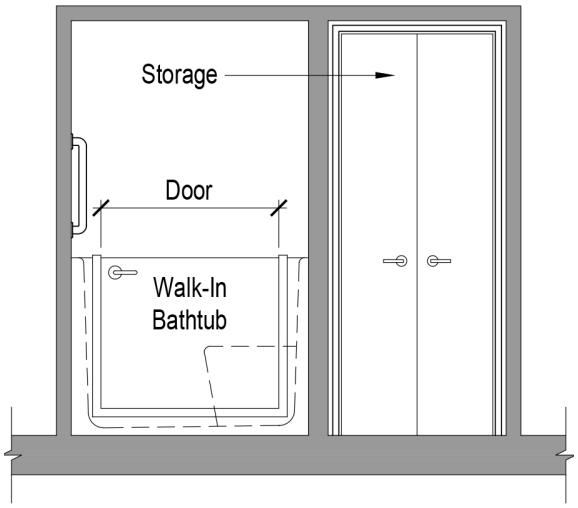
(e)
Walk-in Bathtub and Dressing Area



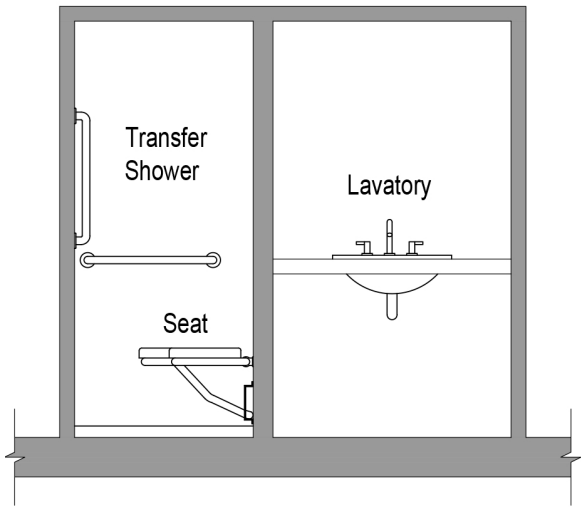
(f)
Walk-in Bathtub and Transfer Type Shower



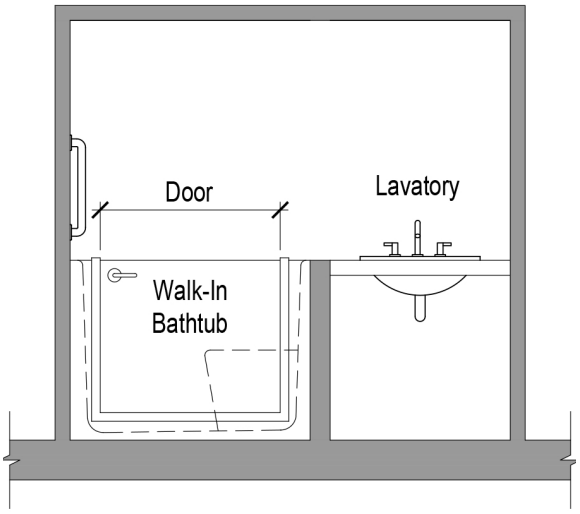
(h)
Transfer Shower and Storage Closet



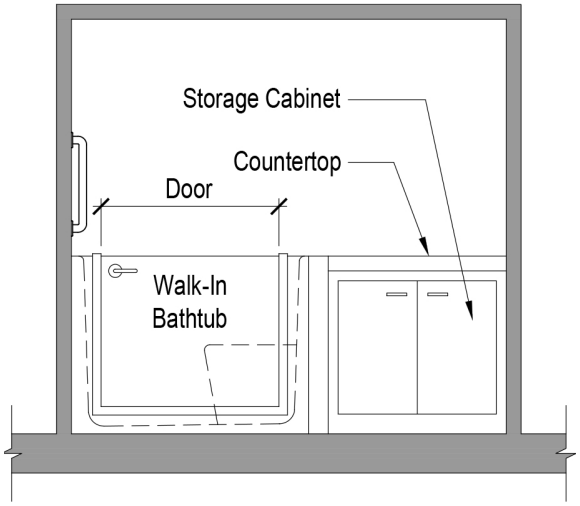
(g)
Walk-in Bathtub and Storage Closet



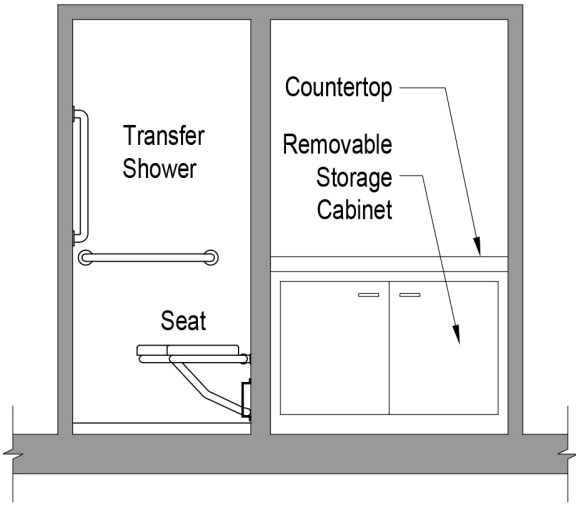
(i)
Transfer Shower and Lavatory



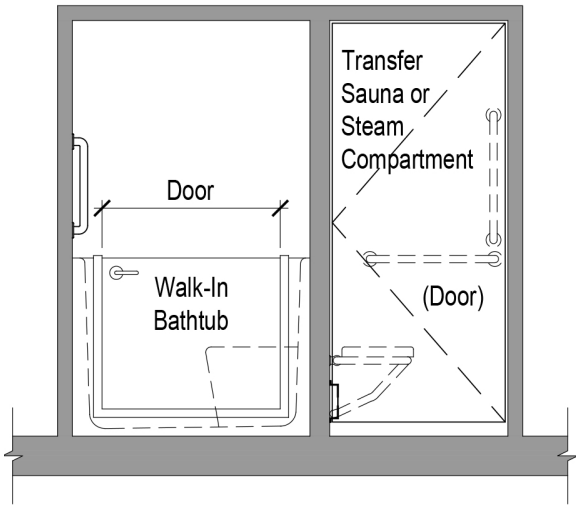
(j)
Walk-in Bathtub and Lavatory



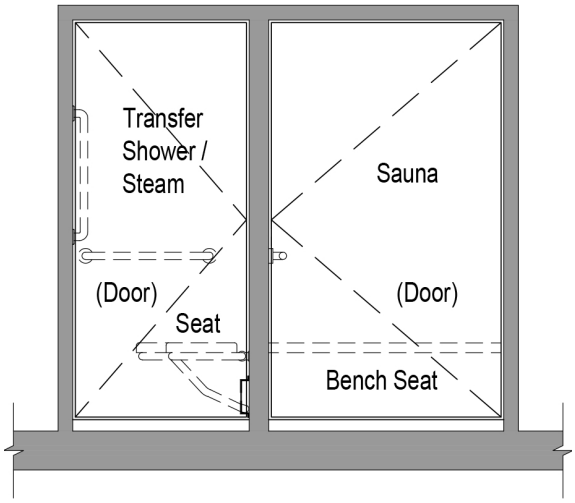
(l)
Walk-in Bathtub with Countertop and Storage Cabinet



(k)
Transfer Shower with Countertop and Removable Storage Cabinet



(m)
Walk-in Bathtub and Transfer Stream or Sauna Compartment



(n)
Transfer Shower / Steam Compartment and Transfer Sauna Compartment

Fig. 608.2.2.4
Multipurpose Bathing Compartment Example Variations

608.2.3 Grab Bars. Grab bars should be provided as per the type of bathtub, shower or other type of compartment utilized. Additional grab bars, if provided, should comply with Section 609. Grab bars should be continuous where possible.

608.2.4 Controls and Hand Shower Locations. Controls and hand showers should be provided using 4 adaptable in-wall control boxes. Locate for bathtub in accordance with Section 607.5 and for showers in accordance with Section 608.4 for transfer, roll-in and alternate-type showers. This will allow rapid reconfiguration of the multipurpose without the need to destroy walls to re-route hot and cold plumbing supply lines.

608.2.4.1 Lavatory Control Box. Consider a supplemental lavatory control box with drain line for a temporary installation in the bathing compartment (e.g. adjacent to a temporary transfer shower).

608.2.5 Hand Shower. A hand shower with a hose 59 inches (1500) minimum in length, that can be used both as a fixed shower head and as a hand shower, should be provided. The hand shower should have a control with a non-positive shut-off feature. Where provided, an adjustable-height hand shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

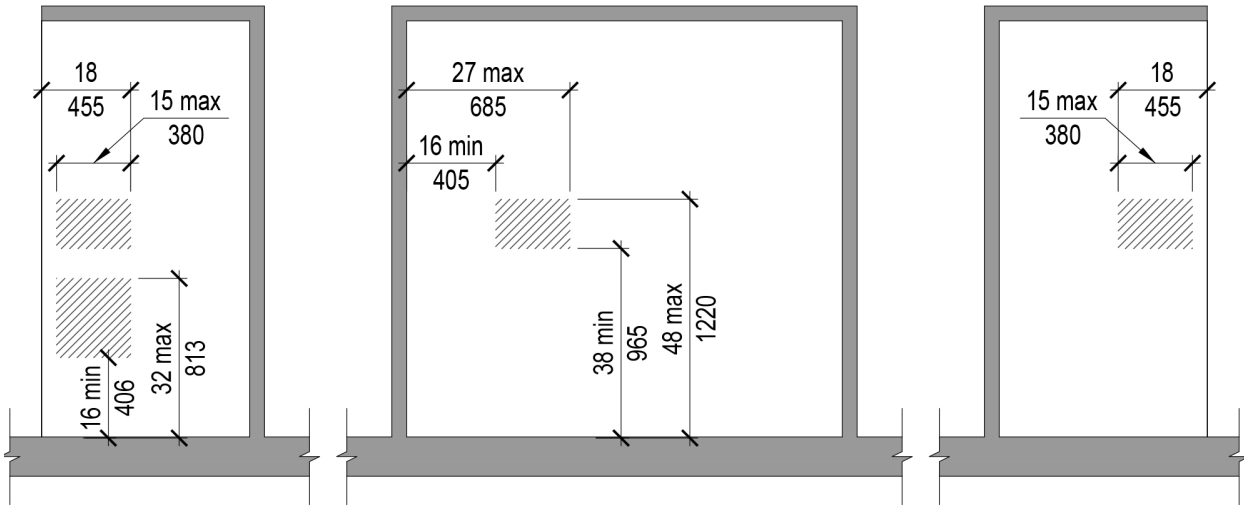


Fig. 608.2.5
Controls and Hand Shower Locations

608.2.6 Thresholds. Thresholds should be flush , but if this is not possible then 1/2 inch (13 mm) maximum in height in accordance with Section 303 and should be beveled, rounded, or vertical.

608.2.7 Surfaces and Enclosures. The multipurpose compartment surfaces should be finished on floor, walls and ceiling to maximize the flexibility to reconfigure the components without destruction of the surrounding surfaces. Other types of enclosures should be in accordance with the bathing component utilized.

608.2.8 Water Temperature. Showers should deliver water that is 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

608.2.9 Doors. An entry door should have a clear opening width 36 inches (915 mm) minimum The door should be outward opening. Provide a handle on both the interior and exterior. Door should be laminated safety glass in case of an emergency. Door hardware should comply with Section 404.2.6.

608.2.10 Drainage. Drainage line should be provided for bathtubs and transfer, roll-in and alternate-type showers. This will allow rapid reconfiguration of the multipurpose without the need to destroy the floor of the multipurpose compartment to accommodate drainage lines.

608.2.10.1 Floor Waterproofing and Back-up Floor Drain. The room floor should be waterproof with a back-up floor drain that contains an automatic trap primer to prevent sewer gases from escaping. The floor slope should not be steeper than 1:48.

608.2.11 Tactile Floor Characteristics. Provide tactile floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

608.2.12 Emergency Alarm. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Provide a water detection alarm for overflow and floor flooding.

608.2.12.1 Push Button Locations. A waterproof push button should be located within control area complying with Section 608.5.1 or immediately outside shower compartment complying with 702.2.

608.2.13 Illumination. Illumination should be provided within the bathing compartment. Fixture should be water resistant. Controls should be located immediately outside of the bathing compartment. Provide automatic lighting controls.

608.2.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

608.2.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located adjacent to the control location towards the interior of the compartment. Bottom of the niche should align with the bottom edge of the control location.

608.2.15 Other features. Other features may include hydrotherapy, chromotherapy, audiotherapy, aromatherapy, whirlpool, bidet jets, air message/drying, in-line heater, neck rest, message jets, tub air drying, automatic cleaning, automatic sanitizing, heated seat, automatic purge cycle. Any jets should have be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

608.3 Wet Rooms

608.3.1 General. A wet room is a bathroom that contains an area designated for shower bathing that is open to the rest of the room. The wet room contains a water proof floor sloped 2% to a floor drain. Designated sections of the room walls are also water proofed and contain the controls and shower head(s). It essentially allows you to use the bathroom as an open shower with additional room.

608.3.2 Size, Clearance and Seat. Size, clearance and seat should comply with Section 608.3.2.

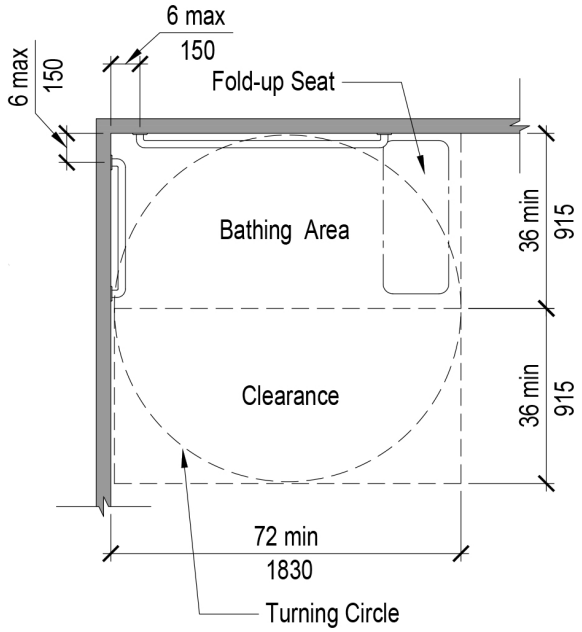


Fig. 608.3.2
Wet Room Shower Area Size and Clearance

608.3.2.1 Size Wet room shower area should have a clear inside dimension of 72 inches (1830 mm) minimum in width and 36 inches (915 mm). An clear open entry 60 inches (1525 mm) minimum in width should be provided.

608.3.2.2 Clearance. A clearance of 72 inches (1830 mm) in length adjacent to the 72 inch (1830 mm) width of the open face of the shower area, and 36 inches (760 mm) minimum in depth, should be provided.

608.3.2.3 Seat. A folding seat complying with Section 610 should be provided on an end wall.

EXCEPTION: A fixed seat should be permitted where the seat does not overlap the minimum clear inside dimension recommended by Section 608.2.2.1.

608.3.3 Grab Bars. Grab bars should comply with Section 609 and should be provided in accordance with Section 608.3.3. Where multiple grab bars are used, horizontal grab bars should be installed at the same height above the floor. Provide continuous grab bars where possible.

608.3.3.1 Horizontal Grab Bar. A horizontal grab bar should be provided on the wall(s) corresponding with the length and width of the shower area. Grab bars should be 6 inches (150 mm) maximum from an adjacent wall. Grab bar should not be placed above the edges of the seat.

608.3.3.2 Vertical Grab Bar. A vertical grab bar 18 inches (455 mm) minimum in length may be provided, coinciding with the edge of the seat 3 inches (75 mm) minimum and 6 inches (150 mm) maximum above the horizontal grab bar. The vertical grab bar should not be placed within the width of length of the seat and should not conflict with control and hand shower.

608.3.4 Controls and Hand Shower Locations. Controls and hand showers should be located above the grab bar, 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the shower floor. Horizontally they should be 16 inches (405 mm) minimum and 27 inches (685 mm) maximum from the back edge of the seat, so that a bather in a seated position shall have the controls and hand shower immediately to their side.

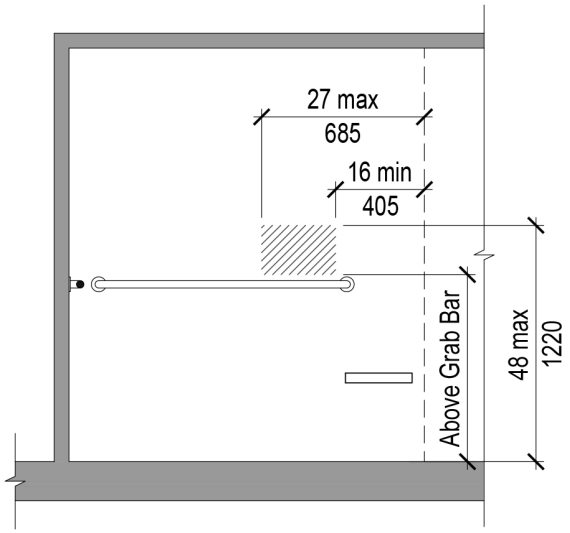


Fig. 608.3.4
Control and Hand Shower Location

608.3.5 Hand Showers. A hand shower with a hose 59 inches (1500) minimum in length, that can be used both as a fixed shower head and as a hand shower, should be provided. The hand shower should have a control with a non-positive shut-off feature (constant pressure not required to keep the water flowing). Where provided, an adjustable-height hand shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

608.3.6 Thresholds. A wet room shower area may contain a thresholds but is often flush with the rest of the floor. If a threshold is used, it should be 1/2 inch (13 mm) maximum in height in accordance with Section 303, and should be beveled, rounded, or vertical.

608.3.7 Shower Area Curtain. The shower may contain a shower rod and curtain to contain the water spray within the shower area of the wet room. It should not obstruct controls, grab bars or seat.

608.3.8 Water Temperature. Showers should deliver water that is 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

608.3.9 Door. The entry door of the bathroom should not swing into the designated shower area.

608.3.10 Floor Waterproofing and Back-up Floor Drain. The entire room floor should be waterproof with a floor drain that contains an automatic trap primer to maintain water seal to prevent sewer gases from escaping.

608.3.11 Tactile Slip Resistant Floor Characteristics. Provide floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

608.3.12 Emergency Alarm. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Consider a water detection alarm for overflow and floor flooding.

608.3.12.1 Push Button Locations. A waterproof push button should be located within control area or immediately outside shower area complying with 702.2.

608.3.13 Illumination. Illumination should be provided within the shower area. Fixture should be water resistant. Controls should be located immediately outside of the shower area. Provide automatic lighting controls.

608.3.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

608.3.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located adjacent to the control location towards the interior of the compartment. Bottom of the niche should align with the bottom edge of the control location.

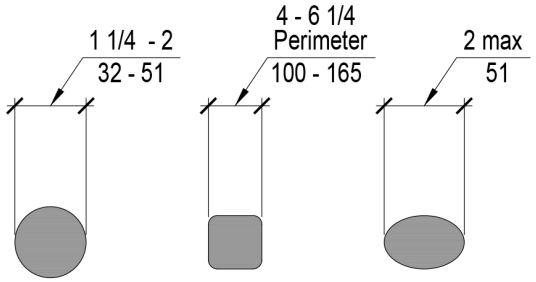
608.3.15 Other features. Other features may include hydrotherapy, chromotherapy, audiotherapy, aromatherapy, air message/ drying, message jets, heated seat, Any jets should be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

609 Grab Bars

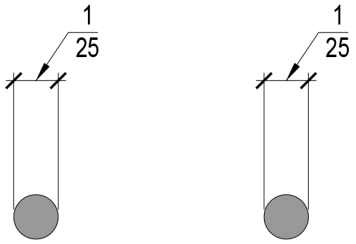
609.1 General. Grab bars should comply with Section 609.

609.1 Advisory. Grab bars can be used anywhere they are needed. In addition to the identified locations for grab bars for toilet or bathing facilities, consider installations for standard toilet compartment, urinals, lavatories and along the room walls.

609.2 Cross Section. Grab bars should have a cross section complying with Section 609.2.1 and 609.2.2.



(a)
Adult Grab Bars



(b)
Children's Grab Bars

(c)
People of Short Stature

Fig. 609.2
Grab Bar Cross Sections

609.2.1 Adult Circular Cross Section. Grab bars with a circular cross section should have an outside diameter of 1-1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.

609.2.2 Adult Non-circular Cross Section. Grab bars with a non-circular cross section should have a cross section dimension of 2 inches (51 mm) maximum, and a perimeter dimension of 4 inches (102 mm) minimum and 4.8 inches (122 mm) maximum.

609.2.3 Children's Circular Cross Section. Children's grab bars should have a circular cross section and an outside diameter of 1 inch (25.4 mm).

609.2.4 People of Short Stature. Circular cross section should comply with Section 609.2.3.

609.3 Spacing. The spacing between the wall and the grab bar should be 1 1/2 inches (38 mm). The space between the grab bar and projecting objects below and at the ends of the grab bar should be 1 1/2 inches (38 mm) minimum. The space between the grab bar and projecting objects above the grab bar should be 12 inches (305 mm) minimum.

EXCEPTIONS:

1. The space between the grab bars and shower controls, shower fittings, and other grab bars above the grab bars should be permitted to be 1 1/2 inches (38 mm) minimum.

2. Swing-up grab bars should not be required to comply with Section 609.3.

3. Emergency alarm button should be permitted within the 12 inch (305 mm) clearance complying with Section 603.5.1.

4. Horizontal grab bars are not required on walls 12 inches (305 mm) wide or less.

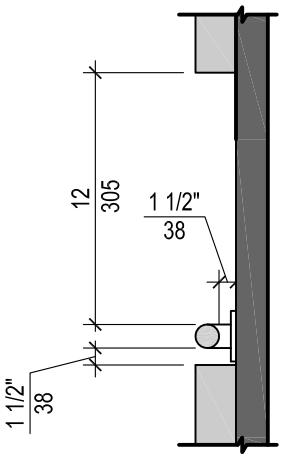


Fig. 609.3
Spacing of Grab Bars

609.4 Height of Horizontal Grab Bars. Height of grab bars should comply with Section 609.4.

609.4.1 Adult Grab Bar Heights. Adult grab bar should be installed generally in a horizontal position, 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finished floor measured to the top of the gripping surface. At water closets for adults, grab bars should be installed in a horizontal position 34 1/2 inches (875 mm) minimum and 36 inches (915 mm) maximum. See Figure 604.8.

609.4.2 Children's Grab Bar Heights. Children's grab bars should be installed generally in a horizontal position. Dimensions are from the finished floor to the top of the gripping surface. Children ages 9 through 12, 25 inches (635 mm) to 27 inches (685 mm). Children ages 5 through 8, 20 inches (510 mm) to 25 inches (635 mm). Children 3 and 4, 18 inches (455 mm) to 20 inches (510 mm). In showers children's grab bars should be provided that address the primary age group that the facility serves. See Figure 604.10.

609.4.2 Advisory. Children's dimensions were obtained from the *2004 ADA-ABA*,Section 105.3. The lower heights may create a conflict if a bathtub is used since the lower grab bar is required by code to be 9 inches minimum above the tub rim: 18 inches (typical rim height range 15-18 inches) plus 9 inches places the bar at approximately 27 inches. Thus, the lower bar may need to be relocated if a bathtub is used.

609.4.3 People of Short Stature Grab Bar Heights. Grab bar heights should be 25 inches (635 mm) to 27 inches (685 mm) above the finished floor. See Figure 604.10.

609.5 Surface Hazards. Grab bars, and any wall or other surfaces adjacent to grab bars should be free of sharp or abrasive elements. Edges should be rounded.

609.6 Fittings. Grab bars should not rotate within their fittings.

609.7 Installation. Grab bars should be installed in any manner that provides a gripping surface at the locations specified in this standard and does not obstruct the floor space.

609.8 Structural Strength. Allowable stresses should not be exceeded for materials used where a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the grab bar, fastener mounting device, or supporting structure.

609.8 Advisory. Pull down grab bars should accommodate an higher impact load. Provide strong fasteners attached directly to structural members. The increased strength is necessary to sustain impact loads (e.g., someone slipping).

610 Shower Seats

610.1 General. Seats for inclusive roll-in-type shower compartments should comply with Section 610.

610.2 Seat. A fold down type seat should be provided in a roll-in shower compartment adjacent to the controls. A dual height seat or seat with an adaptor or an adjustable height seat should be provided.

610.3 Height. A dual height seat or seat with adaptor should be 17 inches (430 mm) and 19 inches (485 mm) above the finished floor, measured to the top of the seat. An adjustable height seat should have an extended low range to accommodate children that is 12 inches (305 mm) minimum above the finished floor.

610.3 Advisory. A minimum of 12 inches may be used to accommodate children but the reinforcement should be capable of supporting the range of heights from young children to adults. A height option of 15 inches is preferred by many adults.

610.3.1 Height for People of Short Stature. A seat should be 15 inches (380 mm) minimum and 17 inches (430 mm) maximum above the finished floor, measured to the top of the seat.

610.4 Clearances. The rear edge of a rectangular seat should be 2 1/2 inches (64 mm) maximum and the front edge 15 inches (380 mm) minimum to 16 inches (405 mm) maximum from the seat wall. The side edge of the seat should be 1 1/2 inches (38 mm) maximum from the control wall. The seat should extend from the control wall to a point within 3 inches (75 mm) of the compartment entry. The length of the seat should not conflict the vertical grab bar complying with Section 608.3.1.2.

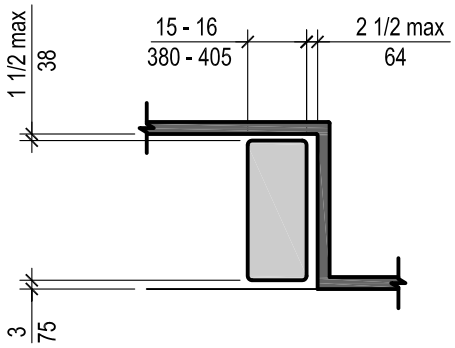


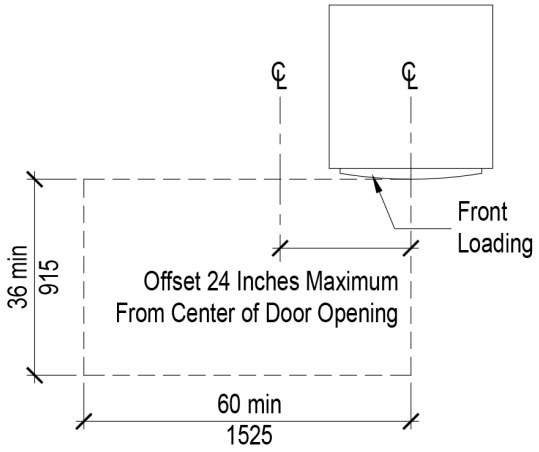
Fig. 610.4
Shower Seat Clearances

610.5 Structural Strength. Allowable stresses should not be exceeded for materials used where a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener mounting device, or supporting structure.

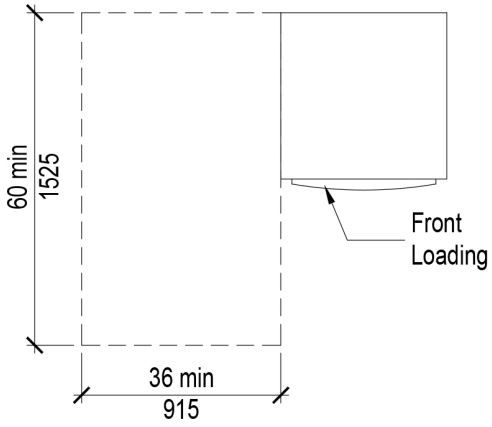
611 Washing Machines and Clothes Dryers

611.1 General. Washing machines and clothes dryers should be front loading and comply with Section 611. Consider models with sloping door face/opening for enhanced access. Provide a water overflow alarm, smoke alarm and gas detection alarm (for gas fired units) complying with Section 309.9. Provide local shutoffs or multisensory signage with location of main shutoffs. Amenities should comply with Section 1010.

611.2 Clear Floor Space. A clear floor space complying with Section 305, positioned for parallel approach, should be provided. The clear floor space should be centered on the appliance door opening. An alternate side approach may be preferred.



(a)
Front Approach



(b)
Alternate Side Approach

Fig. 611.2
Clear Floor Space

611.3 Operable Parts. Operable parts, including doors, lighting, timer, lint screens, detergent and bleach compartments, should comply with Sections 308 and 309.

611.4 Height. Front loading machines should have the bottom of the opening to the laundry compartment 19 1/2 inches (495 mm) minimum as per Section 308 and 34 inches (865 mm) maximum above the floor. Provide pedestals to meet suggested height if necessary. Consider pedestals with a toe recess. Consider machines mounted to provide knee and toe clearance for a seated perpendicular approach complying with Section 306.

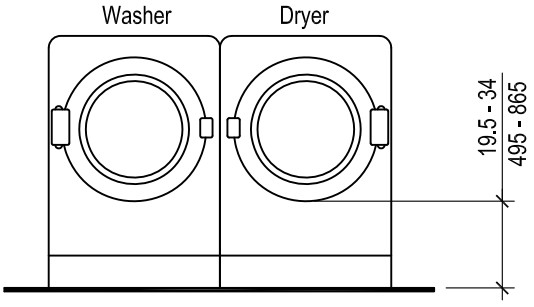


Fig. 611.4
Height of Laundry Equipment

611.4.1 Adjustable Height Bases. Consider automatic adjustable height pedestals to accommodate user needs and preferences for both a seated and standing position.

611.5 Sloped Front Face. Provide a sloped front face angle for the washer and dryer in a range of 0^0-30^0 angled to increase ease of loading and unloading.

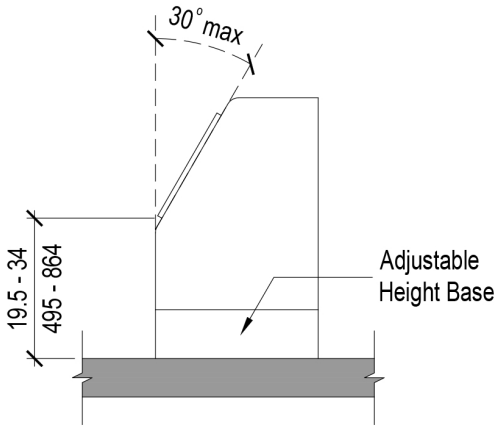


Fig. 611.5
Sloped Front Face

611.6 Clothes Dryer Light and Timer. Dryers should be equipped with an internal light source, ambient and work lighting within the room. Provide a multisensory timer complying with Section 309.

611.7 Illumination. Provide adequate general and task lighting for washing machine and clothes dryer.

611.8 Work Surface. Provide a work surface complying Section 902.

611.9 Water Supply Connections. Provide access to water supply connections and shutoffs with lever handles complying with Section 308 Reach Ranges.

611.9.1 Floor Drain. Consider a floor drain that contains an automatic trap primer to prevent sewer gases from escaping. The floor slope should not be steeper than 1:48

611.9.2 Electrical. Provide access to electrical connections for both the washer and dryer or their electrical circuit complying with Section 308 Reach Ranges.

611.9.3 Exhaust. Provide a dryer exhaust line clean out and access to the clean out complying with Section 308 Reach Ranges and Section 309 Operable Parts.

611.9.4 Seating. Provide a seat complying with Section 610 within close proximity of the washer and dryer.

612 Saunas and Steam Rooms

612.1 Standard Compartment

612.1.1 General. Standard saunas and steam rooms should comply with Section 612.1

612.1.2 Size, Clearance and Seat. Size, clearance and seating should comply with Section 612.1.2.

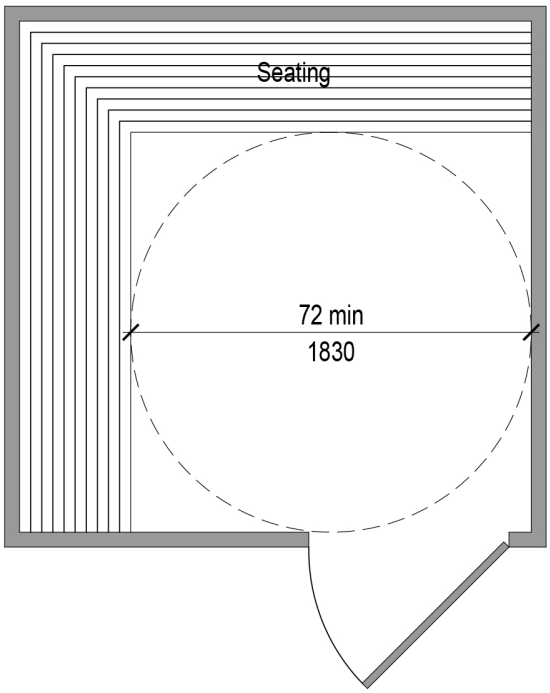


Fig. 612.1.2
Standard Sauna Unit
Size & Clearance

612.1.2 Advisory. It is suggested to provide a clear floor space 72 x 72 inches complying with Section 304 in large saunas. This may not be practical in small facilities or possible due to existing conditions. An alternative is a 36 x 60 inch space complying with Section 305, but requires the occupant to either back in or out. Since a person who uses a mobility device should not operate their device in reverse, the turning circle is recommended. If a side entry is used, provide a clear floor space complying with Section 305.7 Alcoves.

612.1.2.1 Clear Floor Space. A clear floor space should be provided complying with Section 305.

612.1.2.2 Turning Space. A turning space should be provided complying with Section 304.

612.1.2.3 Seating. Transferrable benches should be provided complying with Section 903. Seating should be cedar or other type of wood in saunas. Seating should comply with Section 610.

612.1.3 Grab Bars. Grab bars should comply with Section 612.1.3 and should be provided in accordance with Section 609. Where multiple grab bars are used, horizontal grab bars should be installed at the same height above the floor. Provide continuous grab bars where possible. Provide wood or padded grab bars in saunas.

612.1.3.1 Horizontal Grab Bar. A horizontal grab bar should be provided on wall(s) that are clear of seating and should not obstruct the clear floor space, controls, heating element(s) or steam outlet(s). Grab bars should be 6 inches (150 mm) maximum from an adjacent wall.

612.1.3.2 Vertical Grab Bar. A vertical grab bar 18 inches (455 mm) minimum in length may be provided, coinciding with the edge of the seating, 3 inches (75 mm) minimum and 6 inches (150 mm) maximum above a horizontal grab bar. The vertical grab bar should not be placed within the width of length of the seat and should not conflict with controls, heating elements, steam outlets, and hand shower.

612.1.4 Controls. Controls should be located on the exterior of the sauna with an outside automatic and interior manual emergency shut-off complying with Section 308 and Section 309 located on the wall adjacent to the clear floor space. Sauna heating unit(s) and steam outlets should not be located in the clear floor space. Controls should be located above a grab bar if provided, 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the steam or sauna floor. Horizontally they should be 16 inches (405 mm) minimum and 27 inches (685 mm) maximum from the back edge of the seat, so that a person in a seated position should have the controls immediately at their side.

612.1.5 Hand-Held Showers. A hand-held shower should be provided in steam rooms with a hose 59 inches (1500) minimum in length, that can be used both as a hand-held shower, should be provided. The hand-held shower should have a control with a non-positive shut-off feature (constant pressure not required to keep the water flowing). See Section 106.5. Where provided, an adjustable-height hand-held shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

612.1.6 Threshold. Thresholds should be 1/2 inch (13 mm) maximum in height in accordance with Section 303, and should be beveled, rounded, or vertical.

612.1.7 Enclosures. Saunas should have interior enclosure of cedar or other types of wood. Steam rooms should have waterproof surfaces.

612.1.8 Water and Room Temperature. Water and Room Temperature should comply with Section 612.1.8.

612.1.8.1 Water Temperature Water temperature should be 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

612.1.8.2 Room Temperature. The maximum allowable sauna temperature in the US is 194^0 F (90^0 C). Steam temperature is 90^0-120^0 (30^0-50^0 C). The length of timers in either a sauna or steam room should not exceed 1 hour and should be much shorter depending on temperature. Exposure varies from person to person. Refer to the requisite code for the particular location. Exercise caution and verify temperature and time based on medical research, American Medical Association and manufacturers recommendations.

612.1.9 Door. Doors should be provided with a swing out door, a 36 inch (915 mm) minimum clear opening with view panel complying with Section 404.2.10. Doors should not swing into the clear floor space required by Section 903.2.

612.1.10 Drainage and Water Proofing Provide positive drainage to a floor drain not exceeding 1:48. Floor surfaces should comply with Section 302. The entire room floor should be waterproof with a floor drain that contains an automatic trap primer to maintain water seal to prevent sewer gases from escaping.

612.1.11 Slip Resistant Floor Characteristics. Saunas should provide cedar flooring. Steam rooms should provide slip resistant floors. Provide floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

612.1.12 Emergency Alarm Provide an emergency alarm complying with Section 708, multisensory alarms complying with Section 309.9 and two-way communication system. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Consider a water detection alarm for overflow and floor flooding.

612.1.12.1 Push Button Locations. A waterproof button should be located within control area or immediately outside the compartment complying with Section 702.2.

612.1.13 Illumination. Illumination should be provided within the shower area. Fixture should be water resistant. Controls should be located immediately outside of the shower area. Provide automatic lighting controls.

612.1.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

612.1.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located within reach ranges complying with Section 309.3.1 Comfort Seated Reach Zone with the top of the niche not too exceed 48 inches (1220 mm) maximum above the finished floor.

612.1.15 Other features. Other features may include chromotherapy, audiotherapy, aromatherapy, air message/drying, message jets. Any jets should be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.

612.2 Transfer Compartment

612.2.1 General. Transfer saunas and steam rooms should comply with Section 612.2.

612.2.2 Size, Clearance and Seat. Size, clearance and seating should comply with Section 612.2.2.

612.2.2.1 Size. Transfer-type compartments should have a clear inside dimension of 36 inches (915 mm) in width and 36 inches (915 mm) in depth, measured at the center point of opposing sides. An entry 36 inches (915 mm) minimum in width should be provided.

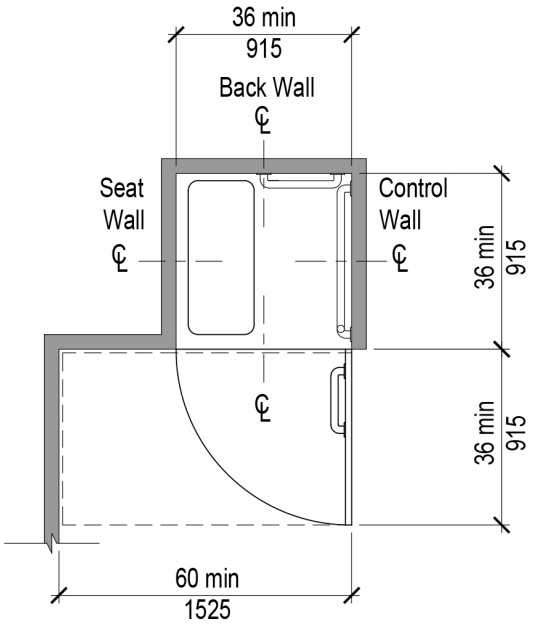


Fig. 612.2.2.1
Transfer Sauna and Steam Compartment Size & Clearance

612.2.2.2 Clearance. A clearance of 60 inches (1525 mm) minimum in length measured perpendicular from the control wall, and 36 inches (915 mm) minimum in depth should be provided adjacent to the open face of the compartment.

612.2.2.3 Seating. A folding or non-folding seat complying with Section 610 should be provided on the wall opposite the control wall. Seating should be cedar or other type of wood in saunas. Seating should comply with Section 610.

612.2.3 Grab Bars. Grab bars should comply with Section 609 and should be provided in accordance with Section 608.3. Where multiple grab bars are used, horizontal grab bars should be installed at the same height above the floor. Provide continuous grab bars where possible. Provide wood or padded grab bars in sauna.

612.2.3.1 Horizontal Grab Bars. Horizontal grab bars should be provided across the control wall and on the back wall to a point 18 inches (455 mm) from the control wall. They should not obstruct the controls, heating element(s) or steam outlet(s). Grab bars should be 6 inches (150 mm) maximum from an adjacent wall.

612.2.3.2 Vertical Grab Bar. A vertical grab bar 18 inches (455 mm) minimum in length should be provided on the control end wall 3 inches (75 mm) minimum and 6 inches (150 mm) maximum above the horizontal grab bar, and 4 inches (100 mm) maximum inward from the front edge of the compartment. The vertical grab bar should not be placed within the width of length seat and should not conflict with controls, heating elements, steam outlets and hand-held shower.

612.2.4 Controls. Controls should be located on the exterior of the sauna with an outside automatic and interior manual emergency shut-off complying with Section 308 and Section 309. Sauna heating unit(s) and steam outlets should protect occupant. Controls should be located above a grab bar if provided, 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the steam or sauna floor. The controls and hand shower should be located:

1. On the control wall opposite the seat.

2. At a height of 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the compartment floor.

3. 15 inches (380 mm) maximum, from the centerline of the control wall toward the compartment opening.

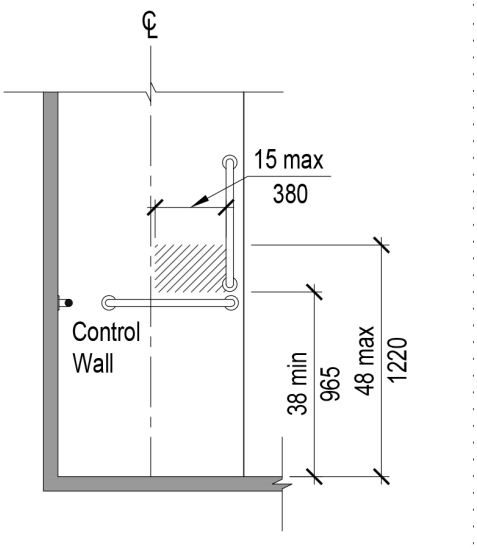


Fig. 612.2.4
Controls and Hand-held Shower Locations in Transfer Type Compartments

612.2.5 Hand-held Showers. A hand-held shower should be provided in steam rooms with a hose 59 inches (1500) minimum in length, that can be used both as a hand-held shower, should be provided. The hand-held shower should have a control with a non-positive shut-off feature (constant pressure not required to keep the water flowing). See Section 106.5. Where provided, an adjustable-height hand-held shower mounted on a vertical bar should be installed so as to not obstruct the use of grab bars.

612.2.6 Threshold. Thresholds should be 1/2 inch (13 mm) maximum in height in accordance with Section 303, and should be beveled, rounded, or vertical.

612.2.7 Enclosures. Saunas should have interior enclosure of cedar or other types of wood. Steam rooms should have waterproof surfaces.

612.2.8 Water and Compartment Temperature. Water and Room Temperature should comply with Section 612.8.

612.2.8.1 Water Temperature Water temperature should be 120^0 F (49^0 C) maximum. An emergency temperature sensor should automatically cut hot water if the outlet temperature exceeds the maximum. A thermostatic control that automatically compensates for both changes in water pressure and changes in temperature is recommended.

612.2.8.2 Compartment Temperature. The maximum allowable sauna temperature in the US is 194^0 F (90^0 C). Steam temperature is 90^0 - 120^0 (30^0 - 50^0 C). The length of timers in either a sauna or steam compartment should not exceed 1 hour and should be much shorter depending on temperature. Exposure varies from person to person. Refer to the requisite code for the particular location. Exercise caution and verify temperature and time based on medical research, American Medical Association and manufacturers' recommendations.

612.2.9 Door. Compartments should be provided with a swing out door, a 36 inch (915 mm) minimum clear opening with view panel complying with Section 404.2.10. Doors should not swing into the clear floor space required by Section 903.2

612.2.10 Drainage and Water Proofing. Provide positive drainage to a floor drain not exceeding 1:48. Floor surfaces should comply with Section 302. The entire room compartment should be waterproof with a floor drain that contains an automatic trap primer to maintain water seal to prevent sewer gases from escaping.

612.2.11 Slip Resistant Floor Characteristics. Sauna compartments should provide cedar flooring. Steam compartments should provide slip resistant floors. Provide floor characteristics complying with Section 302.6 that are highly slip resistant. Do not use a gloss surface.

612.2.12 Emergency Alarm Provide an emergency alarm complying with Section 708, multisensory alarms complying with Section 309.9 and two-way communication system. Emergency alarm should comply with Section 603.5 Push button location should comply with 608.5.7.1. The push button should be waterproof. Consider a water detection alarm for overflow and floor flooding.

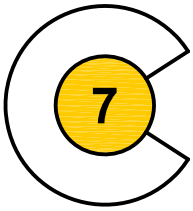
612.2.12.1 Push Button Locations. A waterproof push button should be located within control area or immediately outside the compartment complying with Section 702.2.

612.2.13 Illumination. Illumination should be provided within the compartment. Fixture should be water resistant. Controls should be located immediately outside of the compartment. Provide automatic lighting controls.

612.2.14 Recessed Storage Niche. It is recommended to provide an open recessed storage niche for bathing products and toiletries.

612.2.14.1 Location and Size A recessed storage niche 12 inches (305 mm) minimum in height and 6 inches (155 mm) minimum in width should be located within reach ranges complying with Section 309.3.1 Comfort Seated Reach Zone with the top of the niche not too exceed 48 inches (1220 mm) maximum above the finished floor.

612.2.15 Other features. Other features may include chromotherapy, audiotherapy, aromatherapy, air message/drying, message jets. Any jets should be adjustable for direction, flow, temperature and timing. Consider alternate operation such as verbal commands complying with Section 309.



Communication Elements and Features

700 Introduction. Chapter 7 includes: emergency assistance alarms, visual and tactile characters, Braille, pictograms, remote infrared audible sign systems, telephones, detectable surfaces, detectable warnings, assistive listening systems, information transaction machines, two-way communications, signage systems, public information display types, directories, room number systems, emergency signage and wayfinding.

Emergency assistance alarms for safety and security are recommended throughout the book. The lower button location allows activation from a prone or supine position. Consider the use of an enhanced security system with emergency communication devices in isolated areas and critical locations. Consider a video surveillance system when there is no conflict with privacy, thereby allowing for two-way visual communications.

Alarm output levels should exceed ambient sound levels. Noise and reverberation levels should be reduced to enhance communications and to accommodate specific activities.

Visual characters, tactile characters and Braille recommendations enhance our legal requirements. Starting in 2016, the Unified English Braille (UEB) code has been adopted Internationally to enhance transcription, reduce confusion, and address computer usage. Extensive use of pictograms is recommended to reduce reliance on text and for simplicity. They should consist of common symbols and easily recognized images. The International Symbol of Accessibility has not been changed, but the active symbol that is included in this chapter has been adopted by some jurisdictions (i.e. New York State) to convey an active lifestyle. Pictograms are supplemented with simple text, and when within reach ranges, with Braille. Images can be grouped to identify multiple features. A series can be used to convey a sequential message, similar to a cartoon strip. When not necessary, reliance on multiple languages should be reduced at international venues (e.g. airports and stadiums).

A wide range of communications applications are addressed with remote infrared audible sign systems, telephones, computers, cellular phones, assistive listening systems (e.g. induction loop, infra-red and FM), and other two-way communication systems (e.g. monitors for hand signing for people with hearing disabilities). American Sign Language (ASL), automatic signing, Communicated Real Time Access (CART) and 711 Relay Service is included. An induction loop, the preferred assistive listening system, should be supplemented with CART and ASL.

Information transaction machines (ITMs), including bank ATMs, should be multisensory, provide internet access, accommodate a range of statures and be as easy and simple to use as possible. ATMs should allow multiple types of monetary transactions.

Truncated dome detectable warning and raised strip (corduroy) hazard warning surfaces are defined. Surface treatments may include enhancements, complying with Section 302.6 Sensory Characteristics. Two-way visual communication systems allow visual interpreting for signing and lip reading. Other types of systems, such as an information/navigation reference point system, is recommended for people with visual disabilities. It utilizes a hand-held activator with automatic vibration that can trigger recorded information form base units, providing proximity and directionality. Another system is LinkNYC,

an information/emergency terminal that uses the existing public pay phone infrastructure, allowing direct access to 311, 911, commercial, and emergency information with bidirectional voice and data communication. Virtual keyboards are provided. Robust voice command software could allow full verbal operation in multiple languages. Up to 10,000 “links” will provide citywide gigabit Wi-Fi. The proposed signage system is multisensory and includes a wide range of installations such as those for freestanding, wall, ceiling and floor locations. It should be modular for ease of modification and maintenance. Using graphics, rather than text, reduces confusion and makes information transfer more international in nature with less dependence on the use of multiple languages. Content should be concise and properly illuminated.

Public information display items include: wall-mounted, freestanding, kiosks, help desks, ceiling and floor installations. Multisensory kiosks should be inviting and easy to use, provide content in visual, auditory and tactile formats, and be augmented with raised-line maps and diagrams. They combine wayfinding, general information, 911 emergency, 311 information and other features in multiple and redundant ways to address a variety of sensory and cognitive skills. Various sensor technologies are identified, such as capacitive touch, pressure sensitivity and infrared optics.

Directory components are broken down into non-electronic and electronic types. Main/primary directories, floor directories and suite directories are defined.

The example room numbering system is based on simple logic. It should be clear and concise with compass orientation, visual, tactile and auditory characteristics. Consider the use of an electronic wayfinding system to help locate rooms, suites, or other specific spaces, using the information/navigation reference point system.

Emergency systems are also divided into non-electronic and electronic types. A variety of installation locations are provided, especially floor locations for use during a smoke condition. They should provide critical information and direct occupants to the safest, least circuitous routes to exits. Multisensory information increases effectiveness during adverse and dangerous conditions. Emergency evacuation plan information comprises handouts, drill schedules, maps and directories. A voluntary confidential registry is recommended for identification, location and for occupant verification during an emergency.

Wayfinding should be an intentional, well thought-out, overlapping multisensory navigation system that utilizes the resources of the entire environment. It may be dynamic, passive, dramatic or subtle, functioning on a conscious and subconscious level. Composition of the overall system will determine its effectiveness, especially for first-time visitors. Wayfinding also includes: smart phone/PDA/GPS wayfinding, cell phone audible wayfinding, recorded tours, information/navigation/alert reference point system, information/emergency terminals, multisensory information/emergency kiosks, and multisensory pedestrian sign as. Variable message sign (VMS) criteria is expanded. Multisensory mobile navigation is provided. “Tactile City,” produced by Cooper Union architecture students, contains navigation strategies for people with sight disabilities.

701 General

701.1 Scope. The provisions of Chapter 7 should apply where recommended by the scoping provisions adopted by the administrative authority.

702 Alarms

702.1 General. Accessible audible and visual alarms and notification appliances should comply with Section 702 and should be installed in accordance with *NFPA 72* listed in Section 105.2.2, should be powered by a commercial light and power source, connected to the electrical system, and should be permanently installed. Alarms should be multisensory complying with Section 309.9.

702.2 Emergency Assistance Alarms. Emergency assistance alarms should comply with Section 702.

702.2 Advisory. This section explores the concept of the help button. It may include two-way communication. Versions of this notification system are currently used in facilities such as hospitals, nursing homes, and senior housing. A comparable type of system is the 'blue light" emergency call system, which is common on college campuses. Another version is currently used by the MTA in subway stations. It is recommended to use a blue light indicator for all public area installations to help locate the button. This is especially useful for exterior applications.

702.2.1 Help Button. A round help button with the operable portion of the button, 2 inches (50 mm) minimum in diameter with the word "HELP" in tactile character 5/8 inches (16 mm) in height in accordance with Section 703.3 directly below the button with Braille in accordance with Section 703.4. Buttons may be a variety of shapes and sizes including a pull-cord type (e.g., for use in hospitals), flush, recessed, or protruding. Button should illuminate, beep or provide verbal indication and vibrate when actuated to confirm activation. Refer to Section 309.6, 309.7 and 309.8. Help buttons should be tied into a central alarm and communication system where possible. Buttons should be waterproof and vandal proof with unexposed wiring.

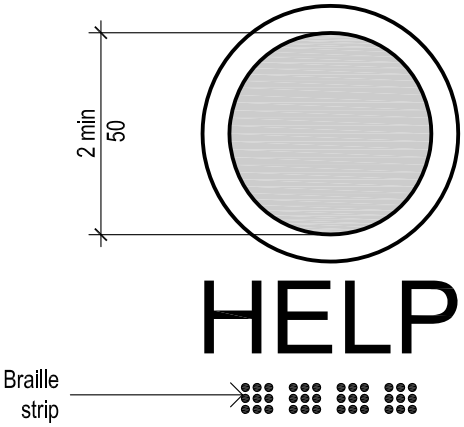


Fig. 702.2.1
Help Button Example

702.2.2 Help Button with Two-Way Communication Device. In some locations it is suggested that in addition to the help button a two-way communication system should also be installed in accordance with Section 708.

702.2.3 Help Button Locations. Help button locations consist of an upper and lower position, identified throughout the guide and should be provided but not limited to the following locations: inclusive toilet compartments, showers, ambulatory compartments, children's toilet compartments, unisex toilets, saunas and steam compartments, elevators, platform lifts, stairways, dwelling units, (bathrooms, entry door, bedrooms and other locations as per the occupants requirements), kiosks, assembly areas, transportation facilities, and dispersed throughout all institutional classification buildings. Distribution should be throughout exterior sites at all points of reference including: entrance, secluded locations, ramps, stairs, rest areas, any directories and included in other types of signage such as kiosks and anywhere that is isolated and/or poses a physical hazard a security risk, or required to provide assistance.

702.2.3 Advisory. The lower button location is for someone who cannot raise themselves off the floor, such as from a fall or medical emergency. The height takes into account a very low reach range in a prone position for a person with very limited dexterity. This may be the only way of summoning help for someone in a life threatening situation. The height also takes into account conflicts with water, and electric outlet locations.

702.2.4 Upper Button Location. The upper button location should be centered 48 inches (1220 mm) maximum above the floor and within reach ranges complying with Section 308 or as recommended for a specific application.

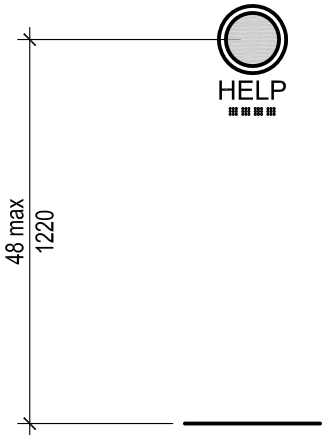


Fig. 702.2.4
Upper Button Location

702.2.4 Advisory. In some instances the upper button is recommended at a specific height, such as in the accessible toilet compartments to avoid conflicts with other component (see 603.5.1).

702.2.5 Lower Button Location. The lower button location should be centered 18.6 -19.5 inches (472-495 mm) above the finished floor complying with Sections 308.2.1 and 308.3.1.

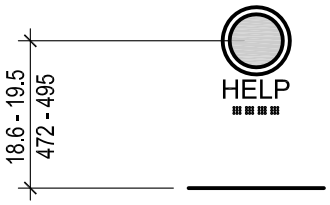


Fig. 702.2.5
Lower Button Location

702.2.5 Advisory. The lower button may also utilize a pull cord activation mechanism. This is appropriate for institutional facilities such as a hospital or nursing home. The pull cord may be the easiest means of activation for someone that is seriously injured and disoriented. See also 702.2.3 Advisory.

702.2.6 Children's Button Locations. The upper and lower locations should be placed within reach ranges complying with Section 308.4 or as recommended for a specific application in the *IDG*.

702.2.7 Help Alarm Notification Device Location. In addition to connection to a central alarm system where viable, a separate help alarm notification device should be provided in accordance with *NFPA 72* that is both visual and auditory and should be provided immediately outside of the following locations: toilet and bathing rooms, dwelling unit, designated classrooms or other institutional rooms, and other rooms or areas that pose a physical hazard, a potential isolation, or security risk.

703 Signs

703.1 General. Signs should comply with Sections 703, 709, 710, 711, 712, 713, and 714. Tactile signs should contain both raised characters and Braille.

703.1.1 Designations. Interior and exterior signs identifying permanent rooms and spaces should comply with Sections 703.1, 703.2, and 703.3.

703.1.2 Directional and Informational Signs. Signs that provide direction to or information about interior spaces and facilities of the site should comply with 703.2.

703.1.3 Pictograms. Where pictograms are provided as designations of permanent interior rooms and spaces, the pictograms should comply with Section 703.5, 703.6 and should have text descriptors located directly below the pictogram field complying with Sections 703.2 and 703.3.

703.2 Visual Characters.

703.2.1 General. Visual characters should comply with Section 703.2.

EXCEPTION: Visual characters complying with Section 703.3 should not be required to comply with Section 703.2.

703.2.2 Case. Characters should be a mixture of uppercase and lowercase.

703.2.2 Advisory. Avoid the use of all upper case letters to increase legibility.

703.2.3 Style. Characters should be conventional in form. Characters should not be italic, oblique, script, highly decorative, or of other unusual forms.

703.2.4 Visual Character Height. The upper case letter "I" should be used to determine the allowable height of all characters of a font. The uppercase letter "I" of the font should have a minimum height complying with Table 703.2.4. Viewing distance should be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign.

703.2.5 Character Width. The uppercase letter "O" should be used to determine the allowable width of all characters of a font. The width of the uppercase "O" of the font should be 55 percent minimum and 110 percent maximum of the height of the uppercase "I" of the font.

703.2.6 Stroke Width. The uppercase letter "I" should be used to determine the allowable stoke width of all characters of a font. The stroke width should be 10 percent minimum and 30 percent maximum of the height of the uppercase "I" of the font.

Height above Floor to Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	Less than 6 feet (1830 mm)	5/8 inch (16 mm)
	6 feet (1830 mm) and greater	5/8 inch (16 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 6 feet (1830 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	Less than 15 feet (4570 mm)	2 inches (51 mm)
	15 feet (4570 mm) and greater	2 inches (51 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 15 feet (4570 mm)
Greater than 120 inches (3050 mm)	Less than 21 feet (6400 mm)	3 inches (75 mm)
	21 feet (6400 mm) and greater	3 inches (76 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

Table 703.2.4
Character Height

703.2.7 Character Spacing. Spacing should be measured between the two closest points of adjacent characters within a message, excluding word spaces. Spacing between individual characters should be 10 percent minimum and 35 percent maximum of the character height.

703.2.8 Line Spacing. Spacing between the baselines of separate lines of characters within a message should be 135 percent minimum to 170 percent maximum of the character height.

703.2.9 Height Above Floor. Visual characters should be 40 inches (1015 mm) minimum above the floor of the viewing position, measured to the baseline of the character. Heights should comply with Table 703.2.4, based on the size of the characters on the sign. Consider also eye levels complying with Section 310.

EXCEPTION: Visual characters indicating elevator car controls should not be required to comply with Section 703.2.9.

703.2.9 Advisory. Refer to Section 407 and Section 408 for signage requirements for elevators and LULA's.

703.2.9.1 Floor Surface. Provide floor surface signage in addition to typical wall mounted signage where appropriate. Integrate signage into the surface material (e.g. street names in sidewalk concrete) or apply to floor surface complying with Section 302 and in some instances Section 303. Floor surface signage locations are provided throughout the guide but not limited to the following locations: fire stairs, entry doors, toilet and bathing facilities, critical reference points, transportation facilities (various locations), assembly areas and seating locations, swimming pool along the perimeter, throughout medical facilities, exterior routes, and other locations that would benefit by the installation of floor signage in additional to the standard wall mounted location.

703.2.9.2 Supplemental Emergency Floor Surface Signage. Provide floor surface emergency egress signage complying with Section 713. This includes directional signage to exterior discharge or nearest area of rescue. Signage should include the word "EXIT" and directional arrows for the most direct exit route. All emergency signage should be photo luminescent complying with Section 703.2.11.

703.2.9.3 Integrated Signage. Some signage may be integrated with components. This includes but is not limited to the following: top surfaces of parapet walls, handrails, door panic hardware, windows, plumbing fixtures, appliance control panels, alarms, automatic teller machines, sales and service counters, etc. Integrated signage should be both visual and tactile, including Braille and should comply with Section 703.

703.2.10 Finish and Contrast. Characters and their background should have a non-glare finish. Characters should contrast with their background, with either light characters on a dark background, or dark characters on a light background complying with Section 302.10 and 302.11.

703.2.10 Advisory. The highest possible contrast should be used. White or yellow on a black background are easier to read for a greater range of users than dark letters on a light background. The contrast of colors is more important then the colors themselves since some people have difficulty distinguishing color and will have to rely on the contrast. Avoid using colors of similar lightness adjacent to one another, exaggerate lightness difference between foreground and background colors. Refer to the Lighthouse International, *Effective Color Contrast, Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, Ph.D.

703.2.11 Photo Luminescent. In addition to complying with all applicable code requirements, all emergency exit path signage at both wall and floor locations and all directional arrows or other graphic guidance should be comprised of photo luminescent materials. They should be washable, non-toxic, non-radioactive, and if subjected to fire must be self-extinguishing when flame is removed.

703.3 Tactile Characters.

703.3.1 General. Tactile characters should comply with Section 703.3, and should be duplicated in Braille complying with Section 703.4.

703.3.2 Depth. Tactile characters should be raised 1/32 inch (0.8 mm) minimum above their background.

703.3.3 Case. Characters should be uppercase.

703.3.4 Style. Characters should be sans serif. Characters should not be italic, oblique, script, highly decorative, or other unusual forms.

703.3.5 Character Height. The uppercase letter "I" should be used to determine the allowable height of all the characters of a font. The height of the upper case letter "I" of the font, measured vertically from the baseline of the character, should be 5/8 inch (16 mm) minimum, and 2 inches (50 mm) maximum.

EXCEPTION: Where separate tactile and visual characters with the same information are provided, the height of the tactile uppercase letter "I" should be permitted to be 1/2 inch (13 mm) minimum.

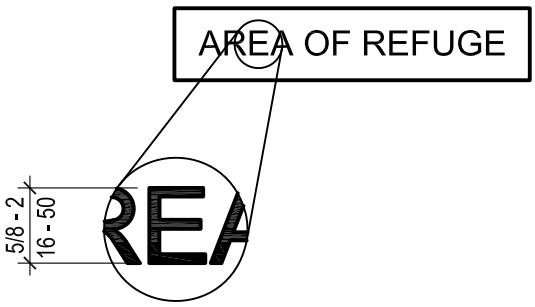


Fig. 703.3.5
Character Height

703.3.6 Character Width. The uppercase letter "O" should be used to determine the allowable width of all characters of a font. The width of the upper case "O" of the font should be 55 percent minimum and 110 percent maximum of the height of the uppercase "I" of the font.

703.3.7 Stroke Width. Tactile character stroke width should comply with Section 703.3.7. The uppercase letter "I" of the font should be used to determine the allowable stroke width of all characters of the font.

703.3.7 Advisory. The stroke width as written allows a wider stroke at the bottom that tapers toward the top.

703.3.7.1 Maximum. The stroke width should be 15 percent maximum of the height of the uppercase letter "I" measured at the top surface of the character, and 30 percent maximum of the uppercase letter "I" measured at the base of the character.

703.3.7.2 Minimum. When characters are both visual and tactile, the stroke width should be 10 percent minimum of the height of the upper case letter "I".

703.3.8 Character Spacing. Character spacing should be measured between the two closest points of adjacent tactile characters within a message, excluding word spaces. Spacing between individual tactile characters should be 1/8 inch (3.2 mm) minimum measured at the top surface of the characters, 1/16 inch (1.6 mm) minimum measured at the base of the characters, and four times the tactile character stroke width maximum. Characters should be separated from raised borders and decorative elements 3/8 inch (9.5 mm) minimum.

703.3.9 Line Spacing. Spacing between the baselines of separate lines of tactile characters within a message should be 135 percent minimum and 170 percent maximum of the tactile character height.

703.3.10 Height above Floor. Height above floor should comply with Section 703.3.10.

703.3.10 Advisory. Refer to Section 407 and Section 408 for signage requirements for elevators and LULA's.

703.3.10.1 Adult Standing Position. Tactile characters should be 48 inches (1220 mm) minimum above the floor, measured to the baseline of the lowest tactile character and 60 inches (1525 mm) maximum above the floor, measured to the baseline of the highest tactile character.

EXCEPTION: Tactile characters for elevator car controls should not be required to comply with Section 703.3.10.

703.3.10.2 Adult Seated Position. Tactile characters should be 36 inches (915 mm) minimum above the floor, measured to the baseline of the lowest tactile character and 44 inches (1020 mm) maximum above the floor, measured to the baseline of the highest tactile character.

703.3.10.3 Children Position Ages 6 - 12. Tactile characters for children should comply with Section 703.3.10.2.

703.3.10.3.1 People of Short Stature. Tactile characters for people of short stature should comply with Section 703.3.10.2.

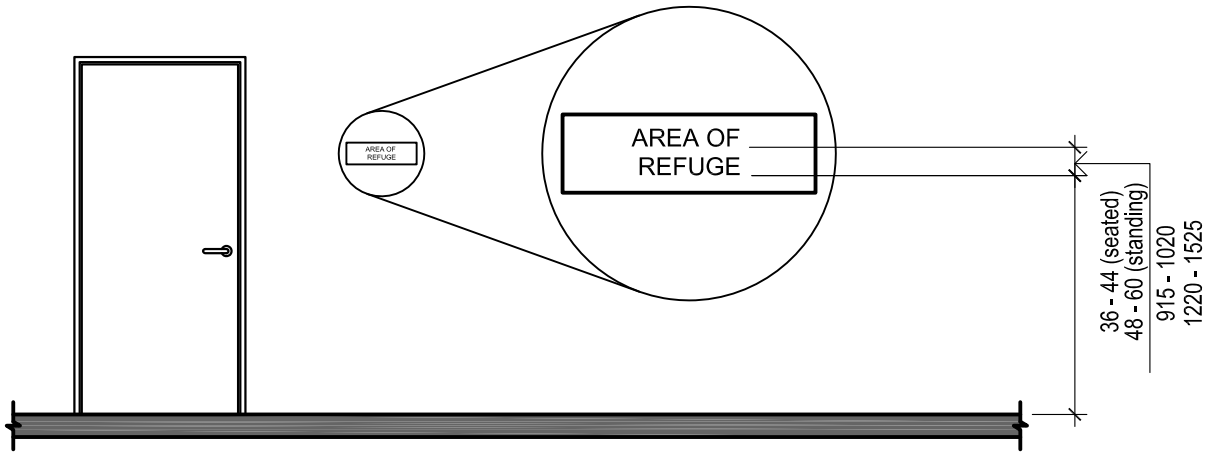


Fig. 703.3.10
Height of Tactile Characters above Floor or Ground

703.3.10.4 Floor Surface. Provide floor surface tactile signage in addition to typical wall mounted signage where appropriate. Integrate signage into the surface material (e.g. street names in sidewalk concrete) or apply to floor surface complying with Section 302 and Section 303. Floor surface tactile signage locations are provided throughout the guide but not limited to the following locations: fire stairs, entry doors, toilet and bathing facilities, critical reference points, transportation facilities (various locations), assembly areas and seating locations, swimming pool both along the perimeter and underwater identifying ladder and stair locations, throughout medical facilities, exterior routes, saunas and steam rooms and other locations that would benefit by the installation of floor signage in additional to the standard wall mounted location.

703.3.10.5 Supplemental Emergency Floor Surface Signage. Provide in addition to standard emergency exit signage floor tactile surface emergency egress signage from each floor to exterior discharge or nearest area of refuge. Signage should include the word " EXIT" and directional arrows for the most direct exit route. All emergency signage should be photo luminescent complying with Section 703.2.11.

703.3.10.6 Supplemental Tactile Signage Locations. In addition to tactile signage locations on walls and floors, tactile signage integrated into components is equally important. Component integration includes but is not limited to the following: top surfaces of parapet walls, handrails, door panic hardware, windows, plumbing fixtures, appliance control panels, alarms, automatic teller machines, sales and service counters, etc. Integrated signage should be both visual and tactile, including Braille, and should comply with Section 703.

703.3.11 Door Location. Where a tactile sign is provided at a door, the sign should be alongside the door at the latch side. Signs containing tactile characters should be located so that a clear floor area 30 inches (765 mm) minimum by 30 inches (765 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Where a tactile sign is provided at double doors with one active leaf, the sign should be located on the inactive leaf side. Where a tactile sign is provided at double doors with two active leaves, signage should be located on wall adjacent to each door. Where there is no wall space on the latch side of a single door, or to the right side of double doors, signs should be on the nearest adjacent wall.

EXCEPTION: Signs with tactile characters should be permitted on the push side of doors with closers and without hold-open devices.

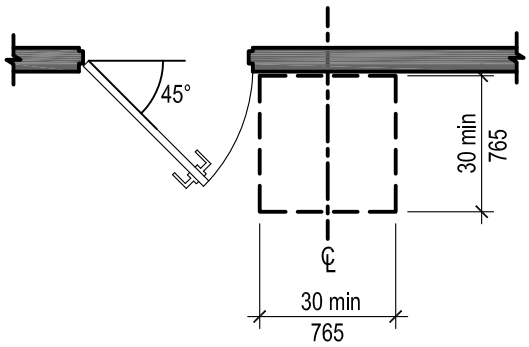


Fig. 703.3.11
Location of Tactile Signage at Doors

703.3.11 Advisory. The 30" x 30" clear floor space is provided for a standing person to feel the tactile sign. It is based on a person that may be using a cane, walker or other mobility device and for people that have a large stature. This clear floor space is already accommodated based on maneuvering clearance at doors, Section 404.2.3 while providing sufficient clearance for a seated person to touch the tactile signage.

703.3.12 Finish and Contrast. Characters and their background should have a non-glare finish. Characters should contrast with their background with either light characters on a dark background, or dark characters on a light background complying with Section 302.10 and Section 302.11.

703.3.12 Advisory. The highest possible contrast should be used. White or yellow on a black background are easier to read for a greater range of users than dark letters on a light background. The contrast of colors is more important then the colors themselves since some people have difficulty distinguishing color and will have to rely on the contrast. Avoid using colors of similar lightness adjacent to one another, exaggerate lightness difference between foreground and background colors. Refer to the Lighthouse International, *Effective Color Contrast, Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, PhD.

703.3.13 Photo Luminescent. In addition to complying with all applicable code requirements, all emergency exit path signage at both wall and floor locations and all directional arrows or other graphic guidance should be comprised of photo luminescent materials. They should be washable, non-toxic, non-radioactive, and if subjected to fire must be self-extinguishing when flame is removed. Comply with Section 713.

703.4 Braille

703.4.1 General. Braille should be contracted (Grade 2) Braille and should comply with Section 703.4. Starting in 2016 the existing literary Braille Code was changed to what is known as Unified English Braille (UEB).

703.4.1 Advisory. Louis Braille, created the system in 1821. Grade 1 Braille is a one-to-one letter conversion. Grade 2 is the commonly used version that can use a “contracted” form of a word. Due to technological advances in the last century, print has evolved in the way that it’s used. The use of mathematical and computer symbols is increasing in our everyday written language. For instance, email or website addresses are commonly used in letters, books and articles. Starting 2016, the Literary Braille Code will be changing to what is known as Unified English Braille (UEB). These changes are being adopted for the following reasons:

1. To enhance transcription between Braille and print. There are many discrepancies in the transcription process because the rules of print and Braille are not the same.

2. Eliminate confusion when capitalizing letters within words. Some Braille contractions are eliminated in order to have consistency when capitalizing letters within a word.

3. Currently, one has to switch between literary Braille and computer Braille to write an email or website address. This includes extra notations that take up space as well as requiring familiarity with the rules of the different codes. UEB will allow users to write email and website addresses without having to switch codes.

The changes mainly affect common Braille contractions and punctuations. Starting 2016, it is important to use UEB when creating Braille signage, menus, flyers, books and other commonlu used printed items. The Braille Authority of North America (BANA) and the International Council on English Braille (ICEB) have information and guides regarding the changes on their websites:
BANA UEB Changes: www.brailleauthority.org
ICEB: http://www.iceb.org/ueb

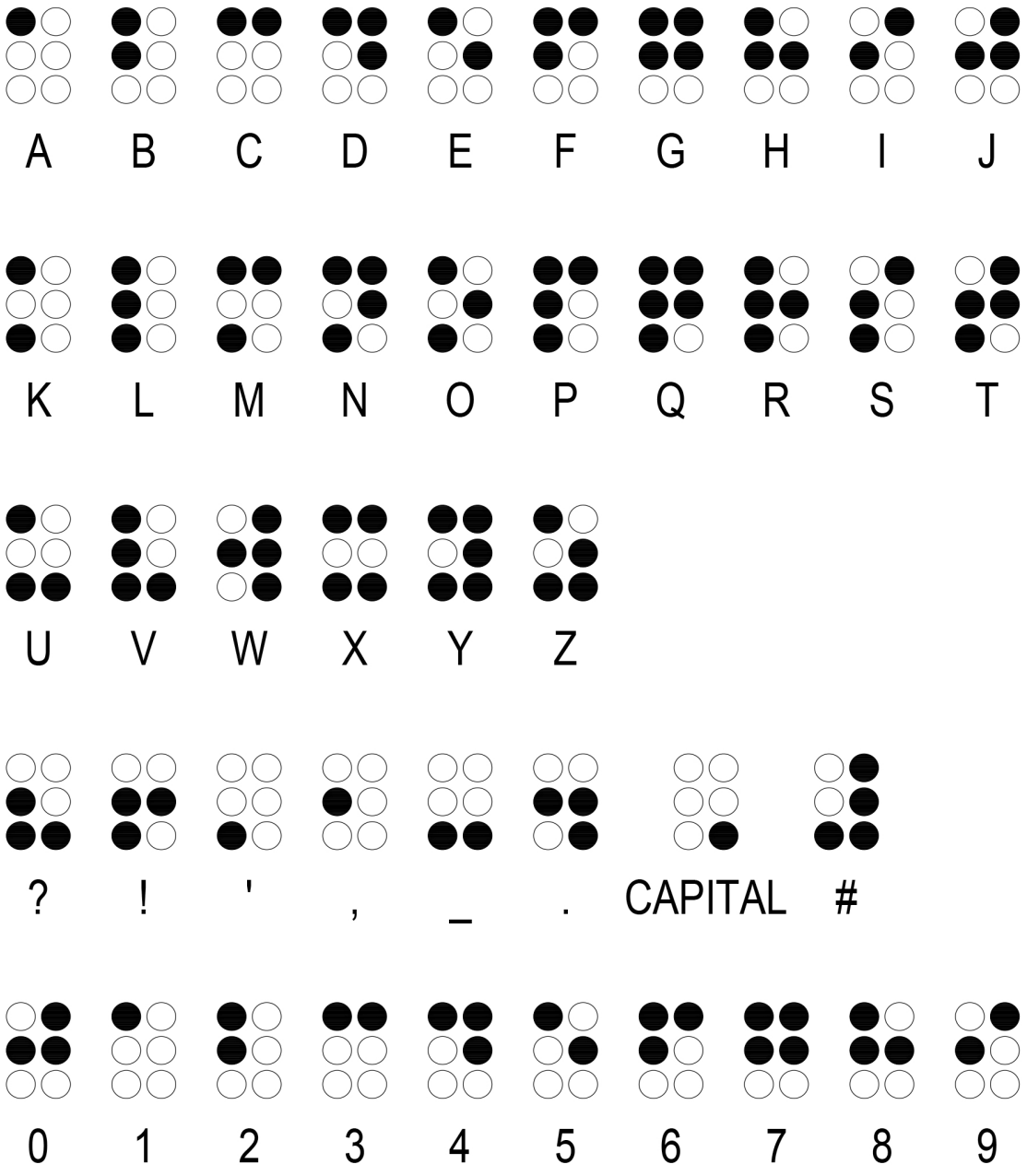


Fig. 703.4.1
Braille Alphabet

703.4.2 Uppercase Letters. The indication of an uppercase letter or letters should only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, or acronyms.

703.4.3 Dimensions. Braille dots should have a domed or rounded shape and comply with Table 703. Cell height should be 1/4 - 9/32 (6.1 - 6.8). See figure 703.4.3 (b).

703.4.4 Position. Braille should be below the corresponding text. If text is multilined, Braille should be placed below entire text. Braille should be separated 3/8 inch (9.5 mm) minimum from any other tactile characters and 3/8 inch (9.5 mm) minimum from raised borders and decorative elements. Braille provided on elevator car controls should be separated 3/16 inch (4.8 mm) minimum either directly below or adjacent to the corresponding raised characters or symbols.

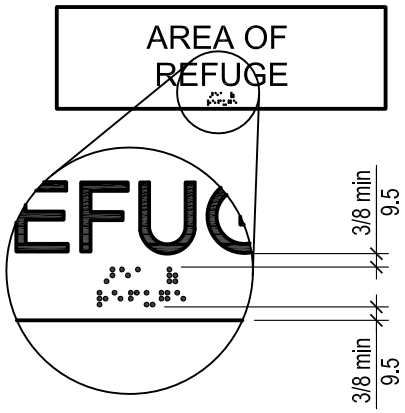
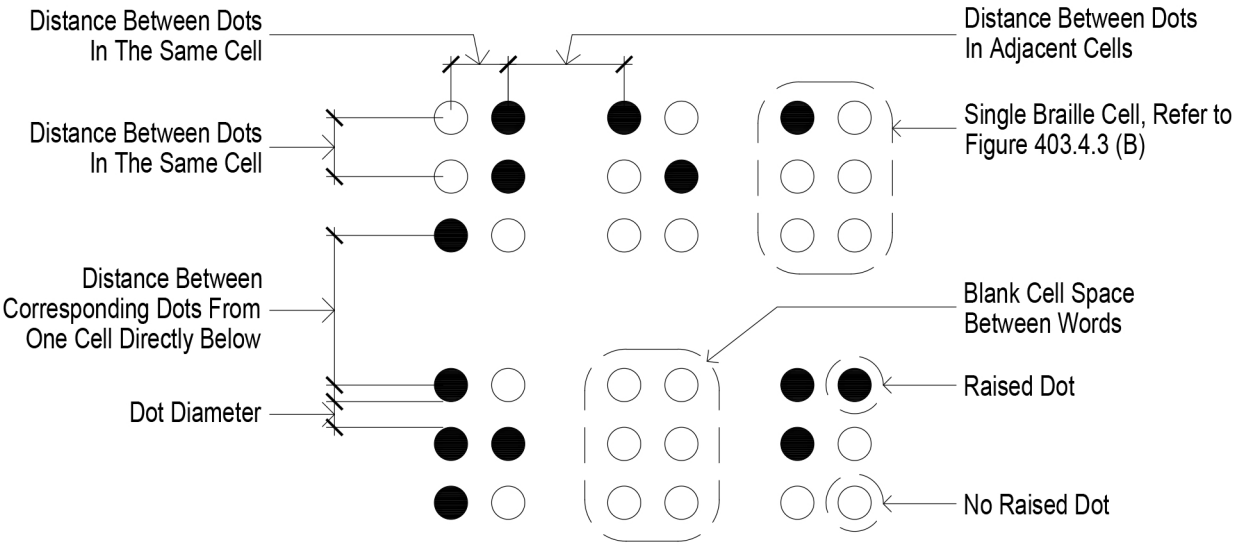
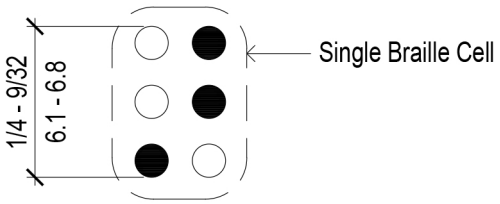


Fig. 703.4.4
Position of Braille



(a)
Spacing



(b)
Cell Height

Fig. 703.4.3
Dimensions

Measurement range	Minimum in inches / Maximum in inches
Dot base diameter	0.059 (1.5 mm) to 0.063 (1.6 mm)
Distance between two dots in the same cell	0.090 (2.3 mm) to 0.100 (2.5 mm)
Distance between corresponding dots in adjacent cells [1]	0.241 (6.1 mm) to 0.300 (7.6 mm)
Dot height	0.025 (0.6 mm) to 0.037 (0.9 mm)
Distance between corresponding dots from one cell directly below [1]	0.395 (10.0 mm) to 0.400 (10.2 mm)

Measured Center to Center [1]

Table 703.4.3
Braille Dimensions

703.4.5 Mounting Heights. Mounting heights should comply with Section 703.4.5.

703.4.5.1 Adult Standing Position. Mounting height for Braille for adult standing position should be 48 inches (1220 mm) minimum above the floor and 60 inches (1525 mm) maximum above the floor, measured to the baseline of the Braille cells.

EXCEPTION: Elevator car controls should not be required to comply with Section 703.4.5.

703.4.5.2 Adult Seated Position. Mounting height for Braille for adult seated position should be 36 inches (915 mm) minimum above the floor and 44 inches (1120 mm) maximum above the floor, measured to the baseline of the Braille cells.

703.4.5.3 Children's Position Ages 6-12. Mounting height of Braille for children should comply with Section 703.4.5.2.

703.4.5.3.1 People of Short Stature. Mounting height of Braille for people of short stature should comply with Section 703.4.5.3.

703.4.5.4 Supplemental Emergency Floor Surface Braille. Provide in addition to standard emergency exit signage, consider supplemental lower wall and floor surface emergency egress signage from each floor to exterior discharge. Signage should include the word " EXIT" in Braille and directional arrows for the most direct exit route. All emergency signage should contain Braille. Lower wall Braille should be located a maximum of 12 inches (305 mm) above floor and may be integrated with base molding.

703.4.5.5 Stair Handrail. Location identification should be provided on the top surface of the handrail extension in Braille complying with Section 505.10.4. Handrails located in close proximity to an exit door discharging to the outside or to the level of exit discharge should be provided with three warning rings followed by Braille stating "EXIT," with directions to the exit, such as: "straight ahead", "behind"; "turn left", "turn right," with a directional arrow.

703.4.5.6 Other Railings. Other railing including handrails along corridors, elevators, and at the top of walls or fencing that provides a gripping surface should contain information in Braille on the upper face of the gripping surface in addition to other signage the may be provided.

Fig. 703.4.5.8
Braille Sentence Example
(Not To Scale)

703.4.5.7 Other Braille locations. In addition to signage locations on walls and floors, signage integrated into components is equally important. Component integration includes but is not limited to: top surfaces of parapet walls, door panic hardware, windows, plumbing fixtures, appliance control panels, alarms, automatic teller machines, sales and service counters, etc.

703.4.5.8 Example. The figure contains a sample Braille sentence. Use the Braille alphabet from Figure 703.4.1 to translate the Braille visually. Then try to imagine reading the line using only your fingertips and sense of touch. It reads: “lesson 1 completed.”

703.5 Pictograms

703.5.1 General. Pictograms should comply with Section 703.5.

703.5.2 Pictogram Field. Pictograms should have a field 6 inches (150 mm) minimum in height. Characters or Braille should not be located in the pictogram field.

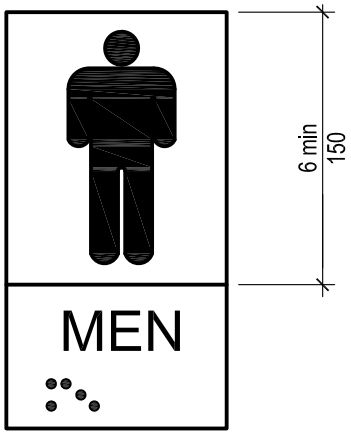


Fig. 703.5.2
Pictogram Field

703.5.3 Finish and Contrast. Pictograms and their fields should have a non-glare finish. Pictograms should contrast with their fields, with either a light pictogram on a dark field or a dark pictogram on a light field and should comply with Section 302.10 and Section 302.11.

703.5.3 Advisory. The highest possible contrast should be used. White or yellow on a black background are easier to read for a greater range of users than dark on a light background. The contrast of colors is more important then the colors themselves since some people have difficulty distinguishing color and will have to rely on the contrast. Avoid using colors of similar lightness adjacent to one another. Exaggerate lightness difference between foreground and background colors. Refer to the Lighthouse International’s *Effective Color Contrast, Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, PhD.

703.5.4 Text Descriptors. Provide text descriptors for pictograms located directly below the pictogram field. Text descriptors should comply with Sections 703.3, and 703.4.

Fig. 703.5.5
Pictogram Examples

703.5.5 Locations. Pictograms should be located throughout a facility. Pictograms should use common symbols and easily recognized images. Pictograms should be supplemented with simple text. In addition to symbols of accessibility, they should be used for routes, doors and doorways, ramps, curb ramps, elevators, parking spaces, parking lot routes, shelters, loading zones, stairways, drinking fountains, toilet and bathing rooms, washing machines and clothes dryers, saunas and steam rooms, alarms, telephones, assistive listening systems, ITM's, rooms types, assembly areas, dressing fitting and locker rooms, kitchens and kitchenettes, transportation facilities, courtrooms, waiting areas, service areas, dining areas, offices, meeting rooms, sales and service counters, storage, trash and recycling, etc.

703.5.6 Pictogram Sequence. Consider a pictogram sequence that graphically conveys steps in pictogram form in lieu of text instructions.

703.6 Symbols of Accessibility

703.6.1 General. Symbols of accessibility should comply with Section 703.6.

703.6.2 Finish and Contrast. Symbols of accessibility and their backgrounds should have a non-glare finish. Symbols of accessibility should contrast with their backgrounds, with either a light symbol on a dark background or a dark symbol on a light background and should comply with Section 302.10 and Section 302.11.

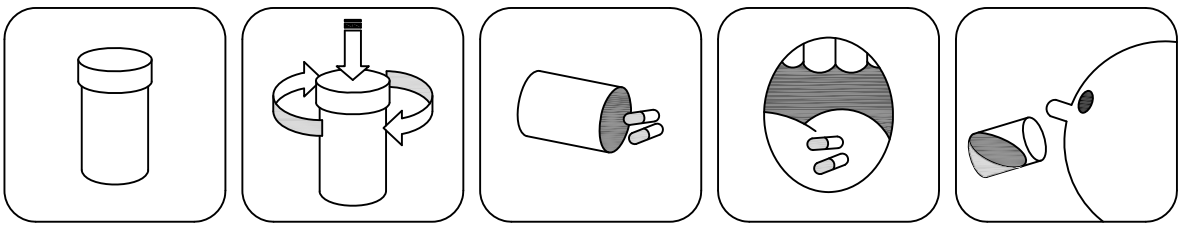


Fig. 703.5.6
Pictogram Sequence Example
(*Taking Medication*)

703.6.2 Advisory. The highest possible contrast should be used. White or yellow on a black background are easier to read for a greater range of users than dark on a light background. The contrast of colors is more important then the colors themselves since some people have difficulty distinguishing color and will have to rely on the contrast. Avoid using colors of similar lightness adjacent to one another. Exaggerate lightness difference between foreground and background colors. Refer to the Lighthouse International's *Effective Color Contrast, Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, PhD.

703.6.3 Symbols.

703.6.3.1 Active Symbol of Accessibility. The International Symbol of Accessibility should comply with Figure 703.6.3.1.

Fig. 703.6.3.1
Active Symbol of Accessibility

703.6.3.1 Advisory. The wheelchair symbol should only be used to indicate access for individuals with limited mobility including people who use wheelchairs. Codes require the installation of this symbol. The original stick figure is unofficially (as of the date of this publication) being replaced with the new refined symbol under the Accessible Icon Project. The new figure conveys motion and active life style indicative of Active Design. It helps to change the general mindset that people with a disability live a sedentary lifestyle. See the Accessible Icon Project www.accessibleicon.org.

703.6.3.2 International Symbol of TTY. The International Symbol of TTY should comply with Figure 703.6.3.2.

Fig. 703.6.3.2
International TTY Symbol

703.6.3.2 Advisory. This symbol indicates a device known as a text telephone (TT), or a telecommunications device for the deaf (TDD). TTY indicates a device used with a telephone for communications with and between deaf, hard of hearing, a person with a speech disability and/or hearing persons.

703.6.3.3 Assistive Listening Systems. Assistive listening systems should be identified by the international Symbol of Access for Hearing Loss complying with Figure 703.6.3.3.

Fig. 703.6.3.3
International Symbol of Access for Hearing Loss

703.6.3.3 Advisory. This symbol indicates systems that transmit amplified sound via hearing aid, headsets or other devices. These include infrared, loop and FM systems. Portable systems may be available from audiovisual equipment suppliers that service conferences and meetings. See Section 706 and 703.6.3.8.2.

703.6.3.4 Volume-Controlled Telephones. Telephones with volume controls should be identified by a pictogram of a telephone handset with radiating sound waves on a square field complying with Figure 703.6.3.4.

Fig. 703.6.3.4
Volume-Controlled Telephone

703.6.3.4 Advisory. This symbol indicates the location of telephones that have handsets with amplified sound and/or adjustable volume controls.

703.6.3.5 Audio Description. The audio description symbol should comply with Figure 703.6.3.5.

Fig.703.6.3.5
Audio Description

703.6.3.5 Advisory. This symbol indicates a service for persons who are blind or have low vision that makes the performing arts, visual arts, television, video and film more accessible. Description of visual elements is provided by a trained Audio Describer through the Secondary Audio Program (SAP) of televisions and monitors equipped with stereo sound. An adapter is used for non-stereo TV's. For live Audio Description, a trained Audio Describer offers live commentary or narration (via headphones and a small transmitter) consisting of concise, objective descriptions of visual elements: i.e., a theater performance, a visual arts exhibition, or movie theaters.

703.6.3.6 Braille. The Braille symbol should comply with Figure 703.6.3.6.

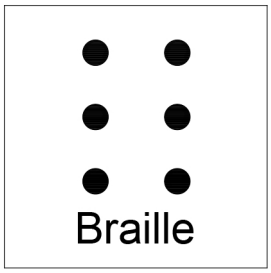


Fig. 703.6.3.6
Braille Symbol

703.6.3.6 Advisory. This symbol in addition to architectural signage indicates that printed material is available in Braille, including exhibition labeling and publications.

703.6.3.7 Closed Captioning (CC). The symbol should comply with Figure 703.6.3.7.

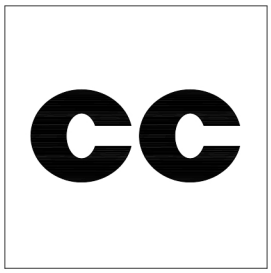


Fig. 703.6.3.7
Closed Captioning (CC)

703.6.3.7 Advisory. This symbol indicates a choice for whether or not to display captions in movie theaters, for a television program or videotape. TV sets that have built-in or separate decoder are equipped to display dialogue for program that are captioned when selected by the viewer. *The Television Decoder Circuitry Act of 1990* requires TV sets (with screens 13" or larger) to have built-in decoders as of July, 1993. Also, videos that are part of exhibitions may be closed captioned using the symbol with instruction to press a button for captioning.

703.6.3.8 Sign Language Interpretation. The symbol should comply with Figure 703.6.3.8.

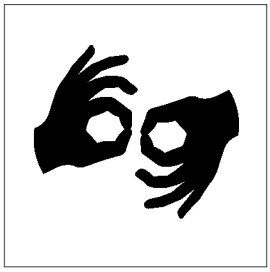


Fig. 703.6.3.8
Sign Language Interpretation

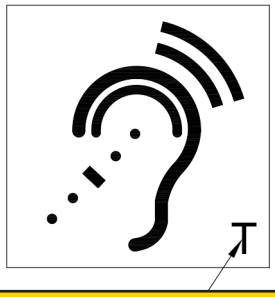
703.6.3.8 Advisory. The symbol indicates that Sign Language Interpretation is provided for a lecture, tour, film, performance, conference, other program or two-way communications.

703.6.3.8.1 Communication Access Realtime Translation (C.A.R.T.). The C.A.R.T. symbol should comply with Figure 703.6.3.15.

Fig. 703.6.3.8.1
Communication Access Realtime Translation (C.A.R.T.)

703.6.3.8.1 Advisory. C.A.R.T. is the immediate translation of the spoken word into text and projected onto a video monitor or other types of electronic displays for use by People with Hearing Disabilities. C.A.R.T. and a signer using American Sign Language (ASL) should supplement assistive listening systems (induction loops are the preferred system type).

703.6.3.8.2 T-coil and Triple Approach. The international symbol for access to hearing loss with a "T" for induction loop, Figure 703.6.3.3 is part of a triple approach for people who are hard of hearing: induction loop (or FM or Infra-red) American Sign Language and CART. See Section 706 Assistive Listening Systems. Provide all three symbols when provided for comprehensive overlapping accommodations.



703.6.3.3 Advisory. Insert a small "T" in the lower right hand corner of the image for hearing aid "T-Coil" use (Induction Loop).

Fig. 703.6.3.8
American Sign Language Alphabet

703.6.3.9 Large Print (18 pt. or Larger). The symbol should comply with Figure 703.6.3.9.

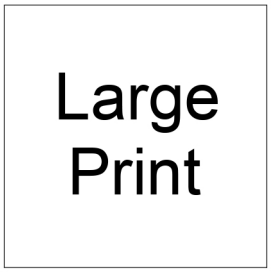


Fig. 703.6.3.9
Large Print (18 pt. or Larger)

703.6.3.9 Advisory. The symbol for large print is "Large Print" printed in 18 pt. or larger text. It indicates that large print versions of books, pamphlets, museum guides and theater programs are available. The symbol is used in other ways to indicate that print materials may be provided in large print. Sans serif or modified serif print with good contrast is important, and special attention should be paid to letter and word spacing.

703.6.3.10 Blind or Low Vision. The symbol should comply with Figure 703.6.3.10.

Fig. 703.6.3.10
Access (Other Than Print or Braille) for Individuals Who Are Blind or Have Low Vision

703.6.3.10 Advisory. This symbol may be used to indicate access for people who are blind or have low vision, including: a guided tour, a path to a nature trail or a scent garden in a park; and a tactile tour or a museum exhibition that may be touched.

703.6.3.11 Open Captioning (OC). The symbol should comply with Figure 703.6.3.11.

Fig. 703.6.3.11
Open Captioning (OC)

703.6.3.11 Advisory. This symbol indicates that captions, which translate dialogues and other sounds in print, are always displayed on videotape, movie or television program. Open Captioning is preferred by many including deaf and hard-of-hearing individuals, and people whose second language is English, In addition, it is helpful in teaching children how to read and keeping sound levels to a minimum in museums and restaurants.

703.6.3.12 Information. The symbol should comply with Figure 703.6.3.12.

Fig. 703.6.3.12
The Information Symbol

703.6.3.12 Advisory. One of the most valuable commodities of today's society is information; to anyone it is important and to a person with a disability it is essential. For example, the symbol may be used on signage or a floor plan to indicate the location of the information or security desk, where more specific information or materials concerning access accommodations and services such as "LARGE PRINT" materials, audio cassette recordings of material, or sign interpreted tours.

703.6.3.13 International Emergency Medical Services. The Star of Life symbol should comply with Fig. 703.6.3.13.

Fig. 703.6.3.13
Star of Life

703.6.3.13 Advisory. See also 407.4.1 Advisory, regarding the accommodation of a stretcher and identifying the car with the Star of Life.

703.6.3.14 Elevator Main Floor. The elevator main floor symbol should comply with Figure 703.6.3.14.

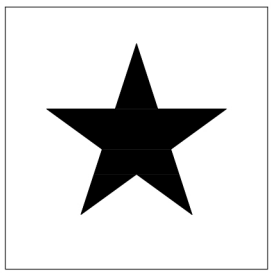


Fig. 703.6.3.14
Elevator Main Floor.

703.6.3.14 Advisory. The raised star on an elevator control panel and floor hall signal means the main entrance / exit level.

703.6.3.15 Alarm Symbol. An alarm symbol should comply with Figure 703.6.3.15.

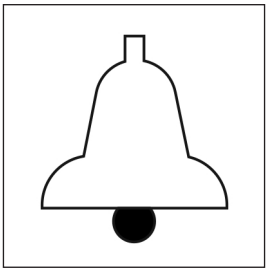


Fig. 703.6.3.15
Alarm

703.6.3.15 Advisory. The raised bell on an elevator control panel and other locations signifies and alarm.

703.7 Variable Message Signs.

703.7.1 General. High resolution variable message signs (VMS) characters should comply with Sections 703.2 and 703.7.12 through 703.14. Low resolution variable message sign (VMS) characters should comply with Section 703.7.

703.7.2 Case. Low resolution VMS characters should be uppercase.

703.7.3 Style. Low resolution VMS characters should be conventional in form, should be san serif, and should not be italic, oblique, script, highly decorative, or of unusual forms.

703.7.4 Character Height. The upper letter "I" should be used to determine the allowable height of all low resolution VMS characters of a font. Viewing distance should be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. The uppercase letter "I" of the font should have a minimum height complying with Table 703.7.4.

EXCEPTION: In assembly seating where the maximum viewing distance is 100 feet (30.5 m) or greater, the height of the uppercase "I" of low resolution VMS fonts should be permitted to be 1-inch (25 mm) for every 30 feet (9.2 m) of viewing distance, provided the character height is 8-inches (205 mm) minimum. Viewing distance should be measured as the horizontal distance between the character and where someone is expected to view the sign.

TABLE 703.7.4 Low Resolution VMS Character Height

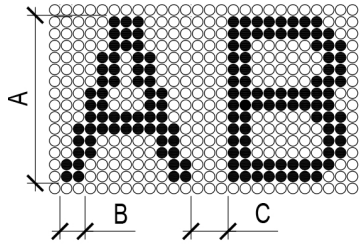
Height above Floor to Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	Less than 10 feet (3050 mm)	2 inches (51 mm)
	10 feet (3050 mm) and greater	2 inches (51 mm), plus 1/5 inch (5.1 mm) per foot (305 mm) of viewing distance above 10 feet (3050 mm).
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	Less than 15 feet (4570 mm)	3 inches (75 mm)
	15 feet (4570 mm) and greater	3 inches (75 mm), plus 1/5 inch (5.1 mm) per foot (305 mm) of viewing distance above 15 feet (4570 mm).
Greater than 120 inches (3050 mm)	Less than 20 feet (6095 mm)	4 inches (100 mm)
	20 feet (6095 mm) and greater	4 inches (100 mm), plus 1/5 inch (5.1 mm) per foot (305 mm) of viewing distance above 20 feet (6095 mm).

TABLE 703.7.5 Pixel Count for Low Resolution VMS Signage

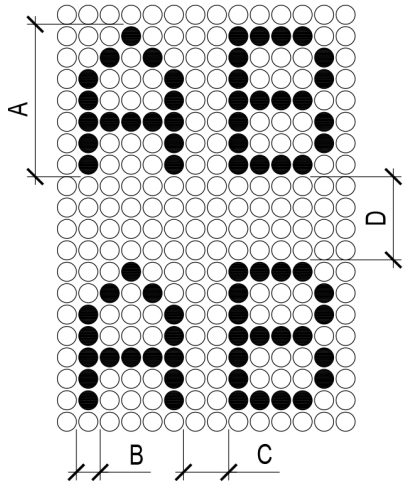
Character Height	Character Width Range	Stroke Width Range	Character Spacing Range
7	5 - 6	1	2
8	6 - 7	1 - 2	2 - 3
9	6 - 8	1 - 2	2 - 3
10	7 - 9	2	2 - 4
11	8 - 10	2	2 - 4
12	8 - 11	2	3 - 4
13	9 - 12	2 - 3	3 - 5
14	10 - 13	2 - 3	3 - 5
15	11 - 14	2 - 3	3 - 5

703.7.5 Character Width. The uppercase letter "O" should be used to determine the allowable width of all low resolution VMS characters of a font. Low resolution VMS characters should comply with the pixel count for character width in Table 703.7.5.

Example 1



Example 2



	Property	Example 1	Example 2
A	Character Height	14 Pixels	7 Pixels
B	Stroke Width	2 Pixels	1 Pixels
C	Character Spacing	3 Pixels	2 Pixels
D	Line Spacing		4 Pixels

Fig. 703.7.5
Low Resolution VMS Characters

703.7.6 Stroke Width. The uppercase letter "I" should be used to determine the allowable stroke width of all low resolution VMS characters of a font. Low resolution VMS characters should comply with the pixel count for stroke width in Table 703.7.5.

703.7.7 Character Spacing. Spacing should be measured between the two closest points of adjacent low resolution VMS characters within a message, excluding word spaces. Low resolution VMS character spacing should comply with the pixel count for character spacing in Table 703.7.5.

703.7.8 Line Spacing. Low resolution VMS characters should comply with Section 703.2.8.

703.7.9 Height Above Floor. Low resolution VMS characters should be 40 inches (1015 mm) minimum above the floor of the viewing position, measured to the baseline of the character. Heights of low resolution variable message sign characters should comply with Table 703.7.4, based on the size of the characters on the sign.

703.7.10 Finish. The background of low resolution VMS characters should have a non-glare finish.

703.7.11 Contrast. Low resolution VMS characters should be light characters on a dark background.

703.7.12 Protective Coating. Where a protective coating layer is placed over VMS characters through which the VMS characters must be viewed, the protective covering should have a non-glare finish.

703.7.13 Brightness. The brightness of the variable message signs in exterior locations should automatically adjust in response to changes in ambient light levels.

703.7.14 Rate of Change. Where a VMS message can be displayed in its entirety on a single screen, it should be displayed on a single screen and should remain motionless on the screen for a minimum of 3 seconds or a one second minimum for every 7 characters of the message including spaces whichever is longer.

703.8 Remote Infrared Audible Sign (RIAS) Systems

703.8.1 General. Remote Infrared Audible Sign Systems should comply with Section 703.7.

703.8.1 Advisory. RIAS systems comprise transmitters and receivers. Pre-recorded verbal messages are transmitted within a limited proximity to the receiver that are heard through a speaker or hearing device that is meant for to provide general, specific and directional information. See also Section 708.7 that uses an activator that vibrates and triggers messages that are transmitted through mounted base units. There are other systems such as induction loop and FM. Other technologies under research should be considered. Systems should not only address people with a wide range of hearing abilities, but should also address a wide range or visual abilities. Typically, infrared is used to limit transmission of information to line of sight for privacy.

703.8.2 Transmitters. Where provided, Remote Infrared Audible Sign Transmitters should be designed to communicate with receivers complying with Section 703.7.3.

703.8.3 Remote Infrared Audible Sign Receivers.

703.8.3.1 Frequency. Basic speech messages should be frequency modulated at 25 kHz, with a +/-2.5 kHz deviation, and should have an infrared wavelength from 850 to 950 nanometer (nm).

703.8.3.2 Optical Power Density. Receiver should produce a 12 decibel (dB) signal-plus-noise-to-noise ratio with a 1kHz modulation tone at +/-2.5 kHz deviation of the 25 kHz sub carrier at an optical power density of 26 Pico watt per square millimeter measured at the receiver photo sensor aperture.

703.8.3.3 Audio Output. The audio output from an internal speaker should be at 75 dBA minimum at 18 inches (455 mm) with a maximum distortion of 10 percent.

703.8.3.4 Reception Range. The receiver should be designed for a high dynamic range and capable of operating in full-sun background illumination.

703.8. 3.5 Multiple Signals. A receiver provided for the capture of the stronger of two signals in the receiver field of view should provide a received power ratio on the order of 20 dB for negligible interference.

703.9 Pedestrian Signals. Pedestrian signals should comply with Section 406.16. See also the *Manual on Uniform Traffic Control Devices* listed in Section 105.2.1, Section 4E.06 – Accessible Pedestrian Signals, and Section 4E.08 Accessible Pedestrian Signal Detectors.

703.9 Advisory. See Section 406.16 Sensory Pedestrian Signals (SPS) that contains suggestions that will supplement or enhance pedestrian signal applications such as alternate technologies for people with reduced hearing or sight abilities. Alternate technologies require the approval of the governmental jurisdiction. Other features include: operable parts, signal countdown, embedded LEDs, vehicle black boxes, smart vests, leading pedestrian intervals, active design, rumble strips, graphics and pedestrian billboards.

704 Telephones

704.1 General. Accessible public telephones should comply with Section 704.

704.1 Advisory. In large facilities (e.g. mercantile), provide phone assistance throughout.

704.2 Inclusive Telephones. Accessible public telephones should comply with Section 704.2.

704.2.1 Clear Floor Space. A clear floor space complying with Section 305 should be provided. The clear floor space should not be obstructed by bases, enclosures, or seats.

704.2.1.1 Parallel Approach. Where a parallel approach is provided, the distance from the edge of the telephone enclosure to the face of the telephone should be 10 inches (255 mm) maximum.

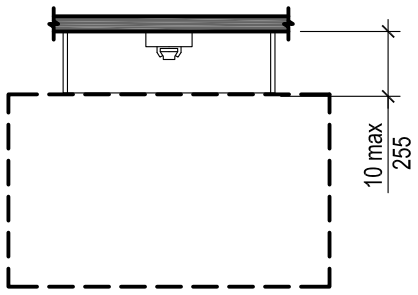


Fig. 704.2.1.1
Parallel Approach

704.2.1.2 Forward Approach. Where a forward approach is provided, the distance from the front edge of a counter within the enclosure to the face of the telephone should be 20 inches (510 mm) maximum.

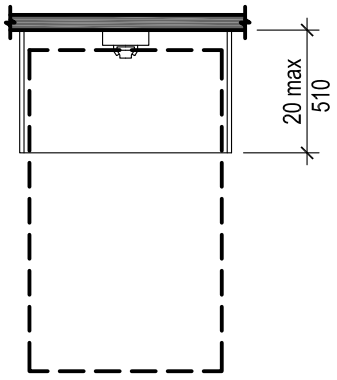


Fig. 704.2.1.2
Forward Approach

704.2.2 Operable Parts. Operable parts should comply with Section 308 and Section 309. Telephones should have push button controls.

704.2.3 Telephone Directories. Where provided, telephone directories should comply with Section 309.

704.2.4 Cord Length. The telephone handset cord should be 29 inches (735 mm) minimum in length.

704.2.5 Hearing-Aid Compatibility. Telephones should be hearing aid compatible.

704.3 Volume-Control Telephones. Public telephones required to have volume controls should be equipped with a receiver volume control that provides a gain adjustable up to 20 dB minimum. Incremental volume controls should provide at least one intermediate step of gain of 12 dB minimum. Automatic reset should be provided.

704.4 TTY. TTYs required at a public pay telephone should be permanently affixed within, or adjacent to, the telephone enclosure. Where an acoustic coupler is used, the telephone cord should be of sufficient length to allow connection of the TTY and the telephone receiver.

704.5 Height. When in use, the touch surface of TTY keypads should be 34 inches (865 mm) minimum above the floor.

EXCEPTION: Where seats are provided, TTYs should not be required to comply with Section 704.5.

704.6 TTY Shelf. Where pay telephones designed to accommodate a portable TTY are provided, they should be equipped with a shelf and an electrical outlet within or adjacent to the telephone enclosure. The telephone handset should be capable of being placed flush on the surface of the shelf. The shelf should be capable of accommodating a TTY and should have a vertical clearance 6 inches (150 mm) minimum in height above the TTY is placement.

704.7 Protruding Objects. Telephones, enclosures, and related equipment should comply with Section 307.

704.8. Locations. Telephones should be placed in consistent locations from floor to floor with other amenities. They should be placed in lobbies and locations off the primary route that provide isolation from general pedestrian traffic.

704.8 Advisory. Cell phones and PDA's are rapidly replacing fixed telephone installations. This includes emergency information terminals complying with Section 708.8. Video phones are used as a tool for closed /open captioning, audio descriptions and sign language interpretation. See section Section 714.10 and 714.11 regarding cellphones. Technological advancements, integration of software and hardware will soon lead to a inclusive communication system that is customized for each user's needs and preferences making fixed phone installations obsolete.

704.9 Privacy. Provide privacy to carry on a normal conversation without distracting others perhaps through the use of sound absorbing partitions, alcove or other sound isolated areas.

704.10 Seating. Phones designed for seated use should comply with Section 903.

704.11 Braille. Calling card and coin slot indicated in Braille complying with Section 703.4.

704.12 TTY Compatibility. Phone clusters should always include a TTY compatible phone that complies with Sections 704.4, 704.5 and 704.6.

704.13 Supplemental Telephone Booths. Consider telephone booths with a clear floor space complying with Section 305, swing-out automatic door or sliding automatic door complying with Section 404. Provide adjustable task lighting, a pull-down seat complying with Section 903. Consider handrails and a reflective surface or mirror to see behind for safety. See Section 811.10 Temporary Workspaces for additional information.

704.13 Advisory. Section 811.10 Temporary Workspaces, are essentially an updated version of the traditional telephone booth that provides two-way communications and a work surface that can be used for a variety of purposes (e.g., office work, computer usage, writing, and study).

704.14 Color and Material. Consider the use of contrasting colors and materials to differentiate the various components of the telephone.

704.15 Internet Connections. Provide internet connection hardware.

704.16 Work Surface. Provide a small work surface complying with Section 902.

704.17 Shelf. Provide shelf adjacent to telephone for placing personal items, writing, using phone book, and counting change, etc., complying with Section 307 and Section 308.

704.18 Computer Communications. In addition to standard telephone devices and configurations, hard-wired and wireless connections should be provided for a wide range of devices.

704.18.1 Height. For permanent installations, height should comply with Section 704.5.

704.19 Cell Phones and PDA's. In addition to standard telephone devices and configurations, cell phones, PDA's and other device requirements should be accommodated.

704.20 Information/Emergency Terminal. Information/emergency terminals should comply with Section 708.8 and may use the existing public pay phone infrastructure, required to be maintained by New York City. The intention is to utilize one of a ganged set of public telephone units or booths.

704.21 Public Smart Phones. Public smart phones should comply with Section 708.8.

704.22 Telecommunications Relay Service (TRS). The Federal Communications Commission adopted use of the 711 dialing code for access to TRS. TRS permits persons with a hearing or speech disability to use the telephone system via a text telephone (TTY) or other device to call persons with or without such disabilities. See: http://www.fcc.gov.

705 Detectable Warnings and Surfaces.

705.1 General. Detectable warning and surfaces should comply with Section 705.

705.2 Standardization. Detectable warning and surfaces should be standardized within a building, facility, site, or complex of buildings.

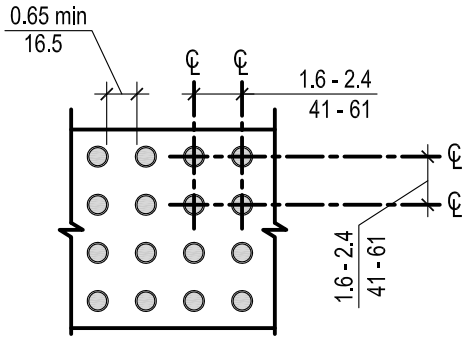
705.3 Visual. Detectable warning and surfaces should contrast visually with adjacent surfaces, either light-on-dark or dark-on-light. Contrast should be at least 70%.

Contrast = $[(B_1 — B_2)/B_1] \times 100$

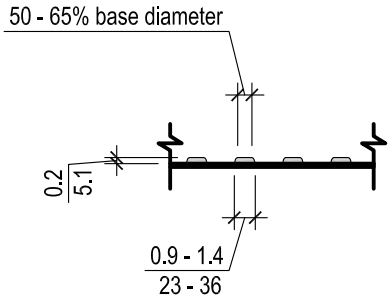
Where B_1 = Light reflectance value (LRV) of the lighter area and B_2 = Light reflectance value (LRV) of the darker area. Note that in any application both white and black are never absolute; thus, B_1, never equals 100 and B_2 is always greater than 0.

705.4 Material Contrast. Detectable warning and surfaces in interior locations should differ from adjoining walking surfaces in resiliency or sound-on-cane contact.

705.5 Truncated Domes. Detectable warning surfaces should have truncated domes complying with Section 705.5.



(a)
Plan



(b)
Elevation (Enlarged)

Fig. 705.5
Truncated Dome Size and Spacing

705.5 Advisory. Truncated domes are used to give advanced warning of level changes or other hazards for people with a sight disability because they can be detected underfoot and with the use of a cane. They are used primarily for exterior applications such as in Section 406 Curb Ramps and in Section 405 Ramps, at the threshold of ramp assembly, but have other applications where an aggressive tactile indicator is required.

705.5.1 Size. Truncated domes should have a base diameter of 0.9 inch (23 mm) minimum to 1.4 inch (36 mm) maximum, and a top diameter of 50 percent minimum to 65 percent maximum of the base diameter.

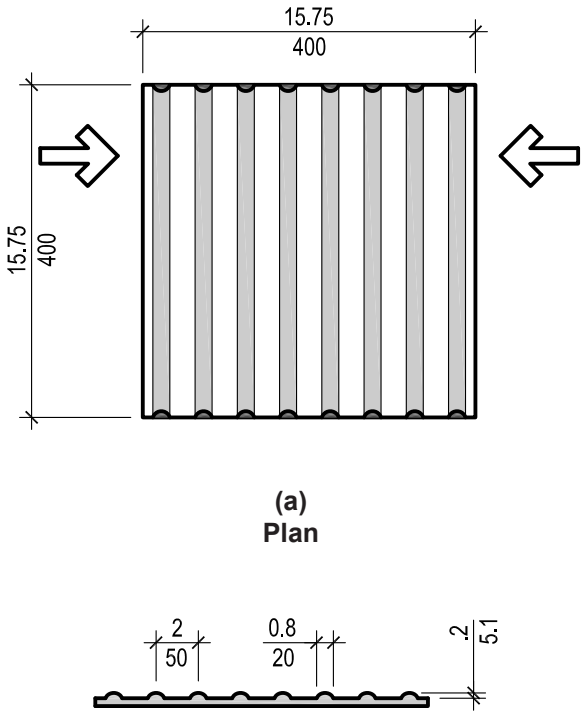
705.5.2 Height. Truncated domes should have a height of 0.2 inch (5.1 mm).

705.5.3 Spacing. Truncated domes should have a center-to-center spacing of 1.6 inches (41 mm) minimum and 2.4 inches (61 mm) maximum, and a base-to-base spacing of 0.65 inch (16.5 mm) minimum, measured between the most adjacent domes on the grid.

705.5.4 Alignment. Truncated domes should be aligned in a square grid pattern.

705.6 Raised Ribbing (Corduroy) Detectable Surface. Raised ribbing (corduroy) detectable surfaces should comply with Section 705.5. [2]

2 Merseytravel and the Five Merseyside Metropolitan Councils of Knowsley, Liverpool, St. Helens, Sefton and Wurral (2006). *Code of Practice on Access and Mobility.* http://www.accesscode.info/ Sections 4.1, 5.6.



(a)
Plan

(b)
Elevation (Enlarged)

Fig. 705.6
Raised Ribbing Detectable Surface
Size and Spacing

705.6 Advisory. Raised ribbing detectable surfaces should only be considered where truncated domes are not required by code. It is not suggested to replace truncated domes, rather to either supplement them or to use the raised strips in other areas where detectable warnings are not required. Raised ribs may be appropriate to warn one of potential hazards or as a pre-indicator to truncated domes or as a means of wayfinding, such as the surface of the upper & lower entry landing for a ramp while providing directional cues.

705.6.1 Size. Ribs should have a width of 0.8 inch (20 mm) the strips should have a semicircular cross section.

705.6.2 Height. Ribs should have a height of 0.2 inch (5.1 mm).

705.6.3 Spacing. Ribs should have a center-to-center spacing of 2 inches (50 mm) measured between the center of each strip.

705.6.4 Wayfinding. Ribs should run perpendicular to the direction of travel to provide wayfinding. See Section 714.19 Tactile City and Section 714.20.2. The continuous strip should be 2 1/2 inches (63.5 mm) in width.

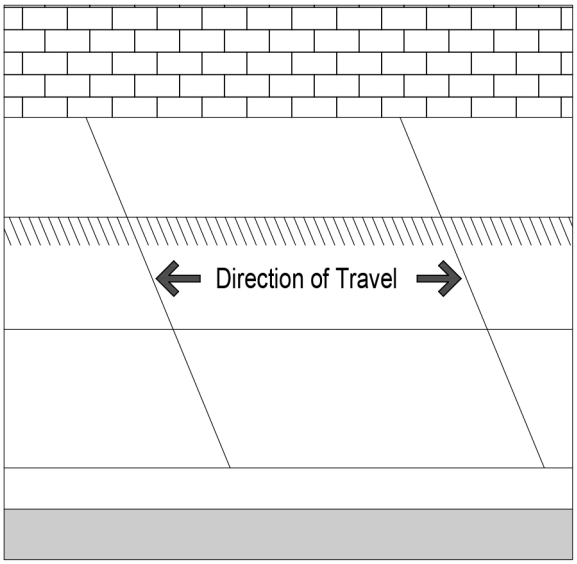


Fig. 705.6.4
Wayfinding

706 Assistive Listening Systems

706.1 General. Assistive listening systems should comply with Section 706.

706.1 Advisory. Inclusive hearing solutions comprise: auditory through induction loops, infra-red and FM assistive listening systems; captioning utilizing Communication Access Real-time Translation (CART); and signing utilizing American Sign Language (ASL). There are essentially two groups with different requirements: those who are Hard-of-Hearing ranging from mild to profound; and those who are deaf - congenital or acquired. Provide an induction loop system with CART to address a wide range of hearing loss; and ALS for those who are deaf. Maximize face-to-face exposure by providing monitors and interpreters within close proximity of those speaking. Automation will eventually reduce the cost of ALS and CART. Physical interpreters use hand, facial and body language to communicate emotion - currently software cannot match this level of effectiveness in real time.

706.2 Receiver Jacks. Receivers required for use with an assistive listening system should include a 1/8-inch (3.2 mm) standard monaural (monophonic jack).

706.3 Categories. See *2014 NYCBC* Appendix N. See also Hearing Loss Association of America, Albany Chapter, Assistive Devices. Assistive Listening Systems are currently divided into four categories comprising: Induction Loops, Infra-Red, FM, and hard wired. Both the *A117.1-2009* and the *2010 ADA Standards* require assistive listening systems for assembly spaces and court facilities but do not establish parameters or requirements for the use of a specific system. Use of one or all three systems may be appropriate to a specific venue type.

706.3.1 Induction Loop. See *2014 NYCBC*, Appendix N, Section BC N102.1 Induction Loop System Specifications. The induction loop system comprises a receiver, transmitter and a copper loop array for signal transmission that is picked up by a hearing aid t-coil (T-switch), or receivers worn by the user. This is the overwhelmingly preferred system by the people who are hard of hearing.

706.3.1 Advisory. The Hearing Loss Association of America (HLAA) and other hearing loss advocates prefer an Induction Loop system over other types of systems. As per the HLAA: “Simply put, individuals with hearing aids equipped with telecoils can enjoy clear sound transmitted from an induction loop directly into their hearing aid without the need for a body pack receiver and headphones. By communicating directly with the hearing aid, the induction loop system improves the sound to background noise problem created by hearing aid’s internal microphones.” Induction loops are preferred by people who have a Cochlear Implant. As per the HLAA, Neither infra-red or Radio systems can replace induction loop systems for the following reasons: highest sound quality; uses built-in T-coil in hearing aids; utilizes internal tonal correction; no additional receiver needed (no visual ques that the person has a disability); hygiene problems eliminated; no loss of special temporary receivers by users; will work in conditions of bright light (infra-red concern); will work effectively for both interior and exterior applications.

706.3.1.1 Micro Loops. A micro loop is a small version of an induction loop is suggested for information and security desks that must be passed to gain access to a facility. This allows a person to be able be able to obtain necessary information and to properly communicate with staff and security personnel. This is also useful for many other applications, such as private consultation regarding health and finance, ticket boots, etc.

706.3.1.1.1 Standard. Where induction loop systems are provided, they should comply with the International Electrotechnical Commission, Induction Loop Performance Standards, IEC-60118-4, Edition 3.0, 2014-12. See Section 105.2

706.3.1.1.1 Advisory. As per the Hearing Loss Association of America: "To be effective hearing loops have to meet the IEC 60118-4 Standard. This is an international performance standard which specifies the allowable magnetic background noise, the maximum field strength of the signals, and the frequency response of the magnetic field in an induction hearing loop -to the benefit of users of hearing aids and cochlear implants."

706.3.2 Infra-Red. See *2014 NYCBC*. See *2014 NYCBC* Appendix N, Section BC N103.1 Infra-red System Specifications. Suggested for use in environments where privacy is a concern such as when addressing sensitive medical and financial matters. It is not recommended if ambient infra-red light produces interference. Transmission is by means of light waves outside of the range of human sight and is picked up by receivers worn by the user.

706.3.3 FM. See *2014 NYCBC*. See *2014 NYCBC* Appendix N, Section BC N104.1 FM System Specifications. Suggested for use in large venues such as an arena where other systems are impractical. Not recommended where an ambient FM signal produces interference. Transmission is by means of FM signal picked up by receivers worn by the user.

706.3.4 Hard Wired. Suggested for one-on-one communication for interviews and counseling. This system utilizes a hard wired jack for the user to connect directly to an immobile electronic system by earbuds, headphones or other means.

706.4 Receiver Hearing–Aid Compatibility. Receivers should be hearing aid compatible and should interface with telecoils in hearing aids through the provision of neck loops.

706.5 Sound Pressure Level. Assistive listening systems should be capable of providing a sound pressure level of 110 dB minimum and 118 dB maximum, with a dynamic range on the volume control of 50 dB.

706.6 Signal-to-Noise Ratio. The signal-to-noise ratio for internally generated noise in assistive listening systems should be 18 dB minimum.

706.7 Peak Clipping Level. Peak clipping should not exceed 18 dB of clipping relative to the peaks of speech.

706.8 Triple Approach. Assistive listening systems become more effective utilizing a triple redundant approach comprising: the particular assistive listening system(s); Communication Access Real-time Translation (C.A.R.T.) that converts dialogue real time into the written word; and American Sign Language (ASL) for use by people who are deaf, that requires a signer to convert dialogue to sign language along with movement of the face and torso body language to accurately convey information.

706.9 Signage. Provide signage complying with Section 703.6.3.3, to identify ALS and for users to obtain additional information. Add a "T" for t-coil usage to the Assistive Listening System symbol. Also include the Sign Language Interpretation symbol, figure 703.6.3.8 and C.A.R.T. symbol, figure 703.6.3.8.1.

707 Information Transaction Machines (ITM)

707.1 General. All ITM's should comply with Section 707 and should be operable by people with sight disabilities.

707.1.1 Instructions. Provide multisensory instructions including the following: Braille instructions complying with Section 703.4 and 707.10; tactile characters complying with Section 703.3; audio complying with 709.7. Provide multiple language as necessary depending on the type of facility and range of users. Provide help numbers in various formats.

707.2 Clear Floor Space. A clear floor space complying with Section 305 should be provided in front of the machine.

EXCEPTION: Clear floor space is not required at drive up only automatic teller and fare machines.

707.3 Operable Parts. Operable parts should comply with Section 309. Each operable part should be differentiated by visual, touch and sound means.

707.4 Privacy. ITM's should provide the opportunity for the same degree of privacy of input and output available to all individuals.

707.5 Keypads. Keypads should be identified by tactile characters complying with Section 703.3 and should be centered on the corresponding keypad button. The number five key should have a single raised dot. The dot should have a base diameter of 0.118 inch (3 mm) minimum to 0.120 inch (3.05 mm) maximum, and a height of 0.025 inch (0.6 mm) minimum to 0.037 inch (0.9 mm) maximum. Keypad should be numeric only with a 12-key ascending telephone keypad. Consider keys with backlite characters to enhance visual identification.

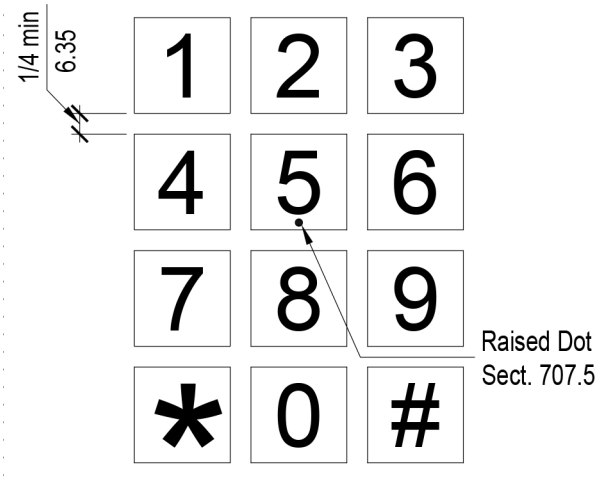


Fig. 707.5
Numeric Key Layout

707.5.1 Key Size. Keys should be a minimum of 1 inch (25 mm) in width and 1 inch (25 mm) in height. Provide a minimum of 1/4 inch (6.35 mm) between keys to tactilely differentiate each key.

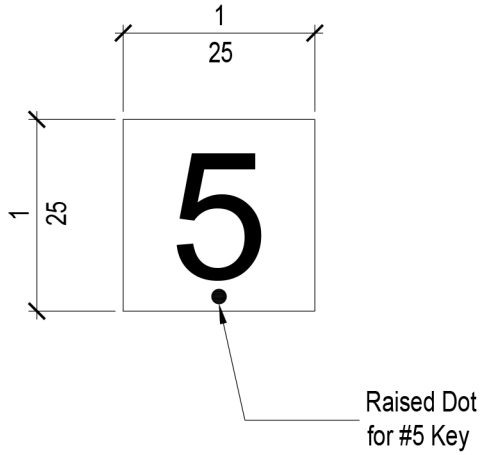


Fig. 707.5.1
Key Size

707.6 Function Keys. Function keys should comply with Section 707.6.

707.6.1 Tactile Symbols. Function key surfaces should have raised tactile symbols as shown in Table 707.6.1.

Key Function	Description of Tactile Symbol	Tactile Symbol
Enter or Proceed:	CIRCLE	O
Clear or Correct:	LEFT ARROW	←
Cancel:	"X"	x
Add Value:	PLUS SIGN	+
Decrease Value:	MINUS SIGN	-

Table 707.6.1
Tactile Symbols

707.6.2 Contrast. Function keys should contrast visually from background surfaces. Characters and symbols on key surfaces should contrast visually from key surfaces. Visual contrast should be either light-on-dark or dark-on-light.

707.7 Display Screen. The display screen should comply with Section 707.7.

707.7.1 Visibility. The display screen should be visible from a point located 40 inches (1015 mm) above the center of the clear floor space.

707.7.1.1 Eye Levels. Eye levels for adult that use a sitting mobility device should comply with Section 310.5. Eye levels for an adult standing should comply with Section 310.1.

707.7.2 Characters. Characters displayed on the screen should be in a sans serif font. The uppercase letter "I" should be used to determine the allowable height of all characters of the font. The uppercase letter "I" of the font should be 3/16 inch (4.8 mm) minimum in height. Characters should contrast with their background with either light characters on a dark background, or dark characters on a light background.

707.7.3 Controls. Provide controls to adjust the display screen brightness, color, and contrast. Provide lighting for controls. Provide a means of controlling screen image elevation.

707.7.4 Audio. Provide audio with the monitor for all transactions. Provide a standard jack for headphones that automatically mutes the audio output. Provide induction loop for hearing aid t-coil usage.

707.7.5 Braille Reader Strip. Consider providing an electronic Braille reader pin strip immediately below the display screen.

707.7.6 Visual. Consider two-way visual communications complying with Section 708.5. Provide automatic sign language interpretation.

707.8 Speech Output. ITM machines should be speech enabled. Operating instructions and orientation, visible transaction prompts, user input verification, error messages, and all displayed information for full use should be accessible to and independently usable by individuals with vision disabilities. Speech should be delivered through a mechanism that is readily available to all users including but not limited to a microphone and speaker, an industry standard connector or a telephone handset or cellphone. Speech should be recorded or digitized human, or synthesized.

EXCEPTIONS:

1. Audible tones should be permitted in lieu of speech for visible output that is not displayed for security purposes, including but not limited to, asterisks representing personal identification numbers.
2. Advertisements and other similar information should not be required to be audible unless they convey information that can be used in the transaction being conducted.

3. Where speech synthesis cannot be supported, dynamic alphabetic output should not be required to be audible.

707.8.1 User Control. Speech should be capable of being repeated and interrupted by the user. There should be a volume control for the speech function.

EXCEPTION: Speech output for any single function should be permitted to be automatically interrupted when a transaction is selected.

707.8.2 Receipts. Where receipts are provided, speech output devices should provide audible balance inquiry information, error messages, and all other information on the printed receipt necessary to complete or verify the transaction.

EXCEPTIONS:

1. Machine location, date and time of transaction, customer account number, and the machine identifier should not be required to be audible.

2. Information on printed receipts that duplicates audible information available on screen should not be required to be presented in the form of an audible receipt.

3. Printed copies of bank statements and checks should not be required to be audible.

707.9 Input Controls. At least one tactually discernible input control should be provided for each function. Where provided, key surfaces not on active areas of display screens should be raised above surrounding surfaces. Where membrane keys are the only method of input, each should be tactually discernible from surrounding surfaces and adjacent keys.

707.10 Braille Instructions. Braille instructions for initiating the speech mode should be provided. Braille should comply with Section 703.4.

708 Two-Way Communication Systems

708.1 General. Two-way communication systems should comply with Section 708.

708.1 Advisory. Two-way emergency communication systems should be provided in kiosks, emergency assistance alarms, building directories, floor directories, remote areas, etc.

708.2 Audible and Visual Indicators. The system should provide both visual and audible signals.

708.3 Handsets. Handset cords, if provided, should be 29 inches (735 mm) minimum in length. Provide volume controls.

708.4 Hands-Free Operation. Hands-Free operation is recommended and should include a waterproof activation button 2 inches (50 mm) minimum in diameter with an activation indicator light and sound with tactile and visual proof and water proof. Output sound level should be greater than 80 dB. All components should be corrosive resistant.

708.4.1 Positions. For a standing position, operable parts (buttons, microphone, speaker, camera, etc.) should be located 48 inches (1220 mm) minimum to 60 inches (1525 mm) maximum above the door. For a seating position, operable parts should be located 36 inches (915 mm) minimum to 44 inches (1120 mm) maximum above the door. A compromise location for both standing and seated should comply with Section 309.3.3 Comfort Zone Overlap.

708.5 Visual Two-Way Communication. Two-way visual communication systems may include a camera and monitor, video phone, computer, PDA, text messaging, voice to text, text to voice, captioning, translators and other means. A video relay system is used for people who are Deaf or hard of hearing. This will allow the use of visual interpreting that includes but is not limited to signing, lip and body language reading.

708.5.1 Eye Levels. Eye levels for adult that use a sitting mobility device should comply with Section 310.5. Eye levels for an adult standing should comply with Section 310.1.

708.5.2 Automatic Signing. Consider automatic signing located within a small image box. Locate in the upper right hand corner but also provide the means to locate signing box anywhere on the screen to accommodate user needs and preferences.

708.6 Standard Keyboard.

708.6 Advisory. There is a difference between a TTY and a standard keyboard communication system. A TTY is a dedicated system that requires two units to communicate. A standard keyboard communication system, can use various hardware such as a laptop, PC on a direct electronic link between two devices with a keyboard and monitor for people with hearing disabilities to communicate.

708.6.1 Tactile Keyboard. Tactile keyboard should be in standard format. Unit should be either permanently available or should be a flip unit that is linked to an alert system such as for elevator installation complying with Section 407.4.11.2.

708.6.1.1 On-Screen Embossed Keyboard. Consider a clear plastic film screen protector containing an embossed keyboard that can be aligned with an on screen visual keyboard to eliminate the need for a standard keyboard.

708.6.2 On-Screen Keyboard. On screen keyboards should comply with Section 707.7 An on-screen keyboard that is only one function of a multipurpose monitor will function well for some users but may present a serious problem for those that have limited mobility or diminished dexterity or a problem for those that do not know how to use a keyboard. On-screen keyboards are not usable or difficult to use by people with sight disabilities. It is a space saver, efficient and addresses vandalism and mechanical concerns.

708.6.3 Locations. Standard type-in keyboards should be placed in locations to provide general information, directions, inquiries and for emergencies. This includes kiosks, building directories, also where TTY's are located typically and where general information is provided, ITM's, medical facilities, etc.

708.6.3.1 Embossed Keyboard. Consider a clear plastic film screen protector containing an embossed keyboard that can be aligned with an on screen visual keyboard to eliminate the need to a standard keyboard.

708.7 Information/Navigation/Alert Reference Point System. An information/navigation/alert reference point system[5] is intended primarily for people with visual disabilities, complying with Section 708.7, 703.3.11 and 706. The activator as per Section 708.7.1.2 could alert the user to an emergency condition by emitting sound, vibrating pulses and blinking light. Consider integrating the system with other devices (e.g., information emergency terminals, kiosks). The system can also be used as talking directional signage. The system may also be used for interior and exterior applications, public and private, ATM's, buses, public transportation and interfaced with APS at intersections.

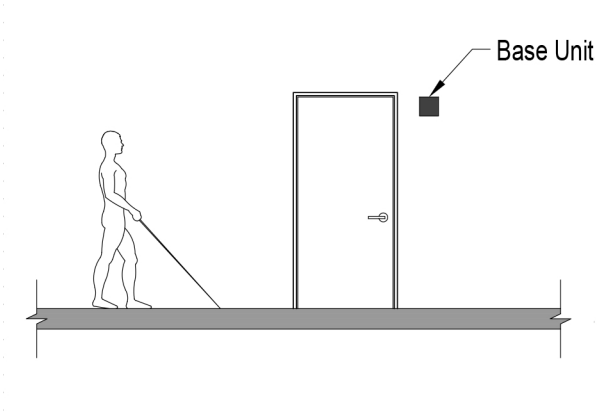


Fig. 708.7
Information/Navigation/Alert
Reference Point System

708.7.1 Unit Types. The system consists of two types of units: base and activator.

708.7.1.1 Base Units. Base units should provide changeable pre-recorded information. Activation distance is dictated by the environment and functionality of the space and should be location sensitive. Each unit should contain an adjustable distance activation feature, perhaps with three settings (e.g., adjacent 1-3 m, near 3-6 m and far 6-10 m). Unit should be capable of providing a minimum of at least two user programmable information announcements up to 1 minute each. One announcement maybe use to identify the location and the other to provide instructions (e.g. to next location, restrooms or emergency exits.) Provide a high quality speaker and voice audio output, a recording and power LED indicator, built-in microphone and volume control. Provide a strobe light activation indicator.

708.7.1.2 Activator. The activator is a small hand held tactile/vibration device, similar in size and operation to a car alarm remote with 2 or 3 buttons and light indicator and should comply with Section 309. Activator should vibrate and beep within proximity of a base unit and should provide at least an information button and a stop button. Three button activators are recommended that provide an information 1 button, information 2 button, and a stop button. Buttons may also be used for scrolling through multiple messages.

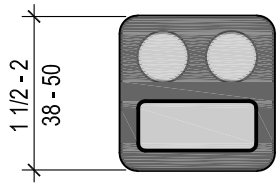


Fig. 708.7.1.2
Activator

5. The Information/Navigation Reference Point System was developed by Step Hear Ltd. Description was provided by Dr. Eran and Dr. Neustadt-Noy

708.7.1.2.1 Automatic Proximity Activation. An alternative to manual message activation is automatic proximity activator that will activate within range of the base unit.

708.7.2 Operation. The activator, held by the user, vibrates, beeps and emits a blinking light to notify that there is a base unit nearby. Pressing a button on the activator will trigger the audible recorded information from the base unit that also provides proximity and directionality to the location.

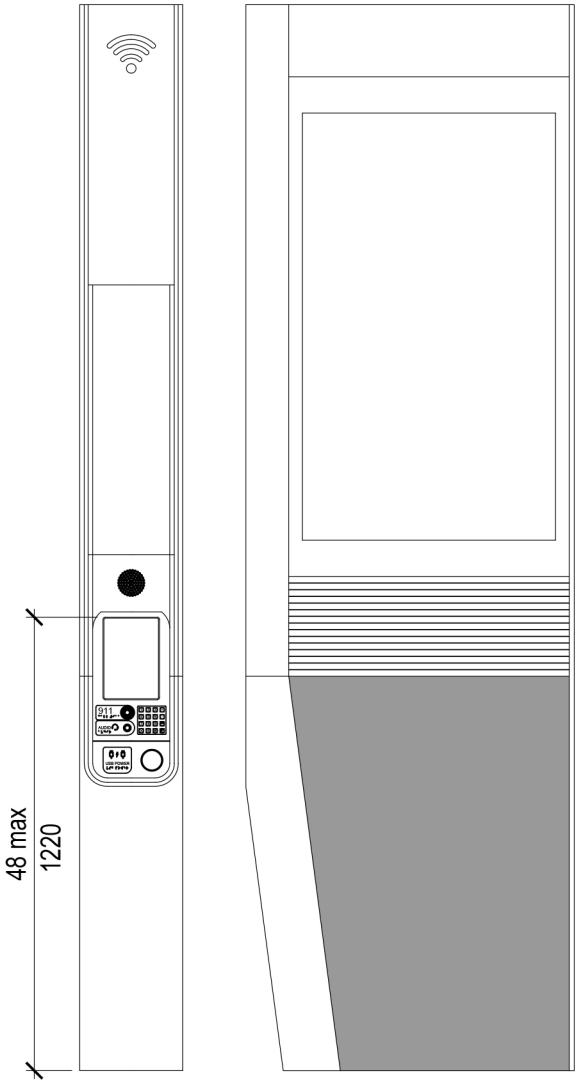
708.7.3 Locations. Base units may be permanently or temporarily installed in key locations. Permanent installations should be vandal proof. Door locations should comply with Section 703.3.11 and Section 712 and should be placed above wall signage without conflicting with visual, tactile or Braille signage. It is suggested to recess the base unit, flush with the wall surface with a secure cover.

708.7.3.1 Interior Applications. Interior applications can help users to easily find their way to areas and spaces (e.g. floor lobbies) rooms, amenities (e.g., rest rooms, water fountains, telephones) vertical circulation (e.g., elevators, stairs), information/transaction machines (e.g., ATM's), transportation facilities (e.g., subway exit, directions to booth, platform and line identification) and other important destinations. Consider installations at exit doors to assist those with visual disabilities to egress in emergencies.

708.7.3.2 Exterior Applications. Exterior installations should be waterproof. The system could improve wayfinding and information gathering at major intersections, parks, transit stations (e.g., bus stops, subway entrances to announce location, transit line), recreation sites and more. The system could be used with pedestrian traffic signals.

708.8 Information/Emergency Terminal. Information/emergency terminals should comply with Section 708.8. The terminal may be used in stand alone kiosks, as part of a building directory system and other applications. The unit can switch to emergency mode to display public bulletins.

708.8.1 Terminal. Terminals are centrally controlled with portrait oriented interactive touch screens with on-screen keyboards and maybe supplemented with a tactile keyboard for people with sight disabilities, that allow access to commercial and informational venues, bidirectional voice and data communication for emergencies (e.g. 911) and public information (e.g. 311), targeted broadcasting alerts (Red, Orange, Yellow), public events (e.g. parades) and general public safety messages. Terminals should comply with Section 706, Sections 305, 306, 307, 308 and 309. Provide controls for brightness, contrast and type size, audio output and language selection (6 languages). Provide a range of options for people with hearing disabilities including an audio frequency induction loop system, video relay system (VRS) utilizing the built-in camera and on-screen keyboard, and closed captioning. Provide two-way visual communications complying with Section 708.5. Clear floor space should be provided with a tactile surface complying with Section 705 Detectable Warning and surfaces. Consider automatic signing as per Section 708.5.2. see also Section 710.4 multisensory information emergency kiosk.



(a) Front **(b) Side**

Fig. 708.8.1 [6]
LinkNYC Terminal

708.8.1.1 LinkNYC. It is the first-of-its-kind communications network that will replace over 7,500 payphones across the 5 boroughs of NYC with links. Each link will provide superfast, free public WiFi, phone calls, device charging and a tablet for internet browsing, access to city service, maps and directories. See www.link.nyc.

708.8.2 Locators. Consider locators utilizing an audio attract beacon, or an information/ navigation/reference point system complying with Section 708.7, or a blue light identifier complying with Section 708.8.1.1., or voice command, or other types of locators.

708.8.2.1 Blue Light Locator/Identifier. Provide a single blue light locator/identifier for all terminals to visually locate them for use in an emergency and for information. The identifier may be a single enclosed bulb, panel, ring, line of blue LEDs, etc., placed on top or at the upper surface of the unit and should be highly visible but not obtrusive.

708.8.3 Operation. The touch screen should be mounted in the portrait orientation to provide the ability for the user to adjust the height of the touch screen image by simply touching a button on the screen to lower or raise the image. The user may use the auto adjust image, select one of several presets or individually adjust the brightness, contrast and type size, and audio output and language. Operation should be pictogram based to reduce reliance on language. The user touches a pictogram to initiate operation and/or uses verbal commands. The terminal provides the authorities with the ability to directly communicate to the City pedestrians in an efficient and effective new way. This ability provides the City agencies another venue for dissemination of important and timely information (e.g. emergency alerts, amber alerts, safety and transit information). See Section 708.8.3.1 Pedestrian Billboards. The user may touch a pictogram to access 911, 311, directions, local bulletin boards, E-mail, events, visitor center, points of interest, and information that is normally obtainable through the telephone system and the internet.

6 LinkNYC is a franchise agreement with NYC DoiTT and City Br*idg*e to install, operate and maintain the LinkNYC communications network.

708.8.3.1 Tactile Keyboard. Consider a separate physical keyboard or an on screen virtual/tactile keyboard. Keys should be identified by tactile characters complying with Section 703.3 and should be centered on the corresponding key. Keyboard should be water proof and vandal proof. Locate keyboard at the base of the touch screen with face capable of pivoting 0-90 degrees. Virtual keyboards should be tactile using clear embossing on the lower portion of the touch screen. Locate keyboard 28 inches (710 mm) minimum and 34 inches (865 mm) maximum above the finished floor and complying with Section 902.

708.8.3.2 Verbal Operation. It is recommended that the terminal is fully capable of voice operation for those who are blind or have diminished sight or prefer the touch screen or keyboard. Terminal should utilize robust verbal command software, that also identifies components, provides operational instructions and functions and confirms actuation.

708.8.4 Locations. The terminals may be located in any existing or new public phone location, kiosks, building directories, etc. Consider locating terminals to provide easy access to relevant information and resources about the entire city or detailed information about the immediate location on street corners, bus stops, subways, landmarks, hotels, etc.

708.8.4.1 Integration. Consider integrating the terminals with public information display types complying with Section 710, directories complying with Section 711, emergency signage complying with Section 713, and wayfinding complying with Section 714. Interface with Accessible Pedestrian Signals (APS), or a Sensory Pedestrian System (SPS) as per Section 406.16.

708.8.5 Enclosure. Enclosures should be vandal proof and water proof and integrate with the surrounding environment aesthetic. Consider providing a small sloped work surface and task lighting.

708.9 Kiosks. Multisensory kiosks containing wayfinding, general information, 911 emergency, 311 information, and other features in multiple and redundant ways to address a variety of sensory and cognitive skills should comply with Section 710.4.

709 Signage System

709.1 General A building signage system should comply with Section 709. It should be:

A. Multisensory, comprising visual, tactile and audible means of communication.

B. Multilingual where appropriate.

C. Modular for modification, maintenance and updating information.

D. Relies on graphics rather than text to reduce the confusion and to make it more international in nature with less dependence on the use of multiple languages.

709.1 Advisory. Wayfinding is a critical component of a signage system and signage is a critical component of wayfinding. Refer to Section 709.14 and Section 709.19.

709.2 Signage

709.2.1 Exterior Signage. Exterior signage requires protection from the elements and should be waterproof and lighted to a higher level especially for signage meant to be read at a distance such as parking lots. Signage should be placed, where possible, perpendicular to the direction of travel. It should be designed to prevent snow and ice accumulation, capable of sustaining severe winds, graffiti resistant, and built of substantial material that is vandal resistant. Signage subject to a potential conflict with cars should be protected with bollards, curbs, and other elements that will prevent collision. Exterior signage consists of alarms, visual characters, tactile characters, Braille, pictograms, symbols, remote infrared audible, assistive listening systems, two-way communications, public information display types, directories, emergency signage, compass orientation, arrows, etc.

709.2.1.1 Exterior Locations. Exterior locations include: site entry and building entrances, parking, complex and building names, all pedestrian and maintenance routes, intersections, all outdoor spaces and the various levels, plazas, rest areas, shelters, ramps, stairs, reference points (landmarks), public amenities, etc. They may be wall, floor, freestanding, overhead, independent or integrated with landscape and architectural elements. Locations are cited throughout the *IDG* and comply with Section 714 Wayfinding.

709.2.1.2 Building Name and Number. Building name and number should be provided in visual tactile and auditory formats. Tactile signage should be provided adjacent to primary entrances complying with Section 703.3 and Section 703.3.10 regarding recommended placement.

709.2.2 Interior Signage. Interior installations should be vandal resistant, moisture proof, comprised of easy to replace parts, and intuitive. Signage should be placed where possible perpendicular to travel. Interior signage consists of alarms, visual characters, tactile characters, Braille, pictograms, symbols, remote infrared audible sign, assistive listening systems, two-way communications, public information display types, directories, emergency signage, compass orientation, arrows, etc.

709.2.2.1 Interior Locations. Interior locations include: building entrance, lobby, routes, reference points, floor lobbies, elevator lobbies, stairs, ramps, escalators, intersections and turns, all floor levels, branching, open spaces, waiting areas, terminations, amenities, ancillary spaces, and all the other locations cited throughout the *IDG* and complying with Section 714 Wayfinding.

709.3 Visual Signage. Visual signage should comply with Sections 703.2. Signage within reach ranges complying with Sections 703.3.10, and 703.3.11 should contain Braille complying with Section 703.4. Visual signage includes: case, style, heights, widths, stroke width, character spacing, line spacing, height above floor, floor surface, supplemental emergency floor surface signage, integrated signage, finish and contrast, photo luminescent characters.

709.4 Tactile Signage. Tactile signage should comply with Sections 703.3 and contain Braille complying with Section 703.4 Tactile signage includes: depth, case, style, heights, widths, stroke width, character spacing, line spacing, height above floor, adult standing position, adult seated position, children's positions, floor surface, supplemental emergency floor signage, supplemental tactile signage locations, door locations, finish and contrast, and photo luminescent signage.

709.5 Braille. Braille should comply with Section 703.4 that includes: upper and lower case letter usage, dimensions, position, height, adult standing position, adult seated position, children's, positions, supplemental emergency floor surface Braille, stair handrails, railings and other locations.

709.6 Pictograms. Pictograms should comply with Sections 703.5. Pictograms within reach ranges complying with Sections 703.3.10, and 703.3.11 should contain text descriptors complying with Section 703.5.4 and Braille complying with Section 703.4. Pictograms include: field, finish and contrast, text descriptors, symbols. Pictograms should use common symbols and easily recognized images. They should be used throughout and supplemented with simple text. They should be used for routes, doors and doorways, ramps, curb ramps, elevators, parking spaces, parking lot routes, shelters, loading zones, stairways, drinking fountains, toilet and bathing rooms, washing machines and clothes dryers, saunas and steam rooms, alarms, telephones, assistive listening systems, ITM's, room types, assembly areas, dressing fitting and locker rooms, kitchens and kitchenettes, transportation facilities, courtrooms, waiting areas, service areas, dining areas, offices, meeting rooms, sales and service counters, storage, trash and recycling, etc.

709.7 Audible Signage. Audible signage should comply with Section 703.7 and includes: transmitters, receivers, frequency, optical power density, audio output, reception range, multiple signals. Audible signs include other types of transmitters, pre-recorded messages that can be triggered automatically or manually, web connections, cell phone systems, recorded walking tours, proximity signs, public address speaker systems, etc.

709.8 Color and Contrast. Color and contrast is defined for the various components of a signage system and should comply with Sections 302.10 ad 302.11. Refinement of the use of color and contrast is contained in the Lighthouse International publication, *Effective Color Contrast, Designing for People with Partial Sight and Color Deficiencies* by Aries Arditi, PhD. This will help to enhance the inclusiveness and effectiveness of the signage system.

709.9 Comprehension. Comprehension can be increased by simplifying and grouping text into blocks and reducing the amount of the information to the absolute essence. Do not overwhelm visitors with information and provide only information that is relevant for immediate use. Limit the number of languages used to the relevant users. If a large number of languages are required it is suggested to address this with interactive kiosks complying with Section 710.4. More detailed information can be provided with directories and other supplemental means such as printed material, etc. Use common names and simple to understand directions. Refer to the Lighthouse International publication for type Refer to the Lighthouse International website for the following publications: *Making Text Legible, Designing for People with Partial Sight* by Aries Arditi, PhD; and *Simple Steps to More Readable Type Through Universal Graphic Design* by Aries Arditi, PhD.

709.10 Public Information Display Types. Public information display types should comply with Section 710 and includes: wall mounted types, free standing types, kiosk types, help desk types, ceiling types.

709.11 Directories. Directories should comply with Section 711 and includes: non-electronic directories, electronic directories, main/primary directory, floor directories, suite directories. Directories may contain visual and/or tactile maps. Refer to Section 714.7.1 for additional information regarding the use of maps and floor plans. Consider two-way visual communications complying with Section 708.5.

709.12 Queing. Queing is used in a wide variety of building classifications such as banks, restaurant, medical facilities, service areas, etc. It should be provided in a range of formats including visual, and auditory. The system may be tied into other information and display types such as video monitors and other electronic signage. Queing should be supplemented with a manual or automatic ticket device.

709.13 Room Identification System. Room identification system should comply with Section 712.

709.14 Emergency Signage. Emergency signage should comply with Section 713 that includes: electronic and non-electronic signage, directional signage, photoluminescence material, hardware, floor signage, wall base signage, tactile guide strips, handrails, electronic visual signage, content, systems integration, monitors, supplemental monitors, displays, emergency back-up power; audible signage, audible system, building systems, evacuation route, emergency back-up power; emergency evacuation plans, hand-out material, drills, maps, directories and occupant registry.

709.15 Wayfinding. Wayfinding should comply with Section 714. This section supplements the signage system by identifying signage locations that include: site entry, exterior routes, exterior entrances, main lobby, interior routes, reference points, floor lobbies, intersections and turns, ancillary spaces. Wayfinding is a critical component of a signage system.

709.16 Warning and Instruction Labels. Warning and instruction labels should contain visual/tactile characters, Braille and pictograms. Eye levels should comply with Section 310 to enhance readability. Visual characters, tactile characters, Braille and pictograms should comply with Section 703. The information should be concise. Process or steps should be listed in numerical order. If possible supplement text with a pictogram sequence to communicate process or show steps graphically to reduce the dependence on text or language, reduce confusion and to be comprehensible to all.

710 Public Information Display Types.

710.1 General. Public information display types should comply with Section 710. Displays should include wall mounted, free-standing, kiosk type, help desk, ceiling floor and integrated components.

710.2 Wall Mounted Type. Wall mounted types should comply with Section 305, 308, 309 and 707.

710.3 Free-Standing Type. Free standing type displays should comply with Section 305, 307, 308 and 309.

710.4 Multisensory Information/Emergency Kiosks. Multisensory information/emergency kiosks should comply with Section 710.4 and Sections 305, 307, 308, 309 and 708.5. They should function visually, audibly and tactilely. They should not contain any compartments or protruding objects. Combine wayfinding, general information, 911 emergency, 311 information, other features in multiple and redundant ways, to address a variety of sensory and cognitive skills, while being inviting and easy to use. Provide content in visual, auditory and tactile formats.[7] The unit should switch to emergency mode to display public information bulletins.

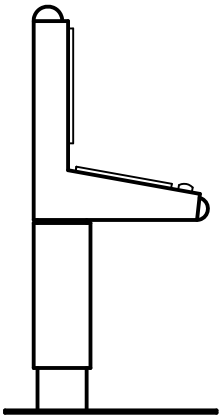


Fig. 710.4
Multisensory Information/Emergency Kiosks

7 The "Talking Kiosk" concept was pioneered by Dr. Karen Gourgey and her team of researchers at Baruch College of the City University of New York. Later, Touch Graphics, Inc., was formed to design and build these units for other clients, such as the Boston Museum of Science, Metropolitan Transportation Authority, the NYC Department of Transportation and the WBLDC. Steven Landau, Touch Graphics, Inc., is the co-creator with Dr. Gourgey. They designed, fabricated, programmed and refined the concept of audio-tactile interactive computing.

710.4.1 Locators. Consider locators utilizing an audio attract beacon, with a repetitive sound (e.g. chirp). A cell phone activated beacon with an attract tone played from the kiosk when a request is placed by the user calling the kiosk's computerized attendant. It can also be used instead of a repeating attract sound. A detectable floor surface will make it easier for people who use a cane to locate and identify the unit and to confirm the correct orientation position for operation. Bright contrasting colors and signage can help identify a kiosk's location for people with low vision. Avoid using color combinations that present discrimination problems for users who are color blind.

> **710.4.1.1 Blue Light Identifier.** Provide a blue light identifier for all kiosk units to help locate them for use in an emergency and for information. The light may be a single enclosed bulb, panel, ring or line of blue LEDs placed on top or at the upper surface of the unit and should be highly visible but not obtrusive.

710.4.2 Operation. Tactile graphics features can be added to help users to understand complex spatial configurations. Raised line maps and diagrams may be augmented with audio tagging, where various features are labeled with sound with touch activated audio descriptions. This can be accomplished with various sensor technologies, such as capacitive touch, pressure-sensitivity or infrared optics. Tactile maps should be placed on a level or slightly angled surface and oriented so users are able to form an accurate mental model of the environment depicted. Tactile maps should include high-contrast colors, lighted locator, and task lighting for low vision or color blind users. Incorporate internationally-recognized pictograms rather than language-specific labels. Large illuminated buttons can be used to scroll through menu choices and selections. Provide a large glowing red push button in the middle of the counter, with one green directional arrow on either side. The quantity of buttons should be kept to a minimum and software should be relied on to adjust the function of the buttons needed to operate the kiosk in each operational mode.

Traditional input and pointing devices, such as QWERTY keyboards, touch screens and trackballs should be avoided, unless their functionality is duplicated in other methods that are more inclusive. Consider two-way visual communications complying with Section 708.5. See Section 309.10 Multisensory Functionality.

710.4.2 Advisory. NYC has installed a prototype Talking Kiosk in two ferry terminals. It resembles an automated teller machine. A low, intermittent bird-like chirp helps blind and low-vision passengers locate the kiosk terminal. The horizontal surface is a three-dimensional tactile floor plan of the concourse level. When users place their finger on the plan, a narrator provides the name of the place they touch. Illumination of that spot is an option. If the user continues to hold their finger in a single spot, they hear the information about that kiosk's position in the terminal. An index allows users to select a destination in the terminal from a list, and then have their finger led to that place on the map through a process of incremental audio coaching. All information provided by the Talking Kiosk is presented in multiple formats, including audio narration, video captions, images and sound effects (earcons). By layering information in this way, the kiosk helps to orient people with a range of abilities, that is engaging and fun.

710.4.3 Unit Enclosure. Physical enclosure should promote ease-of-use for both seated and standing users. Exterior kiosks should be weather proof and vandal proof. Where possible, they should be located under a building overhang or roof structure.

710.5 Help Desk Type. Help desk should comply with Chapter 9, Section 305, 307 and 309. In addition, the following should be provided.

1. Centrally located information desk where people can obtain general information, directions, have questions answered, assistance with the service of self-service equipment.

2. Desk that can accommodate seated users when required.

3. Policy instituted where any user can get on-site personal assistance by appointment.

710.6 Ceiling Types. Ceiling types should have bottom edge not less than 80 inches (2030 mm) above the floor and should contain visual and audible signage.

711 Directories

711.1 General. Directories should comply with Section 711.

711.2 Components. The directory should be visual, tactile and audible. Directories non-electronic, electronic or a combination of both components. Comply with Chapter 3.

711.2.1 Non-electronic Directories. Non-electronic directories should comply with Sections 703 for Visual, Tactile and Braille signage. Pictograms should be included where applicable and should comply with Section 703.5. Braille should comply with Section 704.

711.2.2 Electronic Directories. Electronic directories should consist of standard type-in keyboard as per Section 705, monitors complying with Section 707 and 708.5, telephones complying with Section 704, emergency assistance alarm complying with Section 702, remote infrared audible signage complying with Section 703.7, Wi-Fi, and compliance with Section 707. Monitor should be a touch screen with audible capability, keyboard should contain a Braille strip readout above or directly below. Electronic queries should be both tactile and through voice recognition and should be alphabetical, floor-by-floor or by name.

711.2.2 Advisory. Information/emergency terminals located throughout a facility at key locations, complying with Section 708.8, can be an effective and easy to use electronic directory system. This system may be used for the main/primary director complying with Section 711.3, Floor Directories complying with Section 711.4 and Suite Directories complying with Section 711.5. An information/navigation reference point system complying with Section 708.7, could be integrated with the directories to help locate the unit for people with a sight disability. The terminal may be wall mounted at primary reference points, such as an elevator lobby on each floor. It contains a portrait oriented interactive touch screen and virtual keyboard (that may be supplemented with a physical keyboard and perhaps an active Braille strip reader for people with a sight disability) that can convey building, rooms, occupants, floor layout, and directions for a requested location. It should provide: access to commercial and information venues; bidirectional voice and data communications for emergencies (e.g. 911) and public information (e.g. 311); targeted broadcasting alerts (e.g. Amber) building events, and general safety messages.

The Information/emergency kiosk concept complying with Section 710.4 is similar but primarily tactile in nature. It is multisensory and includes 911 emergency, 311 information, building information and other features in redundant ways to address a variety of sensory and cognitive skills. Content is provided in visual, auditory and tactile formats.

One of the major differences between the two approaches is that the multisensory information/emergency kiosk contains a three dimensional plan of the floor where it is located. This helps not only people with sight disabilities, but makes it easier to understand and use for people that have difficulty understanding and orienting themselves with two dimensional maps and floor plans.

Any system should be a WiFi hotspot so that people can use their personal computer and tie into the system.

711.3 Main/Primary Directory. Main/primary directory should be located close to the main entrance. The information should also include locates of amenities such as restrooms, telephones, etc.

711.4 Floor Directory. Floor directory should be located as close as possible or immediately outside the elevator or floor lobby and should comply with Section 308. Information should be provided for that particular floor.

711.5 Suite Directories. Individual suite directories should be located at the suite entrance and should comply with Section 308. Information should be provided to that particular suite.

712 Room Identification System. The system should be simple, intuitive and consistent for effective wayfinding. Identification should comprise letters, number and names. Provide compass orientation for each side of the building (N,E,S,W), identify floor or level, start numbering sequence at the same location for each floor (e.g., due north increasing clockwise in plan, north to south or west to east), maintain even numbers on one side of the corridor and odd on the other side. Identify special rooms and unique spaces by name (e.g., janitor), abbreviation or a single letter (e.g., “j”). Provide pictograms complying with Section 703.5. Label all usable rooms and spaces (e.g., lobby, corridors, stairwells and restrooms). For example, a hotel room or an apartment on the due north side of the 18th floor, may be labeled: N1801. An office suite in the same location may be labeled: N1801s. A janitor closet in the same location may be labeled: N1801j, N18j or N18 janitor.

712.1 Information/Navigation Reference Point System. Consider an information/navigation reference point system complying with Section 708.7 or other proximity devices, to provide room identification and directions for people with sight disabilities.

713 Emergency Signage System(s).

713.1 General. Emergency signage system should comply with all applicable federal, state and local code requirements, should comply with Section 713 recommendations, which are meant to supplement and enhance the legal requirements. If a conflict arises, comply with the legal requirement.

713.2 Non-Electronic Emergency Signage. Non-electronic emergency signage should include the following.

713.2.1 Directional Signage. Directional signage should provide clear information regarding path of travel for emergency egress. This includes wall, ceiling, floor, free-standing and component integrated locations.

713.2.2 Photo luminescent Material. All exit path signage should be photo luminescent material. These signs should be washable, non-toxic, non-radioactive and if subjected to fire, must be self extinguishing when the flame is removed. Provide floor level photo luminescent arrows, lines or other wayfinding means that will direct occupants to the closest emergency exit and/or area of refuge.

713.2.2.1 Emergency Lighting. Provide an emergency lighting system that will guide occupants to exits and nearest area of rescue.

713.2.3 Floor Emergency Signage. Floor emergency signs should be visual and tactile and comply with Section 703.3. Braille should be provided.

713.2.4 Wall Base Signage. Wall base signage with top of the text no higher than 12 inches (305 mm) above the floor surface, should be considered. Signage should be as close to the floor as possible to accommodate people maneuvering at floor level due to high smoke levels. Signage may be integrated into base molding.

713.2.5 Tactile Guide Strip. Directional arrows or emergency wayfinding should be a tactile guide strip continuous from all major points in the building to exit discharge without interruptions or break in the wayfinding path.

713.2.5 Advisory. It may be difficult to make tactile guide strips continuous due to intervening doors, partitions and other physical interruptions.

713.2.6 Handrails. Handrails should contain a photo luminescent strip to provide additional wayfinding integrated into the handrail. Comply with 713.2.2.

713.3 Electronic Visual Emergency Signage. Electronic visual emergency signage should comply with Section 713.3. Consider utilization of the information/emergency terminals complying with Section 708.8 and the information/emergency kiosks complying with Section 710.4. These units may go into emergency mode to display critical information.

713.3.1 Content. Provide the same information that visual, tactile and Braille signage provides, but should also supplement and provide current or real time emergency information.

713.3.2 Systems Integration. Link to the fire suppression, emergency lighting and other systems.

713.3.3 Visual Comminutions. Provide two-way visual communications signing and lip reading complying with Section 708.5 and should be linked to adjacent Braille displays. This includes directories, kiosks, etc.

713.3.4 Supplemental Monitors. In addition to the standard location for monitors, supplementary monitors should be considered including stairwells, emergency exits, etc.

713.3.5 Displays. Displays are not be limited to monitors but can be other types of illuminated signage incorporated into the building system.

713.3.6 Emergency Back-up Power. Electronic signage should be on a dedicated continuous service and should be provided or connected with a an emergency generator and/or battery backup system(s).

713.4 Audible Emergency Signage. Audible emergency signage should comply with Section 713.4. Consider utilization of the information/emergency terminals complying with Section 708.8 and the information/emergency kiosks complying with Section 710.4 and information/navigation reference point system complying with Section 708.7.

713.4.1. Audible System. In addition to visual signaling systems, the audible signaling systems should help people evacuate along the best route relative to the building condition at the time of the emergency situation.

713.4.2 Building Systems. The audible system should be tied to the centralized system and other systems. Audible systems should be linked to all other electronic means of communication including visual and audio systems (e.g. inductive loop, infrared , FM systems) cell phones, PDA's etc.

713.4.3 Evacuation Route. Best route information must be dynamic, robust and current to address emergencies, building events, peak usage and temporary conditions.

713.4.4 Emergency Back-up Power Audible systems should be on a dedicated continuous service and should be provided or connected with a an emergency generator and battery backup systems.

713.5 Tactile Emergency Signage. Consider integrating vibration with signage at key points. The information/navigation reference point system complying with Section 708.7 may be used in emergencies for directions and may be triggered (to produce pulses) building wide to alert users to an emergency conditions.

713.6 Emergency Evacuation Plans. Emergency evacuation plans should be provided for people who need assistance in an emergency and should comply with Section 713.5.

713.6 Advisory. Emergency evacuation plans should include the following:

1. Handout Material. Handout material should be available showing emergency egress paths that coordinate with the signage system.

2. Drills. Occupants should be provided with periodic drills that show the various egress paths to become familiar with the signage and location of all wayfinding systems and to provide a level of security and comfort so they will be able to navigate out of the building under extreme circumstances.

3. Maps. All floor plan maps should contain information regarding the emergency egress signage system, should be tactile and contain Braille.

4. Directories. Occupants should be made aware of the information located at the various directories and the location of the emergency assistance alarms which should also be indicated on the tactile floor plan.

5. Registry. All occupants that require assistance should provide their names, location and emergency communication numbers to building security. Note: It is commonly difficult to obtain such a list due to privacy concerns.

714 Wayfinding.

714.1 General. Provide a multisensory wayfinding system complying with Section 714. Wayfinding should be visual, tactile and audible. The composition determines the overall effectiveness. Sight, sound and touch should be examined separately, as well as redundancy to evaluate the solution.

714.1 Advisory. Wayfinding should be an intentional, well thought out, overlapping multisensory navigation system and not a design by-product. It is much more than just signage or maps. Maps are useless for some people who cannot read a floor plan, cannot orient themselves and cannot retain the information. Wayfinding functions should effectively guide first time visitors. It utilizes the entire environment. It may be dynamic and passive, dramatic to subtle, conscious and subconscious. It is the composition of the overall system that will determine it's effectiveness. This will vary from person to person depending upon their ability to mentally navigate a room, area or entire facility. It is recommended to consult with a team of people that represent the various disabilities to review the effectiveness of the design.

714.2 Senses

714.2.1 Visual. Visual wayfinding includes but is not limited to the following: signage (including text, pictograms, maps, diagrams, etc.) architectural and landscape elements, space shape and composition, furniture, circulation patterns, natural and artificial light, material, color and contrast. Pictograms are strongly recommended to reduce the dependence on text. Pictograms can be used in lieu of or to supplement text from room or space identification to direct or communicate critical information. Electronic wayfinding includes computer and display monitors, digitized signs, artificial lighting, etc. Also see Section 311. Visual signage should comply with the relevant Sections of Chapter 7: 703.2 Visual Characters, 703.5 Pictograms, 703.6 Symbols of Accessibility, Provide two-way visual communications complying with Section 708.5, 709 Signage System, 710 Public Information Display Types, 711 Directories, 712 Room Identification System, 713 Emergency Signage System.

714.2.1.1 Visual Contrast. Visual contrast should comply with Section 302.10.

714.2.1.2 Color. Color should comply with Section 302.11.

714.2.2 Tactile. Tactile wayfinding includes but is not limited to the following: tactile signage (raised text, Braille, relief maps and diagrams, etc.), landscape and architectural elements, furniture, detectable warnings and surfaces, textures, floor track and strip systems. Floor surface should comply with Section 302 that includes non-compressible, compressible, tactile surfaces, detectable surfaces, and detectable warnings. Electronic signage including Braille pin readers, vibration, etc. Tactile signage should comply with the relevant Sections of Chapter 7: 703.3 Tactile Characters, 703.4 Braille, 703.5 Pictograms, 705 Detectable Warning, 709 Signage System, 710 Public Information Display Types, 711 Directories, 712 Room Identification System, 713 Emergency Signage System,

714.2.2.1 Non-Compressible Floor Surfaces. Non-compressible floor surfaces should comply with Section 302.2.1.

714.2.2.2 Compressible Floor Surfaces. Compressible floor surfaces should comply with Section 302.2.2.

714.2.2.3 Tactile Floor Surfaces. Tactile floor surfaces should comply with Section 302.6.

714.2.2.4 Detectable Surfaces. Detectable surfaces should comply with Section 705.

714.2.2.5 Edges. Edges should comply with Section 302.9.

714.2.3 Auditory. Auditory perception may be affected by one's hearing ability and acoustics (noise level, reverberation, and distance). Auditory wayfinding includes but is not limited to the following: use of ambient and focused sounds (e.g. human and machine made sounds), enhancement or focusing on distinct natural sounds (e.g. water, wind, leaf/branch movement), introduced sounds (e.g. bells, chimes) and electronic systems. Audible signage should comply with the relevant Sections of Chapter 7: 703.7 Remote Infrared Audible Sign Systems, 704 Telephones, 706 Assistive Listening Systems, 708 Two-way Communication Systems, 709 Signage System, 710 Public Information Display Types, 711 Directories, 712 Room Identification System, 713 Emergency Signage System. In addition to cell phone wayfinding complying with Sections 714.8, 714.9, 714.1.

714.2.3.1 Auditory Site Amplification. Consider audio amplification stations, strategically placed within a site so those with diminished hearing can listen to the unique sound features of air, wind, vegetation, wildlife (e.g. birds) and water as part of the wayfinding system. Provide portable listening devices (e.g. headphones). Assistive technology should comply with Section 703.7 and Section 706.

714.2.3.1 Advisory. Assistive listening systems consists of three general wireless types utilizing transmitters and receivers. They are named for their method of signal transmission: induction loop (IL), frequency modulation (FM), and infrared (IR). Audible wayfinding may also include real time navigation utilizing beacons or wireless routers (see 309.4.1.1) and pre-recorded tours, cell phones systems, etc. See Sections 714.10 through 714.16.

714.2.3.2 Sound Reference Points. Utilize unique sound characteristics within and surrounding a site at reference points as part of the wayfinding system. Sounds include the water, e.g. ocean, lakes, streams, fountains; wind, e.g. vegetation movement, birds; sound absorption, e.g. sand, snow; reverberation, e.g. walls, underpasses, spaces between structures. Utilize existing, non-invasive sound generating devices, e.g. bells, wind chimes, fog horns, music.

714.2.3.3 Information/Navigation Reference Point System. An information/navigation reference point system complying with Section 708.7 is recommended for people with a visual disabilities.

714.2.4 Olfactory Reference Points. Utilize unique scent characteristics within the site.

714.3 Landscape Elements. Landscape architecture enhances wayfinding. Consider space shape and composition, element placement and composition, types, shape, color, scale and growth rate/patterns from initial installation to maturity. Density, glare protection, physical characteristics, radiation protection, sound attenuation and air infiltration are important considerations. Utilize features such as, leaf type, branching structure, flowering, scent, and fruit. Consider sound attenuation, solar radiation, screening, glare, reflection and air filtration. Carefully integrated fabricated elements enhance wayfinding (e.g., bollards, natural and paved walkways, curbs and fencing, railings, ramps, walls, drinking fountains, outdoor furniture, planters).

714.4 Architectural Elements. Architecture should intentionally incorporate wayfinding. Architectural elements include but are far from limited to the following: space shape and composition, columns, doors, overhangs (e.g. canopies, trellises), walls, roofs, finishes, decorative details, railing, ramps, walls, stairs, windows. Elements provide clues and emphasize various components such as entries. The massing orientation of the building will provide wayfinding. Work with elements required by code such as egress locations. Art work applications range from landscape and architectural integration to stand alone works.

714.5 Hierarchy. Hierarchy is not limited to primary, secondary and tertiary routes. Spaces (lobbies, waiting areas, intersections, etc.) configuration should be designed to convey level of importance, sequence and applicable to all sensory information.

714.6 Consistency. Consistency is important in a wayfinding system, but carefully crafted deviation from a standardized system can also be used as an advantage to emphasize an element.

714.7 Orientation. Orientation should be provided in several ways including: compass orientation, location of where you are within the facility and distances. Compass orientation can be provided with visual and tactile compass/north arrow images and audible compass direction. Floor placement is strongly recommended. Location where you are within a facility can be provided with a map, reference point, electronically (e.g. cell phone location by calling number located at a particular location or GPS). Distances to nearest features and primary reference points should be provided. Wayfinding kiosks that contain a relief map linked to an electronic monitor, complying with Section 710.4, is recommended. This will tell you where you are, where reference points are and compass direction in addition to other relevant information.

714.7.1 Maps and Floor Plans. Maps and floor plans are of limited usefulness and are not inclusive means of providing wayfinding. Not everyone is capable of reading and understanding them. Exterior maps should provide route, connections to other routes, attractions, amenities (e.g., rest areas, shelters, drinking fountains, toilets, transit stops, and parking), distances, travel times, stress levels, and emergency information. If provided, they should be both visual and tactile with location of the map indicated by a star. It is strongly recommended to combine a map with an electronic display to help guide the visitor to their destination. Maps should be included in public information display complying with Section 710, kiosks complying with Section 710.4 and directories complying with Section 711. Maps may be wall mounted, floor mounted, included in overhead signage, as part of the elevator lobby signage requirements, etc. Refer also to Section 714.10.

714.7.1 Advisory. One way of increasing the comprehension of maps is to use a three dimensional system complying with Section 710.4. The information/emergency kiosk contains a three dimensional floor plan depicting where it is located. This not only helps people with sight disabilities, but makes it easier to understand and use for people that have difficulty comprehending and orienting themselves to two dimensional maps and floor plans.

714.7.2 Directional Indicators. Consider the use of directional indicators (e.g. arrows) to guide the visitor through the facility and to keep them oriented. In lieu of directional arrows a color dot or raised tactile symbol can be used to guide the visitor. Refer to Section 714.14 site information/emergency terminals.

714.7.3 Information/Navigation/Alert Reference Point System. An information/navigation reference point system is intended for people with a visual disability and should comply with Section 706 and Section 708.7. This system utilizes vibration, providing a tactile indicator. Consider other types of proximity detectors.

714.8 Site

714.8.1 Site Entry. Emphasis site entrance utilizing landscape and architectural elements Begin integration of visual, tactile and auditory wayfinding at site entries and public transportation and vehicle drop-off points. Signage should comply with Sections 709. Consider an information kiosk with general signage, maps, brochures etc.

714.8.2 Vehicle Parking. In large parking facilities it is critical to provide a simple way of wayfinding for both locating the entrance of the building and to locate the vehicle. Level, compass direction, and zone should be made easier to identify and locate by identifying each area within the facility with a unique color, level number and compass direction, such as a blue sign background, that reads: Level 2, North. Signage should be located overhead, wall and floor surface mounted. Provide large scale properly lighted signage for distance reading from a moving vehicle located at key points including parking facility entrance, along pedestrian route and building entrances. Include pictograms.

714.8.3 Exterior Route. A primary exterior route should be designed as a part of a well thought out three dimensional circulation system. A direct link should be provided to the building entrance(s). Exterior routes are defined by a number of elements identified in Section 714.2. Routes are more than just paved walkways, they can be defined by living walls and screens. Introduction of fabricated structure, such as fencing, rails, low walls, and curbs will enhance wayfinding. Signage should comply with 713. Provide public information displays complying with Section 710.

714.8.4 Configuration. Exterior route configuration should be intuitive and consistent whether it is based on a standard geometric pattern or organic. It should direct people to the various features within the site with the least amount of effort and confusion. Provide a minimum of one major meeting space to act as a reference point. Other spaces, including intersections should be based on a hierarchy.

714.9 Building

714.9.1 Entrance. Enhance the building entrance(s) through multisensory means to distinguish it from the rest of the building and other doors. If possible, provide direct views of the building entry for the site entry or route to help guide the visitor.

714.9.2 Main Lobby. Upon entering the facility, the wayfinding system should be obvious and continuous from the exterior. Consider the lobby as the primary reference point or one of several primary intersections or reference points within the facility. More aggressive wayfinding such as handrails and floor strip systems should be provided for people with sight disabilities starting at the entry area for some types of buildings (e.g. hospitals) Signage should comply with Section 709.

714.9.3 Route. Route complying with Section 403.5, may be comprised of a primary, secondary and tertiary routes. Provide a hierarchy that distinguishes each (e.g. width, height, shape, ceiling design, color, lighting, decorative elements, etc).

714.9.3.1 Configuration. Interior route configuration should be intuitive and it should not be circuitous regardless if it is based on a standard geometric pattern or organic. Discontinuous routes are not recommended due to the confusion that may arise. It should direct people to the various features within the site. Provide a minimum of one major meeting space to act as a reference point. Other spaces, including intersections should be based on a hierarchy.

714.9.4 Reference Points. Reference points along the route include lobbies, intersections, branching, open spaces, waiting areas, rest areas, terminations, etc. Spaces may convey importance using a particular shape, size, material and texture. Signage should be used to enhance the reference points and provide supplemental graphic information. Floor lobbies, elevator lobbies, restrooms, drinking fountains, telephones, etc. provide reference points. Amenities are typically stacked in multistory buildings for efficiency and provide a consistent reference point from floor to floor.

714.9.5 Floor Lobbies. Floor lobbies include elevator and bathroom lobbies. These act as secondary reference points and should be enhanced with multisensory information. Provide floor directory complying with Section 711.4. Elevator lobbies often double as a floor lobby. Stairs and adjacent amenities within close proximity enhance its importance.

714.9.6 Intersections and Turns. Route intersections are reference points. These should be enhanced with multisensory information, art work and other features. Turns may be used for wayfinding, especially if the route configuration contains only a few. A visitor may find their location simply by remembering that there destination is right after the turn.

714.9.7 Ancillary spaces. Spaces such as rest or seating areas, food courts, balconies and break areas, act as reference points.

714.10 Smart Phone/PDA, GPS Wayfinding. Smart phone/PDA, GPS wayfinding systems are recommended for both interior and exterior applications. They should provide navigation information in audio, visual and tactile/ vibration formats. Features may include road and recreational route maps, floor plans, user locator, a variety of relevant information (street, floor, compass direction, distance, duration, etc.) Reference points should be identified to help users easily locate themselves within a facility (e.g. directory locations, entries, elevators, restrooms, etc.). Any device should accommodate a wide range of applications, user needs and preferences.

714.10.1 Beacon and router technology. A wayfinding app may use beacons to establish reference points. Another potential application of Section 309.4.1.1 Gesture Recognition Operation is potential use of router interference technology to produce three dimensional interior mapping.

714.11 Cell Phone Audible Wayfinding. Cell phone audible wayfinding consists of reference points assigned a specific phone number. At each location the occupant dials the provided number and a pre-recorded message will identify the location, provide directional and other relevant information and assistance if necessary.

714.12 Recorded Tours. Consider audible and visual exterior and interior tours for institutions such as multiple building complexes or museums or other types of exhibitions, temporary facilities such as conventions, etc. Tours may be recorded in a wide range of formats (e.g., downloadable digital tours).

714.13 Information/Navigation/Alert Reference Point System. Consider providing a information/ navigation/alert reference point system complying with Section 708.7.

714.14 Information/Emergency Terminals. Consider providing information/ emergency terminals complying with Section 708.8 in public pay phones in close proximity of major features, facilities, landmarks, within parks, etc. The terminals may provide information, directions, history, and additional information that may be used for self-guided tours.

714.15 Multisensory Information/Emergency Kiosks. Consider providing multisensory information/emergency kiosks complying with Section 710.4.

714.16 Multisensory Pedestrian Signals. Pedestrian signals should be provided in visual, auditory and tactile/vibration overlapping formats complying with Section 406.16 and 703.8.

714.17 Variable Message Signs. Variable message signs (VMS) can be used to provide wayfinding with both static and dynamic messages. See Section 703.7.

714.18 Multisensory Mobile Navigation.

714.18.1. General. Multisensory mobile navigation for travelers with disabilities should comply with Section 714.18. Navigational information can be accessed through mobile devices, virtual kiosks, or tactile maps.

714.18.1 Advisory. Although there are a number of wayfinding technologies available (GPS-related, RIAS, RFID, and others), these technologies are not widely accepted because they require that: a) expensive equipment be installed and maintained; b) individuals purchase special receivers or devices: and c) users learn a new, and often complicated interface.

It has been demonstrated that travelers who are blind prefer not to carry additional devices. They may be already holding a cane or service dog harness, along with their cellphone, smartphone or other personal digital assistant (PDA). In addition, they may regularly travel with a laptop or iPad. Use of additional devices may be resisted.

714.18.1 Advisory Cont'd. Systems have been developed that are cloud based, and work with the pedestrian's existing familar devices (such as ClickAndGo Wayfinding [8]).

In this example, the wayfinding data is customized and prepared with the pedestrian who is blind specifically in mind. All directions and audio descriptions are delivered in an appropriate manner, using non-visual landmarks and cues for the traveler. With this type of system, there is no new interface to learn, no extra device to obtain, and no equipment for any facility to maintain. This system also delivers alternative databases for travelers with a mobility disability, providing searchable stair free directions for a variety of indoor and outdoor venues.

14.18.2 Mobile App Navigation. Wayfinding technology for people who are blind, people with low vision and people with mobility disabilities. Accessible online and via mobile app, it provides narrative directions, low-vision maps, real-time location support and other features that help the user reach their destination independently.

714.18.2.1 Components. The customized data compilation for this system is gathered and prepared using experts in blindness. They conduct a comprehensive assessment of a venue, and organize various categories of wayfinding and informational data. Real time location support is provided through the use of iBeacon technology.

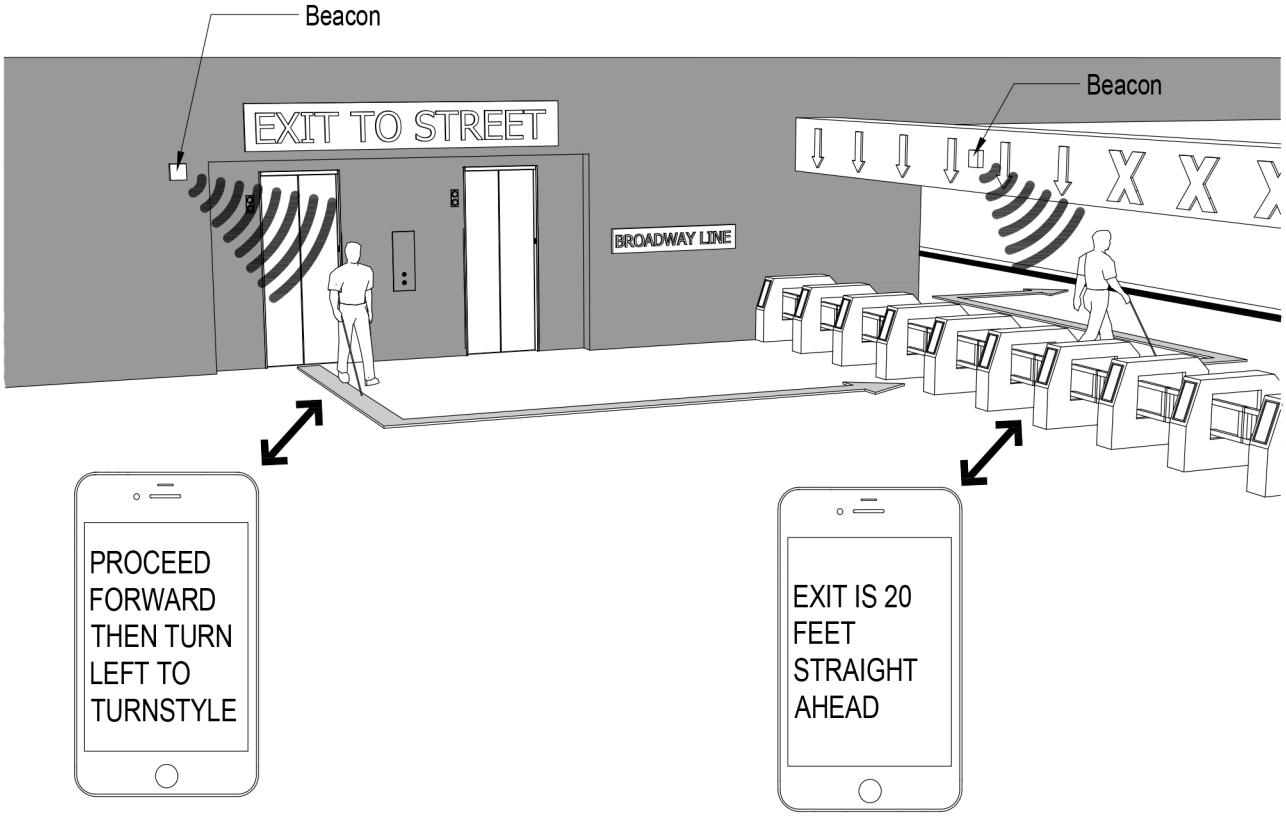


Fig. 714.18.2
Mobile App Navigation

8 System developed by ClickAndGo Wayfinding. It is a patented wayfinding technology for blind, low-vision and mobility-challenged pedestrians: info@clickandgomaps.com

714.18.2.2 Operation. Virtual cloud based wayfinding. Navigational information accessed via the following options: computer screen reader, text and MP# download, mobile device, standard personal cellphone, large print Braille, refreshable Braille, or tactile map. Interative voice response (IVR) is used via telephones.

714.18.2.3 Exterior / Interior Applications. Highly descriptive wayfinding data can be compiled for both exterior and interior spaces, such as bus hubs, pedestrian plazas, ferry terminals, building lobbies, etc. The applications are broad and the specific features that are deliverable include: virtual tours, specific Point A to Point B walking routes, low vision maps, accessible menus, descriptive points of interest, etc.

714.18.3 Virtual Kiosks. Virtual kiosks are virtual information kiosks that can be deployed anywhere within an indoor or outdoor venue. It provides travelers with navigational and venue-specific information using tools that fullfil the same functions as traditional electronic kiosks.

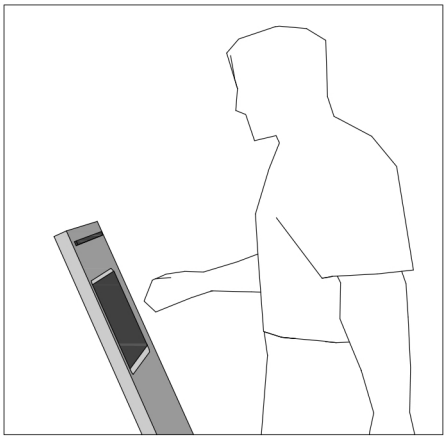


Fig. 714.18.3
Virtual Kiosk

714.18.3.1 Components. Consists of a small wireless beacon that communicates with a navigation app. It can be a seamless upgrade for standard kiosks that don't currently support people with a visual disability. It can include additional information that is critical to people with a mobility disability and those that are memory challenged.

714.18.3.2 Operation. The virtual kiosks are triggered automatically when a user approaches, notifying travelers of their current location using a proprietary app on their mobile device. The same app can be used to find routes to various locations at a venue, using the kiosk as the starting point.

714.18.3.3 Exterior/Interior Applications. Virtual kiosks provide not just navigation, but can contain as much information as a venue cares to provide. Restaurant menus, flight information, class timetables and anything that makes the venue more enjoyable to the traveler with a disability.

714.18.4 Tactile Maps. Tactile maps that include both low vision and tactile features[9]. Anyone can use them effectively including people with low vision or people who are blind. Information for people with diminished mobility can be provided, allowing users to identify and plan wheelchair routes.

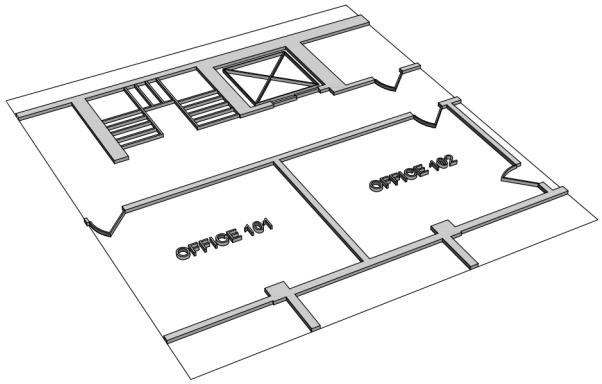


Fig. 714.18.4
Example of Tactile Map

9 InTouch Graphics partnered with ClickAndGo to provide tactile maps that include both low vision and tactile features.

714.18.4.1 Components. Permanent installation maps can be etched in magnesium, but can also be produced in bronze or other materials. They have a high contrast enamel paint and include color features. Labeled in Braille, they also utilize an easy to read tactile-visual symbol system and includes large print, high contrast displays. They come with a legend and directory locations and can be designed with an x/y coordinate system for quick tactile navigation. Portable tactile maps are designed in swell paper (encapsulated plastic) and though they can be as small as 11”x17” (280 x 432 mm) they can be designed in a larger, collapsible format for ease of use.

714.18.4.2 Operation. Permanent tactile maps use three dimensional surfaces and texture as well as audio to guide the traveler. As the person feels the map, it provides both tactile feedback and redundant verbal descriptions to help navigate the plan and the actual space or environment that is mapped. Portable versions should be provided so travelers can carry them.

714.18.4.3 Exterior / Interior Applications. Allows people who are blind to navigate both exterior and interior routes. It allows people who use a wheelchair to plan accessible routes. Maps can be made to represent for example, outdoor walking routes, campus areas, indoor floor plan layouts, fire exit routes. Portable versions can be use for pre-journey learning at home. Can be used in combination with virtual kiosks at venues to achieve the greatest effect. When a user is notified via their app that a virtual kiosk is near, they are also informed if a tactile map is in the same location. Portable tactile maps could also be distributed from the same spot..

714.19 Tactile City.

714.19 Advisory. Tactile City is a Cooper Union, Irwin S. Chanin School of Architecture, student designed research project led by Teddy Kofman, Assistant Professor: http://www.tactilecity.org/ Several city entities provided support: the NYC Department of Design and Construction (DDC) (project initiation); the NYC Department of Transportation (DOT) and the NYC Mayor’s Office for People with Disabilities (MOPD). This is a reproduction of the project synopsis produced by the student team formatted to the *IDG*. Thank you to the entire team.

Please keep in mind that this project uses detectable warnings in an unconventional manner. A standard usage is shown in Section 406 Curb Ramps. They are typically 24-inches (610 mm) in depth with various widths. Configurations that deviate from a rectangular shape may cause confusion for people who are blind. Tactile City uses experimental triangles that provide directionality, pathway centering and turn Indicators. It is part of continuously evolving wayfinding.

714.19.1 General. Tactile City comprises navigation strategies for people with visual disabilities. The project addresses the challenges that pedestrians with sight disabilities face when navigating New York City. Many technological solutions have been made available to assist these pedestrians in traversing the streets safely. Yet we believe that the conveyance of this necessary information could be achieved by utilizing a much simpler tactile method, integrated within the existing urban infrastructure of New York. This citywide approach will serve as a prototype for the handling of any type of interruption to pedestrian traffic by the creation of a parallel communication channel. The integration of this system will require minimal intervention into standard sidewalk construction processes. As an alternative approach that develops over time, keeping up with city growth and reinvention, this project can avoid the difficult implementation most major infrastructure projects entail.

714.19.1 General Cont'd. Independent navigation in a constantly changing environment like New York City presents a great challenge for pedestrians with visual disabilities. They rely heavily on memory to navigate though public space in the City. This memory relies on sounds, tactile surfaces, smell, and previous experience. Interruption to pedestrian movement, particularly construction work, poses an obstacle that may deter people with visual disabilities from passing through the area. Various other interventions in New York City's public space pose similar challenges, from film shooting to street fairs. Yet due to the relatively long processes inherent building assembly, construction generally tends to be the longest interruption to the public circulation in the City.

714.19.1 Advisory. The tactile path here utilizes ribbing running perpendicular to travel. It may be better to run the ribbon parallel with travel for people who use canes to run the tip between the ribbing. See Section 705.6 Raised Ribbing.

714.19.2 City Wide Strategy. The proposal suggests a city wide strategy with emphasis on pedestrian interruptions.

714.19.2.1 Tactile Path. In addition to existing visual cues, a tactile path should be integrated into each sidewalk in the city. Tactile notation in contrasting colors along the path should draw attention to key points of interest along the street, such as public transportation stops, building entrances, street furniture and information poles.

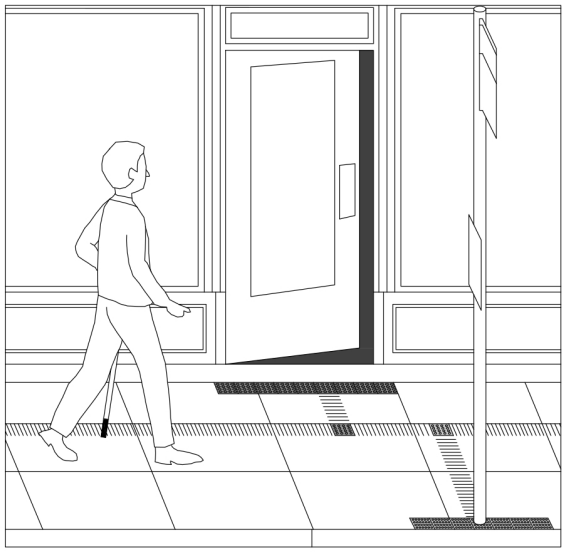


Fig. 714.19.2.1
Tactile Path

714.19.2.2 Tactile Addresses. As part of this strategy each city block should be divided into four segments, indicated on the tactile path. The block's breakdown in distance and scale creates additional points of reference, serving as tactile "addresses" for buildings, stations and street furniture.

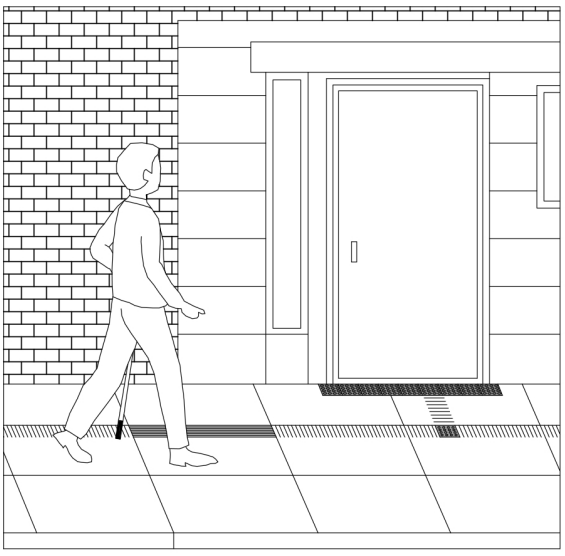


Fig. 714.19.2.2
Tactile Addresses

714.19.2.3 Implementation. The implementation of the tactile path requires no more than a simple metal brush or stamp, to be applied while the sidewalk concrete is curing. Alternatively if the concrete has already set or other material is used, a saw can be used, or prefabricated pavement panels can be installed.

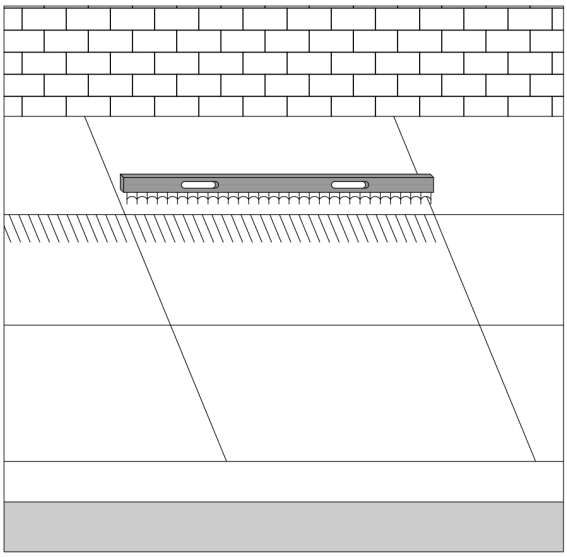


Fig. 714.19.2.3
Implementation

714.19.3 Interruption Strategy. Interruption strategy comprises notifying pedestrians of upcoming interruptions and guidance through detours using tactility and sound.

714.19.3.1 Textured Surface. Applied on top of the tactile path to indicate upcoming interruption. The surfaces should be connected and secured to the path using grooves in the concrete. The triangular surface pattern should safely direct the pedestrians through the detour, indicating where to turn.

714.19.3.1 Advisory. Maintain a continuous ribbed indicator or use truncated domes at a change in elevation. Truncated domes are a drop-off or transition indicator. Consistency is critical to maintain safety. Refer to Section 406 Curb Ramps.

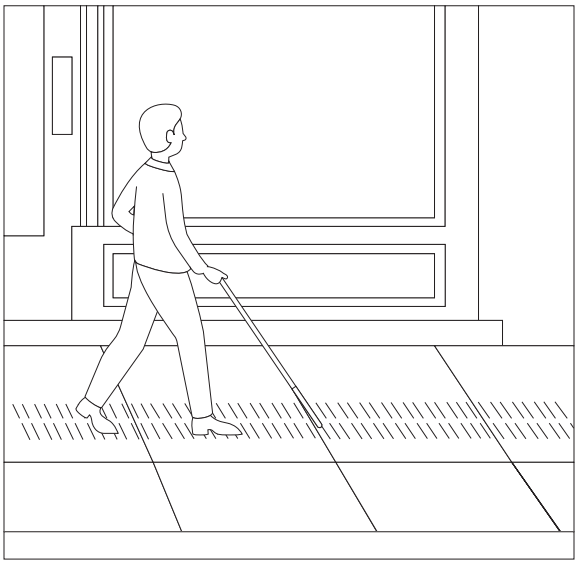


Fig. 714.19.3.1
Textured Indicator

714.19.3.2 Top Guiding Edge. Braille and textured surfaces applied to top edge should convey tactile information.

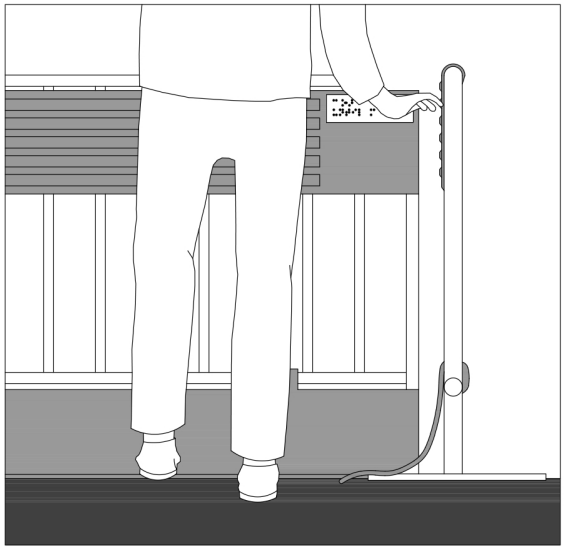


Fig. 714.19.3.2
Top Guiding Edge

714.19.3.3 Bottom Guiding Edge. Bottom edge allows for detection with a cane and creates uniform identification for different barriers.

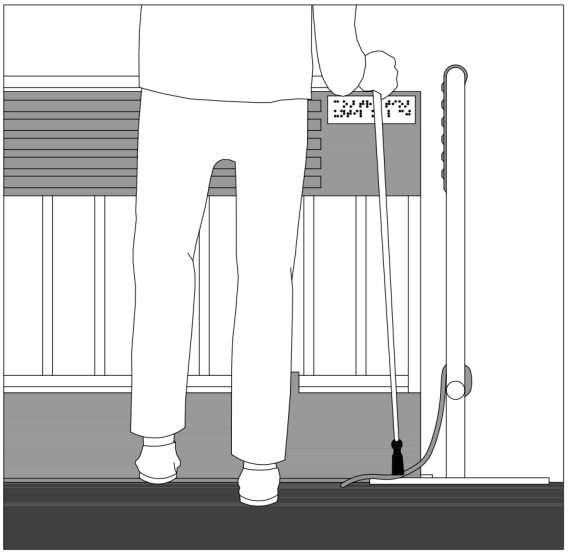


Fig. 714.19.3.3
Bottom Guiding Edge

714.19.3.4 Scaffolding. Scaffolding tends to be confusing. Guiding edges could be attached to these as well as to various other types of construction barriers.

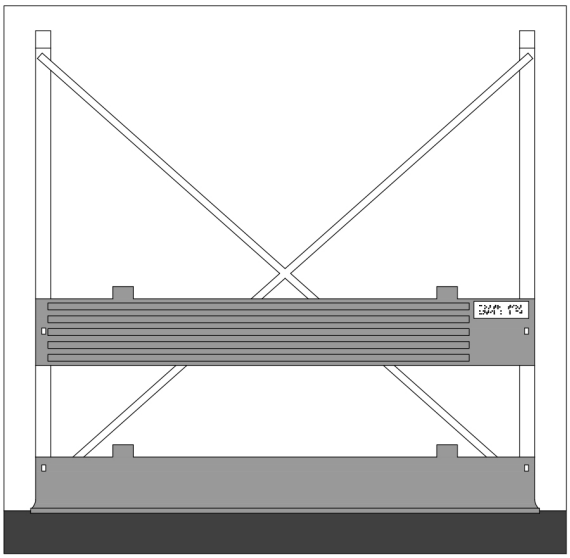


Fig. 714.19.3.4
Scaffolding

714.19.3.5 Speaker/Microphone Device. Sensitive sound devices can be easily attached to existing barriers. They will inform pedestrians of upcoming interruptions and will guide their passage through the detour. Pedestrians should turn in the direction opposite to the sound or receive verbal directional guidance. The volume level and repetition duration is responsive to the number of people and the ambient sound level.

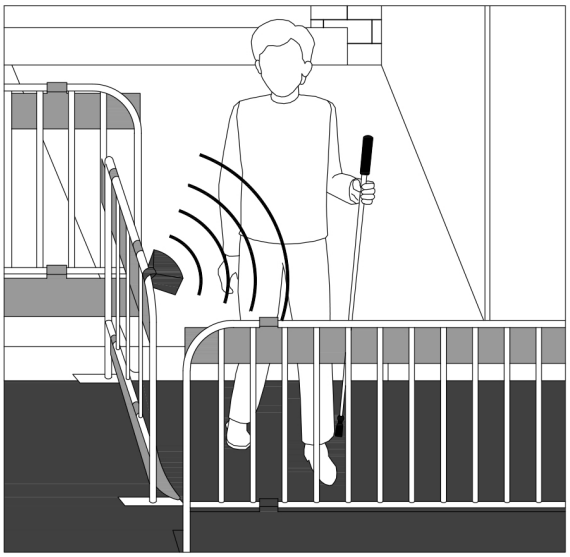


Fig. 714.19.3.5
Speaker/Microphone Device

714.19.3.6 Elevated Platforms. Modular elevated platform should be installed in instances of long term interruption to pedestrian traffic. The platforms should direct pedestrians and continue the standard tactile notation of the street. Modular, reusable and easy to assemble, the platform pieces should provide safe passage through the detour. The space beneath the elevated platform could be utilized for cables and other construction needs.

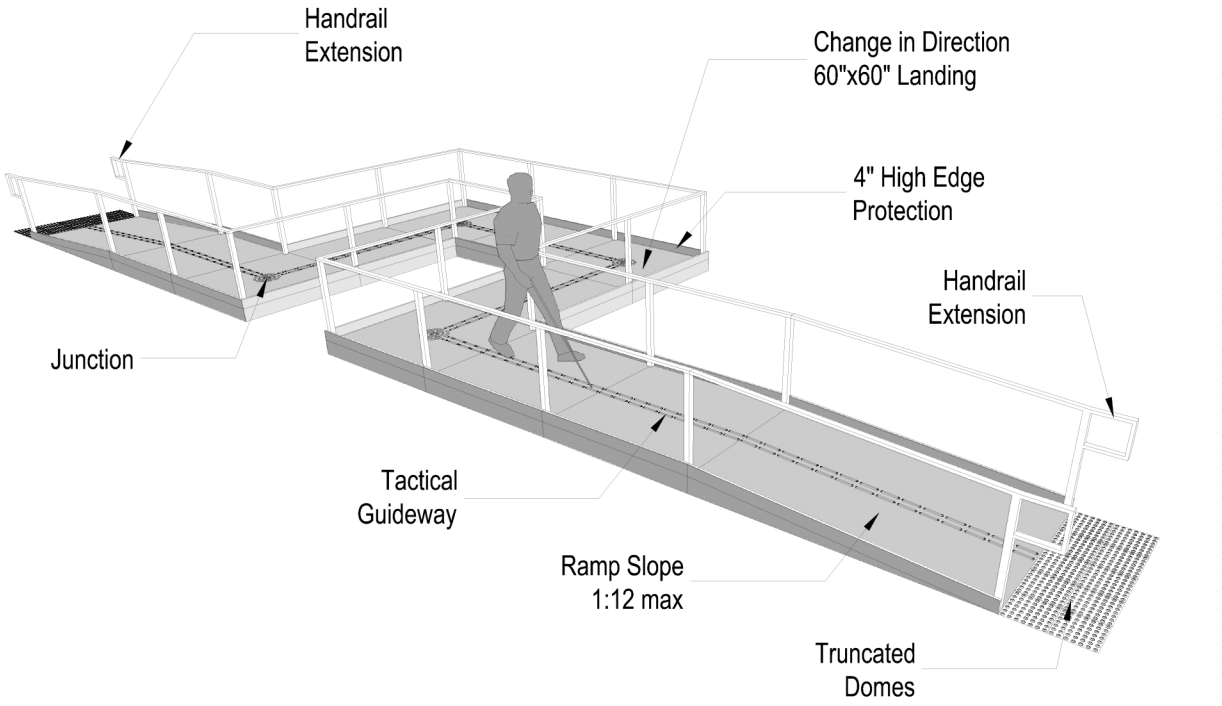


Fig. 714.19.3.6
Elevated Platforms

714.19.3.6 Advisory. Use a truncated dome area that is 24-inch (610 mm) deep maximum and as wide as the ramp at the landing. Truncated domes are a drop-off or transition indicator. Tactile consistency is critical to maintain safety. Refer to Section 406 Curb Ramps.

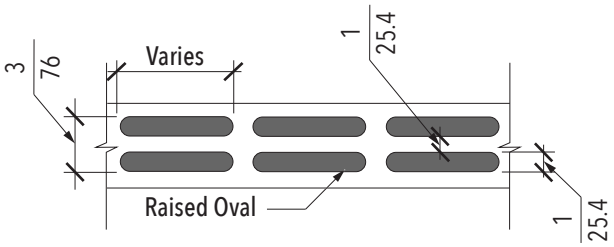
714.20 Tactile Guideways. Tactile guideways are a form of wayfinding for Pedestrians with Low-Vision or Blind.

714.20 Advisory. This section was included to provide our proposed recommendations at the time of publication but the solution for use in NYC may not include any of these. These are recommendations, not requirements, but provide enough information to encourage additional research and refinements. These may include the use of embedded LED's, beacon technology, sensors, proximity detectors, supplemented with various apps and other technology such as Induction Loops. Truncated elongated ovals seem to be the most logical system choice: they provide tactile guidance without creating tactile confusion with truncated domes; creates a slot between the elongated ovals for cane tips; the gap between each oval allows for drainage; the tactile ovals act as a general locator of the system that makes it easy to find the cane tip slot; the surface installation is easy and depending on the color and material could blend well with the surrounding aesthetics or with high contrast and color stand out from the surrounding.

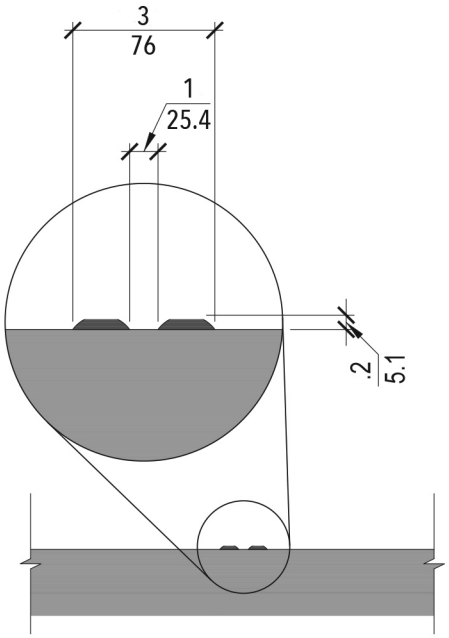
714.20 Advisory Cont'd.
Ribbing is an alternate tactile indicator that also does not cause tactile confusion with truncated domes. Embedded guideways are similar but are installed within the depth of the sidewalks creating a more durable and permanent installation. Saw cut slots may be the fastest and easiest permanent installation method requires the use of tactile thermal plastic markings that are quick and easy to install, but the slot could fill with dirt and may be subject to ice formation from water sitting in the slot.

714.20.1 Surface Applied Guideways. Surface guideways are applied directly to the route surface. Guideway comprises two or four rows of 1-inch (25.4 mm) wide truncated elongated ovals, 6 inches (152.4 mm) in length and .2 inch (5.1 mm) in height with a 1 inch (25.4 mm) gap between the ovals that forms a guideway for a cane tip. An alternate tactile indicator may be raised ribbing (corduroy) complying with Section 705.6 running perpendicular to direction of travel. This system will comprise continuous strips or abutted segments of plastic or metal located on the center line of the sidewalk or route. Various colors may be used to provide compatibility with the surrounds, but contrast is more effective than color. Refer to Section 302.10 for visual contrast and Section 302.11 for color. Attach directly to the walking surface using physical anchors, adhesive or both. The gaps between the elongated ovals provide drainage and help to prevent ice.

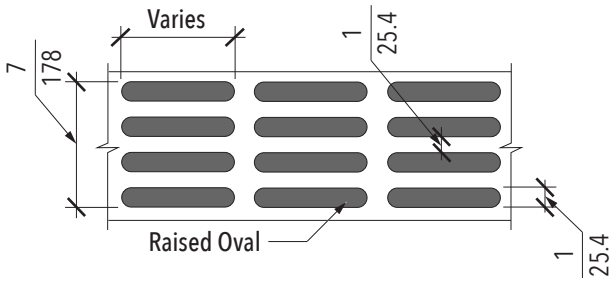
714.20.1 Advisory. Four parallel rows of elongated ovals may be used to increase tactile indication and to create three slots for cane tips to accommodate use error tolerance.



(a)
Plan with 2 rows



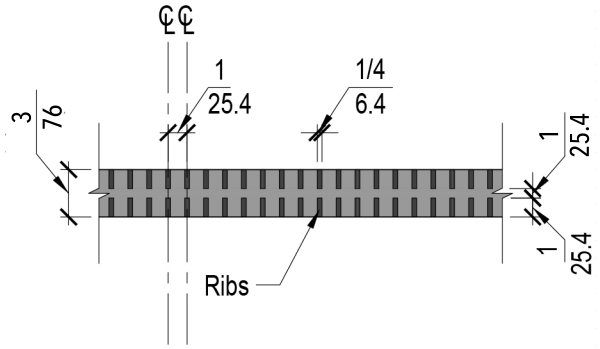
(b)
Cross Section



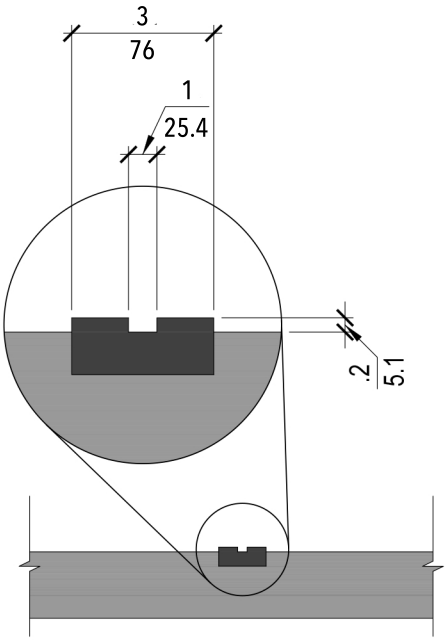
(c)
Plan with 4 rows

Fig. 714.20.1
Surface Guideway

714.20.2 Embedded Guideways. Embedded guideways comprise prefabricated units installed into the sidewalk surface tactile indicators complying with Section 714.20.1 or ribbing (as shown) or other tactile indicators. Refer to Section 302.10 for visual contrast and Section 302.11 for color. Ribbed guideways may be used as a transition indicator, such as, prior to a door threshold or junction.

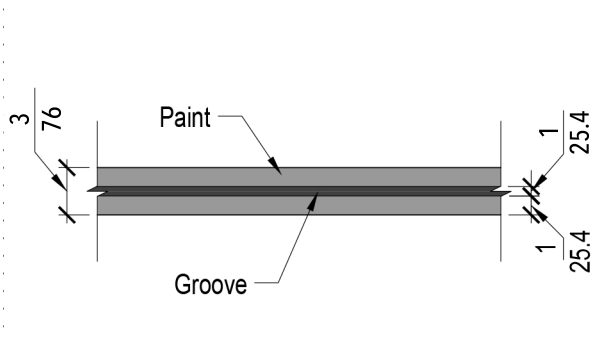


(a)
Plan

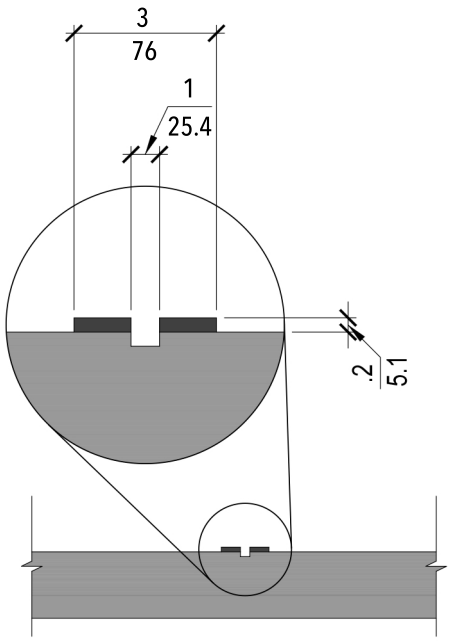


(b)
Cross Section

Fig. 714.20.2
Embedded Guideway



(a)
Plan



(b)
Cross Section

Fig. 714.20.3
Saw Cut Guideway

714.20.3 Saw Cut Guideways. Saw cut guideways are 1 inch (25.4 mm) wide and 1/2 inch in depth cut directly into the route surface forming the cane tip guideway with a 1-inch (25.4 mm) wide hot applied raised thermal plastic marking .2-inch (5.1 mm) on both sides of the saw cut. The markings may be segmented to provide a more effective tactile indicator and also to help drainage.

714.20.4 Junctions. A circular junction 8 inches (203 mm) minimum in diameter should be provided to allow multiple tactile guideways to intersect properly. Tactile guideways will crisscross or there will be locations where a guideway may branch off from another guideway to locate a building entrance, curb ramp or other type of destinations. Junctions should contain a tactile surface (i.e., concentric curved elongated ovals) that create a tactile stop with proper drainage to avoid water accumulation that could turn into ice and thus diminish the tactile quality. Junctions may be various shapes but a circular shape allows intersecting guideways at any angle. Other junction shapes, such as a triangle may provide enhanced directionality but standardization may limit the shape to a circle. Provide an Induction Loop complying with Section 714.20.7 and a beacon at the center of the junction complying with Section 714.20.8.

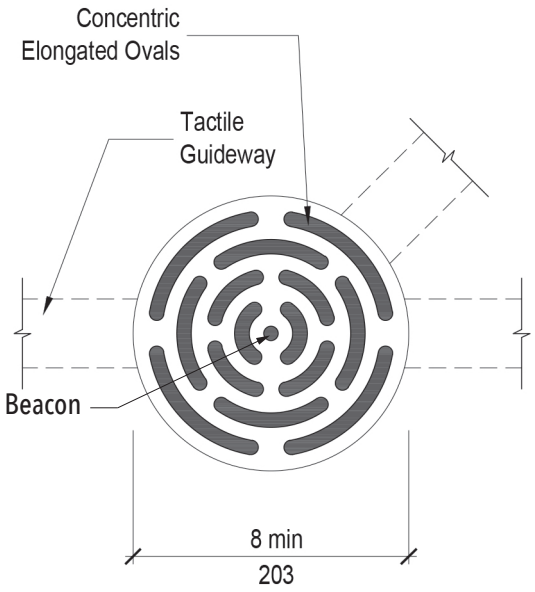


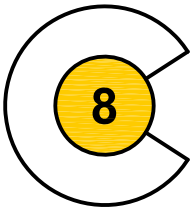
Fig. 714.20.4
Junction

714.20.5. Smart Canes. Smart cane features are evolving at an increasing rate. This may include the ability to work with tactile guideways to provide audible information that supplements the tactile information provided by the guideway as well as amplification of the tactile characteristics and enhancing the tactile information with vibratory patterns. In addition, the integration of an induction loop in the tactile guideway can transmit information to a telecoil (t-coils are normally used in hearing aids) that is interfaced with the smart cane or other device to enhance the effectiveness of the tactile guideways as well as SPS (see Section 706.16.7).

714.20.6 Personal Digital Assistant and Apps. Tactile guideways should interface with personal digital assistants (PDA), such as a smartphone, smart watch, smart cane or other type of device with the appropriate current and future apps. GPS will become more accurate and function in 3-D. Other technology and apps will appear and evolve, becoming more robust, and other means of wayfinding will become available, but the need for a passive physical tactile guideway may still be required or preferred by people who use canes.

714.20.7 Induction Loop. Provide an induction loop integrated or below and aligned with the centerline of the tactile guideway. A single or dual induction line should be connected to the corner traffic control box for power, receiver and transmitter and a CPU to work with hearing aid t-coils, smart canes, smart phones, PDA and other devices. This will help the user regardless if they are hard-of-hearing or not to navigate, provide proximity detection to the guideway, maintain proper orientation, convey directionality, integrate with the APS system or the SPS system, integrate other wayfinding systems, provide reference points, convey distance, identify addresses, identify entry point(s), and act as a real time means to transmit information. This will help to efficiently, accurately and safely navigate streetscape and other environments that will increase the level of independence for people who are blind. See Section 706.3.1 Induction Loop.

714.20.8 Beacons. Consider the use of beacon technology that can communicate with a navigation app. See Section 714.18. Beacons are very useful for identifying an exact location and providing relevant information, such as addresses, entry points, street names and cross-street, at intersections, junction points and other critical information that will substantially increase the ability of a person who is blind to independently navigate.



Selected Spaces

800 Introduction. Chapter 8 examines some particular types of rooms and spaces containing unique technical criteria (e.g. variable height spaces). They are all subject, of course, to compliance with the other chapters. Ultimately a fully inclusive environment is the goal. The administrative authority determines and defines application through scoping provisions in the relevant code. See Chapter 2, Scoping, for additional information.

Some *IDG* sections commonly apply, such as those identified under this chapter in the general paragraphs for Sections 802 through 812. These include, but are not limited to, the following example sections: 302 Floor Surfaces, 303 Changes in Level, 304 Turning Space, 305 Clear Floor Space, 306 Knee and Toe Clearance, 307 Protruding Objects, 308 Reach Ranges, 309 Operable Parts, 310 Eye Levels, 403 Walking Surfaces, 404 Doors and Doorways, 405 Ramps, 505 Handrails, 506 Windows, 602 Drinking Fountains, 609 Grab Bars, 702 Alarms, 703 Signs, 704 Telephones, 706 Assistive Listening Systems, 708 Two-way Communications, 709 Signage Systems, 710 Public Display Types, 902 Dining and Work Surfaces, 903 Seating and 906 Trash and Recycling Receptacles.

Chapter 8 covers assembly areas, dressing areas, fitting and locker rooms, kitchens and kitchenettes, transportation facilities, holding cells and housing cells, courtrooms, waiting areas, service areas, dining areas, offices, Type “A” and “B” temporary work spaces and meeting rooms. These few examples should help designers apply similar logic to other types of spaces.

Assembly areas focus on spectator seating accommodations in public assembly and entertainment venues (e.g. stadiums, arenas, theaters, playhouses and auditoriums). Sites, routes, entrances, doors, vertical circulation, parking, services and concessions, amenities, signage, wayfinding and other components are covered under other chapters in the *IDG*. Assembly seating includes: adjustable height space, adjustable height multiple seating platforms and stationary inclusive spaces, standard seating, communication elements and features, lines of sight and dispersion. Seating accommodates a wide range of needs and preferences. Public assembly should be easy to use, containing a simple and intuitive circulation system that reduces confusion and congestion and also eliminates choke points. Lines of sight are critical. Seating should be comfortable and adjustable where practical. Concessions and amenities should be logically places to avoid long travel distances, accommodate peak pedestrian traffic, be recognizable and easy to enter and exit. Maintain direct or electronic visual and audible links to the performance or event in all areas of the facility.

Lobbies should be large enough to accommodate peak occupancy and properly integrate and enhance the circulation system. Vertical circulation, seating, restrooms and other amenities should be within close proximity of the primary lobby and floor lobbies.

Kitchens and kitchenettes should provide proper clearance, work surfaces, sinks and appliances that create an inclusive environment for cooking. Section 804 applies to all kitchens except those in dwelling units, described in Chapter 10. Kitchens should work for a wide variety of users, especially where it is not known who will use the facility.

Transportation facilities specifically address boarding, shelters, signage and wayfinding. Subway wayfinding provides directional information at entrances and key locations. Holding cells and housing cells accommodate mobility devices and address benches, beds, toilet facilities and communication features.

Courtrooms contain rooms, spaces, stations and hierarchy. These cover waiting areas, clerk's office, central holding, interview rooms, jury assembly area, conference rooms, courtroom entry, main aisle, routes, spectator area, rail, jury box, witness stand, judge's bench, clerk's and bailiff's stations, court reporter space, judge's chambers, jury deliberation rooms, holding cells, communications and wayfinding. The witness stand utilizes the adjustable height space concept that should also be considered for judge's benches, clerk's stations, bailiff's stations, deputy clerk's stations and space for court reporters.

Waiting and reception areas are common throughout the various building classifications. They should be provided with a directory, other signage, supportive seating and be located within close proximity to restrooms and other amenities. Trash and recycling receptacles should be grouped with these to increase the overall convenience and usability and should not conflict with the path of travel.

Services areas are examined because they are important in a wide variety of building classifications. They should be designed to make the interaction between providers and visitors comfortable, easy to communicate and provide privacy for exchange of sensitive information.

Dining area seating, circulation, surfaces, food service lines and concessions are examined. Awkward and difficult paths of travel within a seating area should be eliminated to better accommodate those with diminished mobility, vision and dexterity. All areas should be usable by everyone, with seating and views providing an equitable and pleasant dining experience.

Offices should be comfortable, accommodating employee needs and preferences. This is necessary because of the amount of time spent in such work space. Lighting controls should be adjustable, logically located and relate to the lighting configuration. Light levels should be appropriate for various tasks. Temporary work spaces comprise Type "A" containing a 72 inch turning circle and Type "B" containing a 60 x 36 inch clear floor space. These are intended for short duration usage.

Meeting rooms should accommodate a wide range of uses, group sizes and the needs and preferences of the widest range of occupants as possible. Maximum flexibility should be built into the design for unanticipated uses and changing needs. The architectural elements should not restrict flexibility. For example, window and door placement should allow for easy and logical subdivision of a room or a space.

801 General

801.1 Scope. The provisions of Chapter 8 should apply where recommended by the scoping provisions adopted by the administrative authority.

801.1 Advisory. Chapter 8 is different from the rest of the book in that it blurs the boundary between technical criteria and scoping. It addresses particular types of facilities rather than focusing strictly on components. The standard list of rooms and spaces in *A117.1-2009* was supplemented to include several other types: waiting areas, service areas, dining areas, offices, Type "A" and "B" temporary workspaces, and meeting rooms. But these are just a few examples. Basic logic determines which sections in other chapters of the book are applicable. The *IDG* should be used as a parts list in this respect. It is the administrative authority of each municipality that should establish the scoping and application of the technical criteria that the designer uses to produce an inclusive environment.

802 Assembly Areas

802.1 General. Assembly areas focuses on seating that accommodates all spectators so that everyone has an equivalent general experience. All other aspects of the venue regardless of type (e.g., stadium, convention center, auditorium, playhouse, movie theater and lecture hall) should comply with the recommendations of the applicable sections in the other chapters of the *IDG*.

1. Building blocks should comply with Chapter 3, including floor surfaces, changes in level, turning space, clear floor space, knee and toe clearance, protruding objects, reach ranges, operable parts and eye levels.

2. Routes should comply with Chapter 4 including walking surfaces, doors and doorways, ramps, and elevators.

3. Parking, stairways and handrails, should comply with Chapter 5.

4. Drinking fountains and toilet facilities should comply with Chapter 6.

5. Communication elements and features should comply with Chapter 7 including signage, assistive listening systems, wayfinding and telephones. Signage recommendations are contained in 805.6.

6. Seating, sales and service counters, dining surfaces and trash receptacles should comply with Chapter 9.

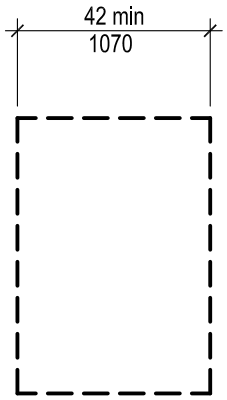
802.1 Advisory. Inclusive locations can be used in multiple ways. The amenities provided at these locations should address the greatest range of spectator needs and preferences.

802.1.1 Seating. Seating in assembly areas comprise adjustable height inclusive spaces, stationary inclusive spaces, companion seating, aisle seating and standard seating. Inclusive space locations should accommodate mobility devices, equipment, transfer seating, other types of seating, and standard seating. Provide directional signage as part of the wayfinding system and comply with Section 714 and public information displays complying with Section 710 and signage system complying with Section 709.

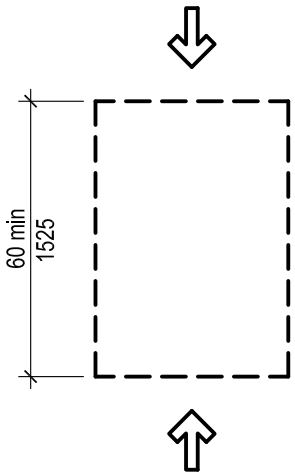
802.2 Floor Surfaces. The floor surface of inclusive space locations should be uninterrupted and have a slope not steeper than 1:48 and should comply with Section 302. It should be level with the adjacent floor surface in the stationary parked position.

802.3 Width. A single inclusive space should be 42 inches (1067 mm) in width. Where two adjacent inclusive spaces are provided, each space should be 36 inches (915 mm) minimum in width.

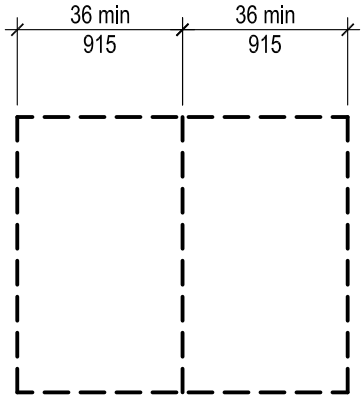
802.3 Advisory. Paired stationary spaces allow greater flexibility for both maneuverability, comfort and option of sitting with a friend, who also could benefit by the inclusive nature of the space.



(a)
Single Space

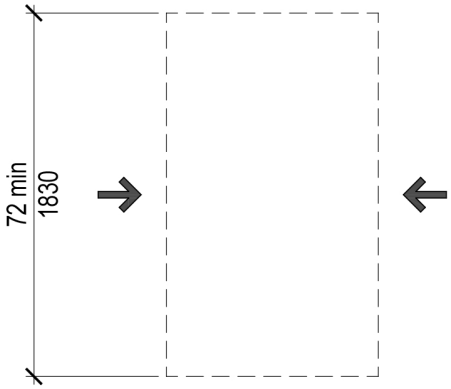


(a)
Front or Rear Access



(b)
Multiple Adjacent Spaces

Fig. 802.3
Width of an Inclusive Space in Assembly Areas



(b)
Side Access

Fig. 802.4
Depth of a Inclusive Space in Assembly Areas

802.4 Depth. Where an inclusive space location can be entered from the front or rear, the space should be 60 inches (1525 mm) in depth. Where the space location can only be entered from the side, the space may be 60 inches minimum (1525 mm) but 72 inches (1830 mm) in depth is recommended.

802.4 Advisory. The maximum allowed car platform size for vertical lifts as per *ASME A18.1-1999* Section 2.6.5, is 18 ft_2 (1.67m2). This limits the various platform configurations for the variable height space as per Section 602.6.1. A side entry with a 60 inch length, limits the width to 42 inches, in order not to exceed the square foot limitation. Maneuvering onto this size platform requires a minimum 48 inch side.

802.5 Approach. The inclusive space location should adjoin a route complying with Section 402. The route should not overlap the space location. The inclusive space may be approached from the rear, front or side. Recommended approach is from the rear. Side approaches are discouraged due to the limited maneuvering clearances. Route should connect the seating areas with the stage, arena, or stadium floor, dressing, locker rooms and all other applicable areas that are available to the general public.

802.5 Advisory. Compliance with Section 402 may appear excessive, especially for a small assembly area. Again the ultimate fall back position is the minimum code requirement as per *ANSI A117.1* Section 802.3 and 802.4. A compromise position may be somewhere in between depending on the size and type of space - a landmark Broadway theatre with restricted space will be treated differently than a new baseball stadium. Some facilities can only accommodate a minimum code 36 inch wide primary route with the associated turning and passing space requirements as per *ANSI A117.1*, Section 403. This should be limited to existing facilities that cannot meet the larger requirements.

802.5.1 Overlap. Inclusive space locations should not overlap the required width of an aisle.

802.6 Inclusive Spaces. Inclusive spaces comprise adjustable height inclusive spaces and stationary inclusive spaces and should comply with Section 802.6. At least two means of egress should be provided.

802.6.1 Adjustable Height Inclusive Space. Adjustable height inclusive space locations and components should comply with Section 802.6. This inclusive space comprises a vertical platform lift that should contain a clear floor space complying with Section 305.3, reach ranges complying with Section 308 and operable parts complying with Section 309. Lines of sight should, at a minimum, comply with Section 802.9 and eye levels complying with Section 310.5. The platform should have only one entrance/exit since the occupant enters and exits at grade.

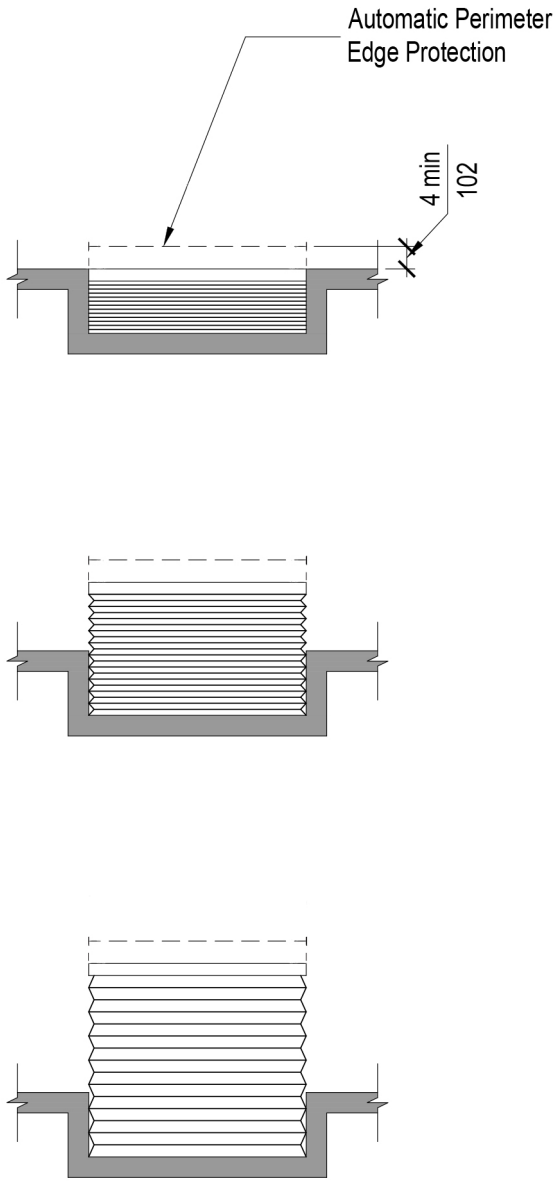


Fig. 802.6.1
Adjustable Height Inclusive Space

802.6.1 Advisory. An adjustable height space allows the spectator to raise or lower them self for changing audience positions, from seated to standing, and to address the varying heights of people in front of the inclusive space. It should provide unobstructed sight lines since the adjustable height will permit the occupant to compensate for most obstructions. Where existing physical conditions cannot or are difficult to modify, an adjustable inclusive space may be the only viable solution. Obstruction of the sight lines of spectators behind the unit is a concern. In some scenarios, proper etiquette must be practiced. Adjustable height allows one to rise and lower with the audience positions. One should be polite and not raise the unit simply to have the best seat in the house. Placement of units should be well thought out to reduce or eliminate these conflicts.

802.6.1.1 Portable Adjustable Height Units. An adjustable height inclusive unit may be portable. Provide an adaptable floor recess with a removable in-fill panel that provides a surface flush with the surrounding floor surfaces. Portable platform unit when inserted into the inclusive space location should comply with Section 802.6.

802.6.1.1 Advisory. The advantage of portable units is that a smaller number of units may be necessary since they can be installed where and when needed.

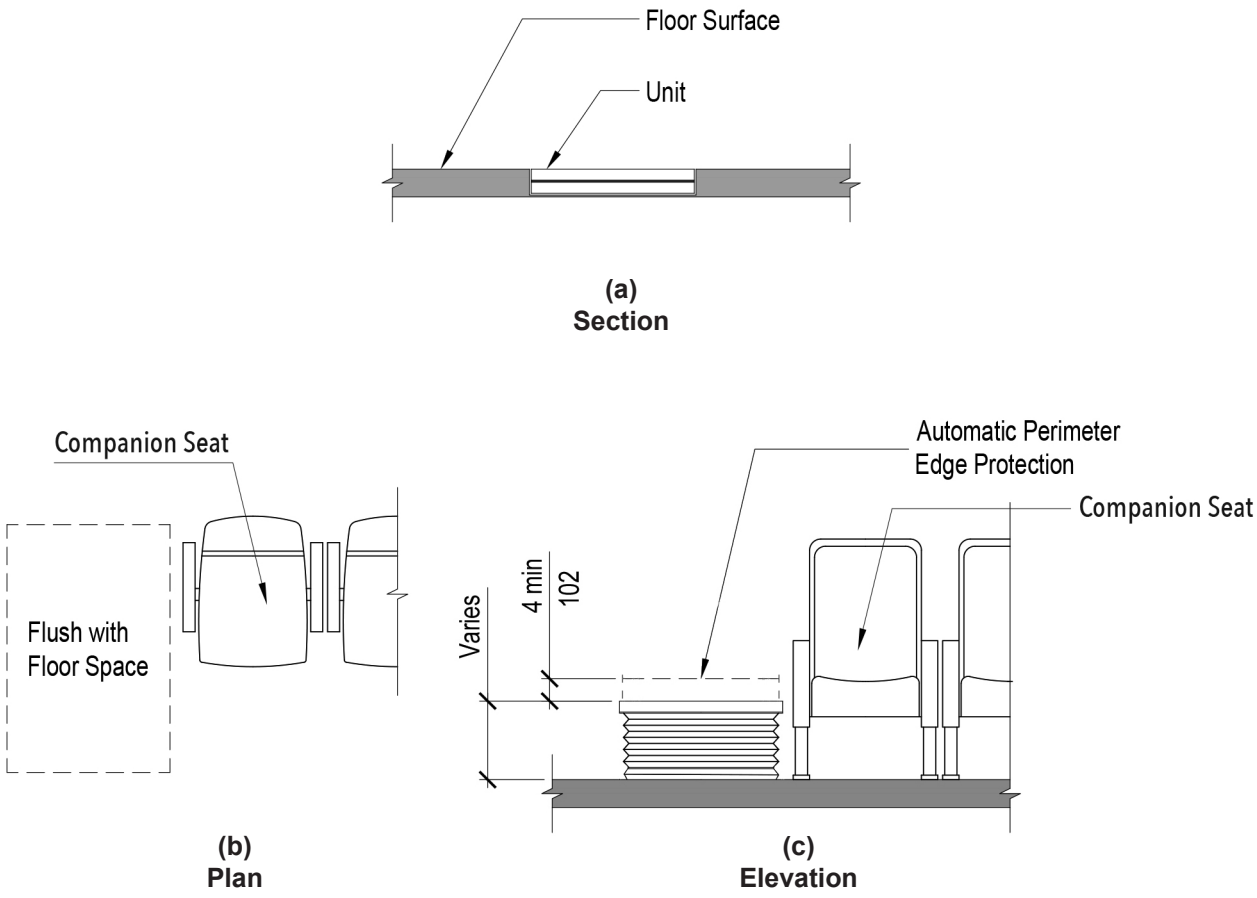


Fig. 802.6.1.1
Portable Adjustable Height Unit

802.6.1.1.1 Adjustable Height Multiple Seating Platforms. Adjustable height multiple seating platforms comprise two or more inclusive spaces grouped together on a single platform. This allows a section rather than individual inclusive spaces for venues where space permits that provides the opportunity for friends to sit together. Provide additional individual dispersed locations comprising a range of seating location options. Platforms should comply with Section 802.6 and are in many ways similar to an adjustable height orchestra pit, but located within the audience seating.

802.6.1.3 Advisory. The use of an adjustable platform will provide unlimited height adjustments within the range of seated viewing positions. It takes into account variables such as obstruction of a large person or spectators standing at an event. Base enclosure on all side can be accomplished with an accordion type material or other means that prevents foot or other entrapment and prevents objects from entering or damaging the lift mechanism.

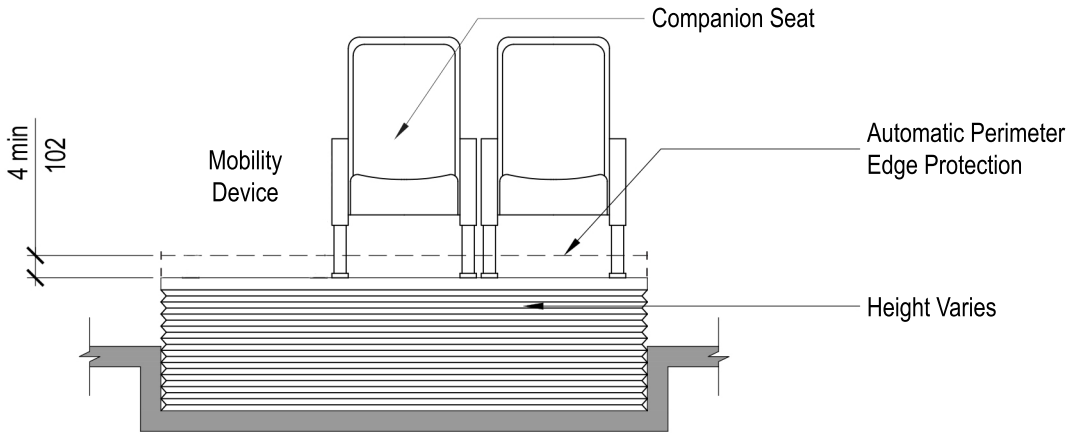


Fig. 802.6.1.1.1
Adjustable Height Multiple Seating Platforms

802.6.1.2 Integration. Inclusive space locations should be an integral part of any seating areas. Venues should not prevent the person from enjoying the experience with a friend or relation especially for people who use mobility devices. These people should not be isolated, located in odd or second rate locations, separated out or placed in positions that call attention to themselves or make them feel slighted, but should be provided with the same level of respect, views, experience and price choices as everyone else.

802.6.1.3 Height. Height should be adjustable via a platform lift with a range from floor level to maximum height above the floor, as per table 802.9.2.2. Platform lift bases should be enclosed on all sides.

802.6.1.3.1 Base Enclosure. Platform lift bases should be enclosed on all sides to prevent body or object entrapment. Enclosure may be panels or bellows type (e.g., telescoping or hinged slats) or enclosed on all side (e.g., witness stand in Section 807.9). Side deflection should be a maximum of 3 inches (75 mm) and should not conflict with mechanism. Provide automatic perimeter edge protection 4 inches (102 mm) in height.

802.6.1.4 Controls. Hand and foot controls should be provided, complying with Section 802.6.1.4 for independent operation.

802.6.1.4.1 Hand Controls. Hand controls may be lever type and comply with Section 308 and Section 309.

802.6.1.4.2 Foot controls. Foot controls should comply with Section 306.2. They should be movable with a flexible cable or with a mechanism that will allow the controllers to be holstered, stored or temporarily swung out of the way to avoid potential obstructions entering or leaving the space.

802.6.1.4.3. Companion Seat Controls. Height controls may also be operable from the companion seat.

802.6.1.5 Speed. The rated lift speed should be 30 ft/min (0.15 m/s) complying with standard listed in Section 105.2.6.

802.6.1.5 Advisory. The maximum operational speed of a platform lift as per *ASME/ANSI A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts* is sufficient for the occupant to rise and lower the unit with the audience. A 3 ft. rise at 2 seconds per foot requires 6 seconds. This is fast enough to keep pace with spectators repositioning and slow enough to maintain safety.

802.6.1.6 Platform Enclosure. Variable height seating platforms are not considered lifts and should not contain an enclosure. Avoid conflict with eye levels and comply with Section 310.5.

802.6.1.6 Advisory. The 42-inch enclosure height dictated by the platform lift code, *ASME/ANSI A18.1*, is not applicable because these units are technically considered lifts because they are not used as part of an accessible route. You enter and exit at the same elevation. Other safety devices could be incorporated into the platform design to avoid roll-off or lateral movement (e.g., chair locking devices, harness, belts or other restraining system) similar to an amusement park ride. Low edge protection will prevent accidental roll-off when deployed.

802.6.1.6 Advisory Cont'd. An automatic 4-inch (102 mm) minimum height perimeter edge protection is recommended that folds flat on all sides with manual backup. This additional protection prevents a wheelchair from rolling off the edge Glass enclosures are not recommended due to reflection and glare. Based on the *2014 NYC Building Code*, Section 1024.14.2 Sight line-constrained guard heights, if voluntarily used, should be a minimum height of 24 inches (610 mm), but may result in a sight line obstruction.

802.6.1.7 Portable Transfer Seat. Provide an easy installation transfer seat to enable the inclusive space locations to be used for transfer seating.

802.6.1.8 Assistive Listening Systems. Assistive listening systems should comply with Section 706 and a receiver jack should be integrated with the seating. Induction loop systems are recommended where viable.

802.6.1.9 Monitor. Provide an adjustable monitor for closed captioning and other uses. It should also be tied into CCTV or audio/visual monitoring of an event. Monitor should contain multiple functions including image enlargement.

802.6.1.10 Electric Outlet. Provide electric outlet for each inclusive seating location to provide power for the various types of equipment that the occupant may require, including battery recharging.

802.6.1.11 Physical and Wireless Computer Connection. Provide wireless and hard-wired jack for computer connection.

802.6.1.12 Alarm. Provide a silent emergency alarm that will trigger an alert at the management/security office, or other designated location that will assure a prompt response.

802.6.1.13 Task Lighting. Provide task lighting with shielded light source.

802.6.1.14 Work Surface. Provide a portable or folding work surface complying with Section 902.4

802.6.2 Stationary Inclusive Space. Stationary Inclusive space locations should be an integral part of any seating areas and should comply with Section 802.8 Lines of sight should comply with Section 802.9.

802.6.2 Advisory. These stationary spaces are not all designated code spaces. The legal minimum number of wheelchair spaces should be identified with the international symbol to avoid a legal conflict. The recommended number of inclusive spaces exceeds the required wheelchair spaces. These additional spaces are intended to be used by who needs or prefers them. NYC has allowed designated wheelchair spaces to be used by anyone if the space is not sold prior to the event (see *2014 NYC Building Code*, Section 1108.2.2).

Some occupants that require an inclusive space may not want or need the adjustable height feature in Section 802.6, especially if the lines of sight meet Section 802.9. Because an adjustable height inclusive space may utilize a platform lift mechanism, a base enclosure should be provided to keep litter and objects out of the mechanism and for child proofing. The stationary inclusive space does not require this enclosure.

Also, providing both adjustable height and stationary spaces presents a choice that accommodates the users needs and preferences while addressing the physical limitations of the facility. The stationary inclusive space can be made adaptable to accept a portable adjustable height unit. This will require an adaptable floor recess with a removable in-fill panel that provides a surface flush with the surrounding floor surfaces. A portable platform unit inserted into the inclusive space location should comply with Section 802.6.

802.6.2.1 Integration. Inclusive space locations should be an integral part of any seating area.

802.6.2.2 Portable Transfer Seat. Provide a removable transfer seat to enable the inclusive space locations to be used for transfer seating.

802.6.2.3 Assistive Listening Systems. Assistive listening systems should comply with Section 706 and a receiver jack should be integrated with the seating. Induction loop systems are recommended where viable.

802.6.2.4 Monitor. Provide a monitor for closed captioning and other uses. It should also be tied into CCTV or audio/visual monitoring of an event. Monitor should contain multiple functions including image enlargement.

802.6.2.5 Electric Outlet. Provide electric outlet for each inclusive seating location to provide power for the various types of equipment that the occupant may require.

802.6.2.6 Physical and Wireless Computer Connection. Provide wireless and hard-wired jack for computer connection.

802.6.2.7 Alarm. Provide a silent emergency alarm complying with Section 707.2 that will trigger an alert at the management/security office, or other designated location that will assure a prompt response.

802.6.2.8 Task Lighting. Provide task lighting with shielded light source.

802.6.2.9 Work Surface. Provide a portable or flip up/down work surface complying with Section 902.

802.7 Companion Seat. A companion seat, complying with Section 802.7, should be provided beside each inclusive space.

802.7.1 Companion Seat Type. A companion seat should be comparable in size and quality to the seats within the seating area adjacent to the inclusive space location to ensure equivalent comfort. Companion seats should be permitted to be moveable.

802.7.2 Companion Seat Alignment. In row seating, the companion seat should be located to provide shoulder alignment with the inclusive space occupant. The companion seat placement should be adjustable to accommodate the specific needs of the inclusive space occupant. The floor surface of the companion seat should be at the same elevation as the inclusive space floor surface.

802.7.3 Companion Seat Controls. Provide height controls for adjustable height inclusive space companion seats.

802.7.3 Advisory. One set of controls on a flexible line or wireless controls may permit operation from either the inclusive space or from the companion seat. This will eliminate redundant controls.

802.8 Standard Seating. Standard seating should provide proper support to prevent fatigue, should be ergonomically correct and adjustable where practical and should comply with Section 903.12. Adjustments may include height, back angle, lumbar support, firmness with folding or retractable arms. Amenities should be provided that are appropriate for the type of assembly space and the primary users. This may include WiFi, monitors located in the back of the seats immediately in front of the spectator, task lighting, flip up desks, cup holders, etc. If an assembly space is to be used for a wide range of uses then it should be provided with the greatest range of amenities.

802.8 Advisory.
1. In addition to inclusive locations, other locations may provide limited amenities to supplement the inclusive locations enhancing the entire facility. This may include designated seating with electronic devices or locations closer to exits for the elderly or children to expedite egress.

2. Standard seats should contain features that are common throughout or within designated sections. The seats may be considered similar to airplane seating containing a mini-environment that allows multiple functions including work, entertainment, eating and relaxing. Since assembly areas are often used in many ways, it makes sense to provide seating that accommodates multiple functions.

802.8.1 Designated Aisle Seats. Designated aisle seats should comply with Section 802.8.1.

802.8.1 Advisory. This is a variation of designated aisle seating. An aisle seat is not inclusive but enhances the assembly area by providing another option. A true transfer seat requires the space for a person in a wheelchair to park and transfer with ease. But the aisle seats accommodate many other people, such as the elderly or those that have diminished mobility and require the convenience that a transfer seat provides.

802.8.1.1 Armrests. Where armrests are provided on seating in the immediate area of designated aisle seats, folding or retractable armrests should be provided on the aisle side of the designated aisle seat. See Section 903.3.3 Armrests.

802.8.1.2 Identification. Each designated aisle seat should be identified graphically.

802.8.2 Communication Elements and Features. Assembly areas should provide communication elements and features complying with Chapter 7.

802.8.2.1 Signage. Signage should be provided throughout the assembly area that complies with Section 703 and Section 709. This includes visual tactile and Braille and remote infrared audible sign (RIAS) systems. Provide row and seat numbering that is clearly indicated by using large type in high contrast to the background. Maximize the use of pictograms.

802.8.2.1 Advisory. Signs located throughout the facility (especially at entrances) should identify the most efficient and least circuitous route to inclusive seating.

802.8.2.2 Assistive Listening Systems. Assistive listening systems should be provided throughout the assembly area that complies with Section 706.

802.8.2.3 Wayfinding. Wayfinding should be provided throughout the assembly area that complies with Section 714. Consider the use of an information/navigation reference point system complying with Section 708.7. Use of color and contrast complying with Section 709.12, floor strips, and other types of systems should make it as efficient as possible and with the least amount of confusion to locate one's seat. This may include the use of visual and tactile signage, Braille, pictograms, audible signage, architectural elements, compass orientation, maps, floor plans, directional arrows, etc. Wayfinding should be initiated from the entrance and continue to the inclusive seating locations. Provide color coded levels.

802.8.3 Other General Assembly Area Amenities. Other general assembly area amenities may include large screen monitors, sound system, computer projectors, projection screens, etc, any equipment that will provide an equitable experience.

802.9 Lines of Sight. Where spectators are expected to remain seated for purposes of viewing events, spectators in inclusive space locations should be provided with lines of sight in accordance with Section 802.9.1. Where spectators in front of the inclusive viewing space locations will be expected to stand at their seats for purposes of viewing events, spectators in inclusive space locations should be provided with a line of sight in accordance with Section 802.9.2.

802.9.1 Line of Sight over Seated Spectators. Where spectators are expected to remain seated during events, spectators seated in inclusive space locations should be provided with lines of sight to the performance area or playing field comparable to that provided to spectators in closest proximity to the inclusive space location. Where seating provides lines of sight over heads, spectators in inclusive space locations should be afforded lines of sight complying with Section 802.9.1.1. Where inclusive space locations provide lines of sight over the shoulder and between heads, spectators in inclusive space locations should be afforded lines of sight complying with Section 802.9.1.2.

802.9.1.1 Lines of Sight Over Heads. Spectators seated in inclusive space locations should be afforded lines of sight over the heads of seated individuals in the first row front of the space location.

802.9.1.2 Lines of Sight Between Heads. Spectators seated in inclusive space locations should be afforded lines of sight over the shoulders and between the heads of seated individuals in the first row in front of the inclusive space location.

802.9.2 Lines of Sight over Standing Spectators. Inclusive space locations required to provide a line of sight over standing spectators should comply with Section 802.9.2.

802.9.2.1 Distance from Adjacent Seating. The front of the inclusive space location should be 12 inches (305 mm) maximum from the back of the chair or bench in the front.

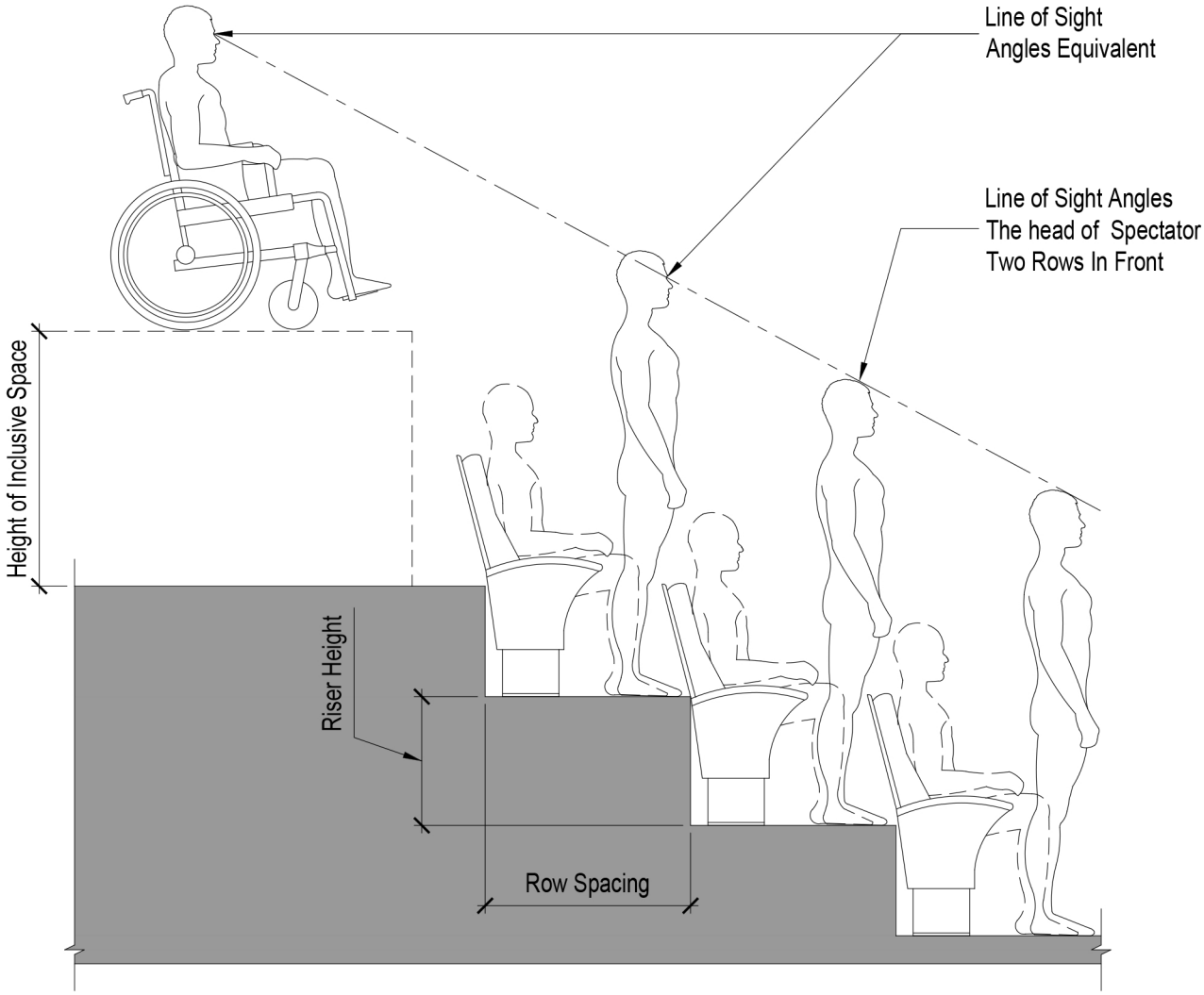


Fig. 802.9.1.1
Inclusive Space Elevation

802.9.2.2 Elevation. The elevation of the tread on which an inclusive space location is located should comply with Table 802.9.2.2 for riser heights other than those provided, interpolations should be permitted.

802.10 Inclusive Space Dispersion. Inclusive spaces should be dispersed in accordance with Table 802.10. Inclusive space locations should be dispersed in accordance with Sections 802.10.1, 802.10.2, 802.10.3 In addition, in spaces utilized primarily for viewing motion picture projection, inclusive space locations should be dispersed in accordance with Section 802.10.4. Dispersion within a section that creates a subdivision does not result in the creation of another section that requires additional inclusive seating locations.

Total seating in Assembly Areas	Recommended number of inclusive spaces
75 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
Over 1000	20 plus 1 for each 100 over 1000

Table 802.10
Inclusive Space Dispersion

802.10 Advisory. Inclusive seating should be designed as an integral part of the seating plan so that people who require these accommodations are treated equally and are not isolated from family and friends.

Riser height	**Minimum height of the inclusive space location based on row spacing[A]**		
	Rows less than 33 inches (840 mm)[B]	**Rows 33 inches (840 mm) to 44 inches (1120 mm)[B]**	**Rows over 44 inches (1120 mm)[B]**
0 inch (0 mm)	16 inch (405 mm)	16 inch (405 mm)	16 inch (405 mm)
4 inch (102 mm)	22 inch (560 mm)	21 inch (535 mm)	21 inch (535 mm)
8 inch (205 mm)	31 inch (785 mm)	30 inch (760 mm)	28 inch (710 mm)
12 inch (305 mm)	40 inch (1015 mm)	37 inch (940 mm)	35 inch (890 mm)
16 inch (406 mm)	49 inch (1245 mm)	45 inch (1145 mm)	42 inch (1065 mm)
20 inch (510 mm)[C]	58 inch (1475 mm)	53 inch (1345 mm)	49 inch (1245 mm)
24 inch (610 mm)	N/A	61 inch (1550 mm)	56 inch (1420 mm)
28 inch (710 mm)[D]	N/A	69 inch (1750 mm)	63 inch (1600 mm)
32 inch (815 mm)	N/A	N/A	70 inch (1780 mm)
36 inch (915 mm) and higher	N/A	N/A	77 inch (1955 mm)

Table 802.9.2.2
Inclusive Space Location Elevation Over Standing Spectators

[A] The height of the inclusive space location is the vertical distance from the tread of the row of seats directly in front of the inclusive space location to the tread of the inclusive space location.
[B] The row spacing is the back-to-back horizontal distance between the rows of seats in front of the inclusive space location.
[C] Seating treads less than 33 inches (840 mm) in depth are not permitted with risers greater than 18 inches (455 mm) in height.
[D] Seating treads less than 44 inches (1120 mm) in depth are not permitted with risers greater than 27 inches (685 mm) in height.

NOTE: Table 802.8.9 is based on providing a spectator in a wheelchair a line of sight over the head of a spectator two rows in front of the inclusive space location using average anthropometrical data. The table is based on the following calculation: [(2X+34)(Y-2.25)/X]+(20.2-Y) where Y is the riser height of the rows in front of the inclusive space location and X is the tread depth of the rows in front of the inclusive space location. The calculation is based on the front of the inclusive space location being located 12 inches (305 mm) from the back of the seating tread directly in front and the eye of the standing spectator being set back 8 inches (205 mm) from the riser.

802.10.1 Horizontal Dispersion. Inclusive space locations should be dispersed horizontally to provide a full range of viewing options. Two inclusive spaces should be permitted to be located side-by-side.

802.10.2 Dispersion for Variety of Distances from the Event. Inclusive space locations should be dispersed at a variety of distances from the event to provide viewing options. Locations should be separated by a minimum of five intervening rows. Dispersion within a section that creates a subdivision does not result in the creation of another section that requires additional inclusive seating locations.

802.10.3 Dispersion by Type. Where there are seating areas, each having distinct services or amenities, inclusive space locations should be provided within each seating area.

802.10.3.1 Dispersion by Cost. Where there are seating areas, each having a distinct cost inclusive space location should be provided within each seating area.

802.10.3.2 Secondary Protocol. Each venue should provide a secondary protocol that requires the venue to identify other back-up locations or sections or other types of accommodations that can be used if the designated seating is sold out.

802.10.4 Spaces Utilized Primarily for Viewing Motion Picture Projections. In spaces utilized primarily for viewing motion picture projections, inclusive space locations should comply with Section 802.10.4.

802.10.4.1 Spaces with Seating on Risers. Where tiered seating is provided, inclusive space locations should be integrated into the tiered seating area.

802.10.4.2 Distance from the Screen. Inclusive space locations should be located within the rear 60 percent of seating.

802.10.4.2 Advisory. It is recommended to locate the inclusive seating within the rear 60% of the theatre to avoid uncomfortable and distorted viewing due to close proximity of the screen. Viewing angle, neck and head positions that compensate for the angle of view, may not be physically possible for some and extremely uncomfortable for others.

803 Dressing, Fitting, and Locker Rooms

803.1 General. Accessible dressing, fitting, and locker rooms should comply with Section 803. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906.

803.2 Turning Space. A turning space complying with Section 304 should be provided within the room.

803.3 Door Swing. Doors should not swing into the room unless a clear floor space complying with Section 305.3 is provided within the room, beyond the arc of the door swing.

803.4 Benches. A bench complying with Section 903 should be provided within the room.

803.4.1 Benches for Children, Ages 5 to 12. Where provided, benches for children ages 5 to 12 should comply with Section 903.10.

803.4.2 Benches for Children, Ages 5 and Younger. Where provided, benches for children ages 5 and younger should comply with Section 903.11.

803.5 Coat Hooks and Shelves. Coat hooks provided within the room should accommodate a forward reach or side reach complying with Section 308. Where provided, a shelf should be 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the floor. Shelves for children should be 20 inches (510 mm) minimum and 36 inches (915 mm) maximum above the floor. Shelves should be recessed and should comply with Section 307.2.

803.6 Lockers. Where lockers are provided, at least 5 percent, but not less than one should have a clear floor space complying with Section 305 that allows either a forward or parallel approach. Latches and locks for lockers should be operable with one hand and without requiring tight grasping, pinching or twisting complying with Section 309. Provide lockers for children as necessary complying with Section 308.4. Locker rooms should be strategically located to be within a short distance from all recreational facilities.

804 Kitchens and Kitchenettes

804.1 General. Accessible kitchens and kitchenettes should comply with Section 804 and supplemented with Section 1012. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903, 906 and 1012.

804.1 Advisory. This kitchen section applies to all kitchens except for dwelling units which are covered under Section 1012. Kitchens should be designed to be usable by anyone since it may not be possible to anticipate who will use the facility at any given time. Kitchens in dwelling units should address the needs of current occupants and thus, should be adaptable, allowing for modifications to accommodate specific needs and preferences.

804.2 Clearance. Where a pass-through kitchen is provided, clearances should comply with Section 804.2.1. Where a U-shaped kitchen is provided, clearances should comply with Section 804.2.2.

804.2 Advisory. 72 inches is generally recommended and is based on Section 305 turning space. This provides a usable environment with adequate maneuvering clearances for all. But this may be considered excessive for some facilities, especially for existing buildings. Reasonable alternatives are provided under Sections 804.2.1 and 804.2.2 that provide adequate maneuvering and enough space for most anticipated usage.

804.2.1 Pass-through Kitchens. In pass-through kitchens where counters, appliances, or cabinets are on two opposing sides, or where counters, appliances or cabinets are opposite a parallel wall, clearance between opposing base cabinets, counter tops, appliances or walls within kitchen work area should be 60 inches (1525 mm) minimum. Pass-through kitchens should have two entries.

804.2.2 U-Shaped Areas. In kitchens enclosed on three contiguous sides, clearances between all opposing base cabinets, counter tops, appliances, or walls within kitchen work areas should be 72 inches (1830 mm) to provide a Tier I turning circle complying with Section 304.3.1.

804.3 Work Surface. Work surfaces should comply with Section 902 and supplemented with Section 1012.3. Pull-out work surfaces complying with Section 1012.3.4 are recommended to increase usability.

804.3.1 Range or Cooktop Work Surface. Provide a work surface adjacent to the range or cook top.

804.3.1 Advisory. The work surface is 36 inches wide, based on Section 902 that cross references 305. The work surface should be provided with an under counter clear floor space. Pull-out work surfaces can be used where under counter space is not viable. See Section 1012.3.4.

804.3.2 Supplemental Work Surfaces. Provide supplemental work surfaces that will increase the usability of the kitchen. Surfaces may be part of the counter, an island, pull-out, or mobile work surfaces. Pull-out work surfaces should be 36 inches (915 mm) wide and comply with Section 1012.3.4. Mobile work surfaces should be 36 inches (915 mm) wide and comply with Section 1012.3.

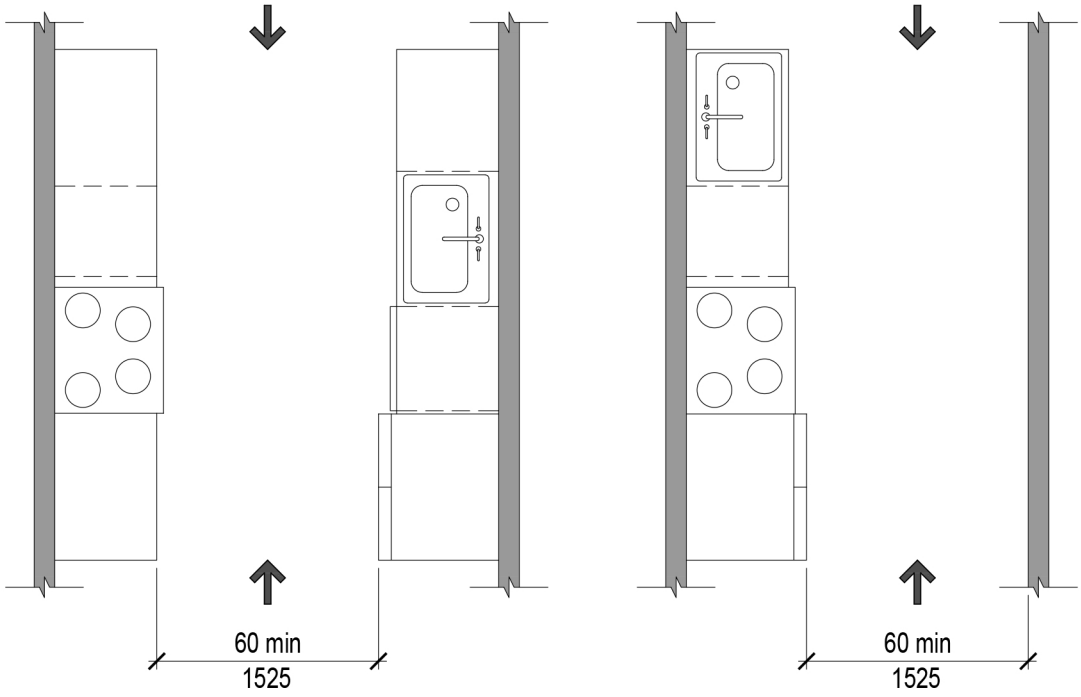


Fig. 804.2.1
Pass-through Kitchen Clearance

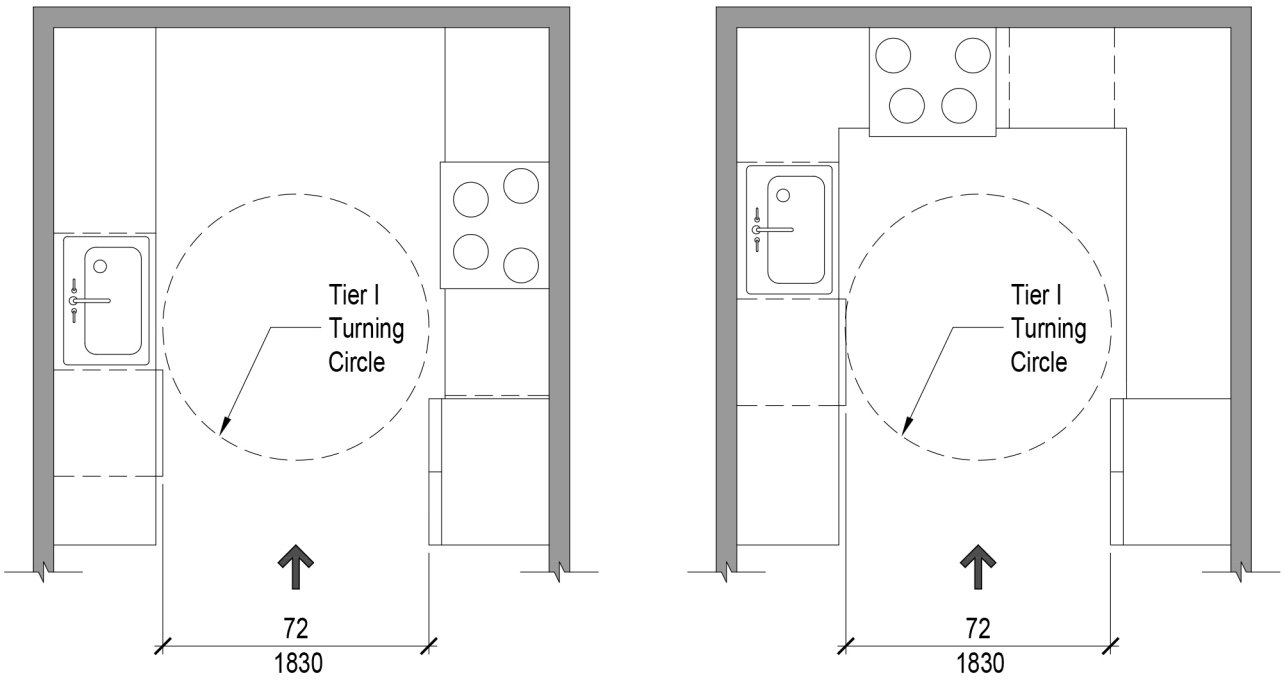


Fig. 804.2.2
U-Shaped Kitchen Clearance

804.3.2 Advisory. It is strongly recommended to provide more than one work location and multiple heights. The work surface adjacent to the stove is necessary for cooking and placing hot items. Provide other surfaces for food prep, temporary placement of ingredients, dishes, plating, etc.

804.4 Sinks. Sinks should comply with Section 606 and Section 1012.4. Under sink cabinetry should not be provided or if necessary, due to limited storage, it should be mobile.

804.4.1 Adjustable Height Sinks. Automatic adjustable height sinks are recommended and should comply with Section 1012.4.3.

804.4.1 Advisory. Other than dwelling units, it may be impossible to know who will use the sink. Thus, an adjustable height sink makes sense. Cabinetry under sinks is not recommended because this will limit use. If storage is extremely limited, a portable unit is a consideration, but temporary placement may create a circulation problem.

804.5 Storage. At least 50 percent of shelf space in cabinets should comply with Section 905 and Section 1012.5. Storage should be a variable composition of general, compartmentalized and dedicated spaces that accommodates user needs and preferences. Consider push/open, automatic operation and other options to increase usability, such as, lower cabinetry comprising drawers as per 1012.5.1.

804.6 Appliances. Where provided, kitchen appliances should comply with Section 804.6 and Section 1012.6.

804.6.1 Clear Floor Space. A clear floor space complying with Section 305 should be provided at each kitchen appliance. Clear floor spaces are permitted to overlap.

804.6.2 Operable Parts. All appliance controls should comply with Section 309 and especially 309.4. Provide multisensory alarms complying with Section 309.9. Each appliance operation should not conflict with other appliance operations when used concurrently.

804.6.3 Dishwasher. A clear floor space, positioned adjacent to the dishwasher door, should be provided. The dishwasher door in the open position should not obstruct the clear floor space for the dishwasher or an adjacent sink. Dishwasher height should comply with Section 1012.6.3.1.

804.6.3 Advisory. Placement of the dishwasher adjacent to the sink allows the user to utilize the clear floor space under the sink to allow easy transfer of dishes and knee clearance from the sink and to provide deeper access to the dishwasher.

804.6.4 Range or Cook top. A clear floor space, positioned for a parallel or forward approach to the space for a range or cook top, should be provided. Range or cook top should comply with Section 1012.6.4. Knee and toe clearance complying with Section 306 should be provided. The underside of the range or cook top should be insulated or otherwise configured to prevent burns, abrasions, or electrical shock. The location of controls should not require reaching across burners. Controls and alarms should comply with Section 309. Ventilation and light should comply with Section 804.6.5.5.

804.6.4.1 Exhaust Hood. Provide an exhaust hood with light and switches that are within reach ranges complying with 308 & 1012.6.4.1.

804.6.4.1 Advisory. Hood light(s) should be used to indicate that the range is in use, as a safety precaution to remind the user that the appliance is still on. Timers should always be used for cooking to indicate completion and to automatically turn off the appliance or to remind the user to turn the unit off if it is not automatic.

804.6.5 Oven. Ovens should comply with Section 804.6.5. and Section 1012.6.5.

804.6.5.1 Side-Hinged Door Ovens. Side-hinged door ovens should have a work surface complying with Section 804.3 and Section 1012.6.5.1. positioned adjacent to the latch side of the oven door.

804.6.5.2 Bottom-Hinged Door Ovens. Bottom-hinged door ovens should have a work surface complying with Section 804.3 and Section 1012.6.5.2, positioned adjacent to one side of the door.

804.6.5.3 Microwave Oven. Microwave oven should comply with Section 1012.6.6.

804.6.5.4 Controls. Ovens should have controls on front panels and alarms complying with Section 309. Units capable of verbal commands can address other operational difficulties for some.

804.6.5.5 Mechanical Ventilation. Mechanical ventilation should comply with Section 1012.7.1. If a conflict arises between this section and applicable code requirements, the code requirements must be met. Provide an exhaust hood with a light and switches that are within reach ranges complying with Section 308.

804.6.6 Refrigerator/Freezer. Combination refrigerators and freezers should comply with Section 1012.6.7 have at least 50 percent of the freezer compartment shelves, including the bottom of the freezer, 48 inches (1220 mm) maximum above the floor when the shelves are installed at the maximum heights possible in the compartment. A clear floor space, positioned for a parallel approach to the space dedicated to a refrigerator/freezer, should be provided. The centerline of the clear floor space should be offset 24 inches (610 mm) maximum from the centerline of the dedicated space.

804.6.6.1 Walk-in Refrigerator/Freezer. Walk in refrigerator/freezers should be provided with a clear floor space complying with Section 305. Provide an entrapment alarm. Provide at least 50 percent of the shelves, 48 inches (1220 mm) maximum above the floor.

805 Transportation Facilities

805.1 General. Transportation facilities should comply with Section 805. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906.

805.2 Bus Boarding and Alighting Areas. Bus boarding and alighting areas should comply with Section 805.2.

805.2.1 Surface. Bus stop boarding and alighting areas should have a firm, stable surface and should comply with Section 302 and 303.

805.2.2 Dimensions. Bus stop boarding and alighting areas should have a 100 inches (2540 mm) minimum clear length, measured perpendicular to the curb or vehicle roadway edge, and a 72 inches (1830 mm) minimum clear width, measured parallel to the vehicle roadway.

805.2.3 Slope. The slope of the bus stop boarding and alighting area parallel to the vehicle roadway should be the same as the roadway, to the maximum extent practicable. The slope of the bus stop boarding and alighting area perpendicular to the vehicle roadway should be 1:48 maximum.

805.2.4 Connection. Bus stop boarding and alighting areas should be connected to streets, sidewalks, or pedestrian paths by an accessible route complying with Section 402.

805.3 Bus Shelters. Bus shelters[7] should comply with Section 402.6 and should provide a minimum clear floor space complying with Section 305 entirely within the shelter. Bus shelters should be connected by an accessible route complying with Section 402.5 to a boarding and alighting area complying with Section 805.2. Consider amenities complying with Section 402.6.6 (e.g.,MetroCard vending machine).

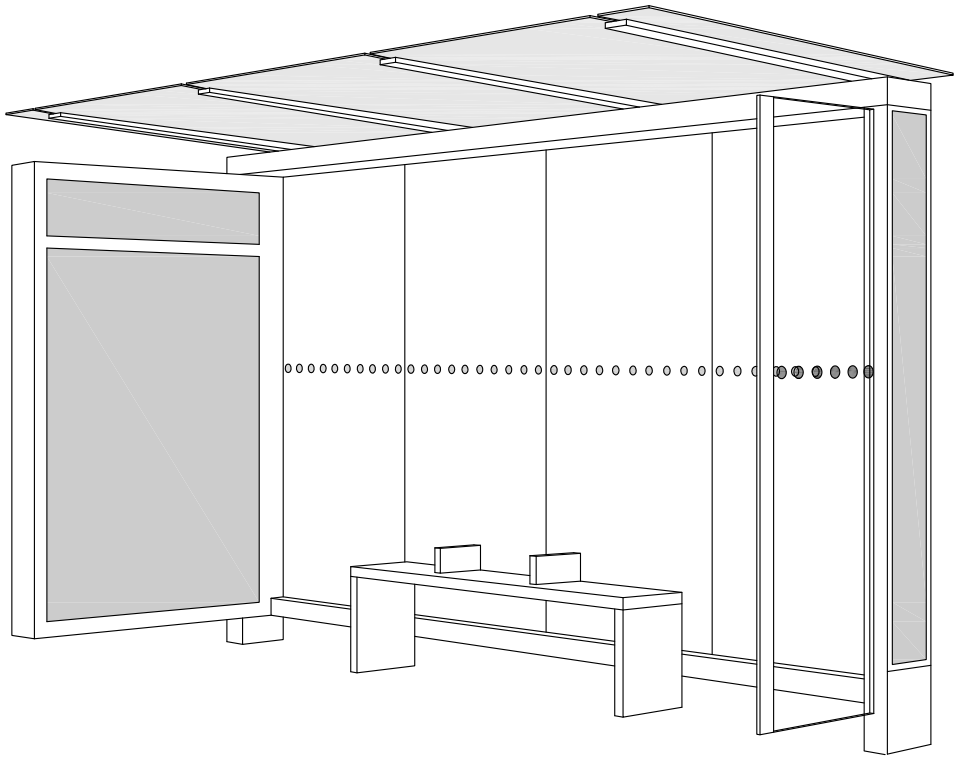


Fig. 805.3
NYC Bus Shelter (DOT)[10]

805.4 Signage. Signage should comply with Chapter 7 as applicable and including Section 702 Emergency Assistance Alarm; 703 Signs; Section 706 Assistive Listening Systems, Section 709 Signage System, Section 710 Public Information Displays; Section 711 Directories; 713 Emergency Signage System, and 714 Wayfinding.

805.5 Rail Platforms. Rail platforms should comply with Section 805.5.

805.5.1 Slope. Rail platforms should not exceed a slope of 1:48 in all directions.

EXCEPTION: Where platforms serve vehicles operating on existing track or track lay in existing roadway, the slope of the platform parallel to the track should be permitted to be equal to the slope (grade) of the roadway or existing track.

805.5.2 Detectable Warnings. Platform boarding edges not protected by platform screens or guards should have a detectable warning complying with Section 705, 24 inches (610 mm) in width, along the full length of the public use area of the platform.

805.6 Signage. Signage should comply with Chapter 7 as applicable and including Section 702 Emergency Assistance Alarm; Section 703 Signs; Section 709 Signage System, Section 710 Public Information Displays; Section 711 Directories; Section 713 Emergency Signage System, and Section 714 Wayfinding.

10.The NYC Department of Transportation bus shelter was designed by Grimshaw Architects.

805.6.1 Subway Wayfinding. Identify at station entrances: train lines, directional information to station booth and train access. On the top and bottom landing of the station entry stairways, on the left and right walls, comply with Section 703.2 for visual, Section 703.3 for tactile and Section 703.4 for Braille. Provide pictograms complying with Section 703.5. Provide a floor installed graphic compass or north arrow with street names and other landmark or reference points to help orient travels as they leave the subway. Compass should be a minimum of 12 inches (305 mm) in diameter and provided at entrances, stair landings, elevators, escalators, and reference points within subway stations.

805.7 Public Address Systems. Where Public address systems convey audible information to the public, the same or equivalent information should be provided in a visual format.

805.8 Clocks. Clocks should be provided for use by the public, the clock face should be uncluttered so that its elements are clearly visible. Hands, numerals and digits should contrast with the background either light-on-dark or dark-on-light. Where clocks are installed overhead, numerals and digits should be visual characters complying with Section 703.2.

805.9 Escalators. Escalators are not recommended since they do not accommodate mobility devices and are difficult or impossible for some people with diminished mobility or dexterity to use. In existing facilities that contain escalators provide an elevator in close proximity, complying with Section 407 or moving walkways complying with Section 403.11.

805.9 Advisory. Escalators in existing stations where there are no elevators are a good alternative for individuals who can't walk stairs or have diminished stamina and limited mobility.

805.10 Track Crossings. Circulation paths serving boarding platforms should not cross tracks.

806 Holding Cells and Housing Cells

806.1 General. Holding cells and housing cells should comply with Section 806. In addition, applicable recommendations in the following sections apply: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906. See also 807.1 Advisory regarding Courthouse Access Advisory Committee report.

806.2 Features for People Using Mobility Devices. Cells required to have features for people using mobility devices should comply with Section 806.2.

806.2.1 Turning Space. Turning space complying with Section 304 should be provided within the cell. Clear floor spaces and turning space are permitted to overlap.

806.2.2 Benches. Where benches are provided, at least one bench should comply with Section 903.

806.2.3 Beds. Where beds are provided, clear floor space complying with Section 305 should be provided on at least one side of the bed. The clear floor space should be positioned for parallel approach to the side of the bed.

806.2.4 Toilet and Bathing Facilities. Toilet facilities or bathing facilities provided as part of a cell should comply with Section 603. Provide grab bars that don't pose a risk for those that are a suicide risk.

806.3 Communication Features. Cells required to have communication features should comply with Section 806.3.

806.3.1 Alarms. Where audible emergency alarm systems are provided to serve the occupants of cells, visual alarms complying with Section 702 should be provided.

806.3.2 Telephones. Telephones within cells should have volume controls complying with Section 704.3. Provide TTY's as per *2014 NYCBC* Section E106.4.8. for secured areas. Hand sets should not be used.

807 Courthouses

807.1 General. Courthouses should comply with Section 807. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906.

807.1 Advisory. This section enhances recommendations contained in the Courthouse Access Advisory Committee's *Justice for All: Designing Accessible Courthouses*. http://www.access-board.gov/caac/report.htm. In addition to the identified specific function areas, there are typical building elements that should comply with the applicable sections in the *IDG* (e.g. exterior route, entrances and doors, parking, site arrival, interior route, protruding objects, signage and egress). See 800 Introduction.

807.2 Turning Space. Where provided, each area that is raised or depressed and accessed by ramps or platform lifts should be provided with an unobstructed turning space complying with Section 304.

807.3 Clear Floor Space. Within the defined area of each jury box and witness stand, a clear floor space complying with Section 305 should be provided.

807.4 Waiting Areas. Waiting areas should comply with Section 808.

807.5 Clerk's Office. Provide for the various functions, a turning space complying with 304, assistive listening systems complying with Section 706, work surface complying with Section 902 and service counters complying with Section 904.

807.6 Central Holding. Holding cells should comply with Section 806.

807.7 Interview Rooms. Provide a turning space complying with 304, assistive listening systems complying with Section 706, work surface complying with Section 902 and service counters complying with Section 904.

807.8 Jury Assembly Area. Provide signage complying with Section 709, operable parts complying with Section 309, assistive listening systems complying with Section 706, assembly area seating complying with Section 802 work surfaces complying with Section 902, counters complying with Section 904.

807.9 Conference Rooms. Provide a turning space complying with Section 304, room circulation complying with Section 403.5.3, infrared or induction loop assistive listening system to maintain privacy complying with Section 706, applicable portions of meeting rooms complying with Section 812, work surfaces complying with Section 902.

807.10 Courtroom Entry. Courtroom entry should comply with Section 404.

807.11 Main Aisle. Main aisle should be 72 inches minimum complying with Section 403.5.1.

807.12 Routes. Routes should comply with Section 402.

807.13 Spectator Area. Provide a 48 inch (1220 mm) access aisle, assembly seating complying with Section 802, turning spaces complying with Section 305, seating complying with Section 903. The number of inclusive locations should comply with 802.10.

807.14 Rail. The courtroom rail should provide an opening complying with Section 404.

807.15 Jury Box. Provide a stationary inclusive space integrated into the seating plan complying with Section 802.8 and room circulation complying with Section 403.5.3.

807.15 Advisory. Height of the jury box in NYC is dictated by Part 34.VII of the *Rules of the Chief Judge, State of New York*.

807.16 Witness Stand. Provide an adjustable height inclusive location integrated with the millwork and complying with Section 802.6.1. Witness position should be raised as per regulatory requirements. Floor surface of stand should be capable of being lowered to surrounding floor level for entry, then raised to designated height. Stand should be front or side entry. Provide a work surface complying with Section 902. Provide task lighting. Provide removable seating complying with Section 903.10.

807.16 Advisory. Height of the witness stand in NYC is dictated by Part 34.VII of the *Rules of the Chief Judge, State of New York.* Front and side entry is recommended. Rear entry may not be possible due to courtroom configuration. The lift requires a separate mechanical equipment space that is typically located under the adjacent judge's bench. Provide side enclosure for the space under the lift when in a raised position.

807.17 Judges Bench. Judge's bench should be provided with a ramp complying with Section 405 or platform lift integrated with the millwork complying with Section 410 and stairs complying with Section 504. Height as per the local regulatory requirements. Provide a stationary inclusive space complying with Section 802.8. Provide work surfaces complying with Section 902. Provide task lighting. Provide seating complying with Section 903.10. Consider an adjustable height inclusive space complying with 802.6.1 if other options are not feasible.

807.17 Advisory. Height of the judges bench in NYC is dictated by Part 34.VII of the *Rules of the Chief Judge, State of New York.* Access should not be through another room.

807.18 Clerk's and Bailiff's Station. Provide a clear floor space complying with Section 305, room circulation complying with Section 403.5.3, and work surface complying with Section 902. Consider an adjustable height inclusive space complying with 802.6.1 if other options are not feasible.

807.19 Court Reporter. Provide a clear floor space complying with Section 305, room circulation complying with Section 403.5.3, and work surface complying with Section 902. Consider an adjustable height inclusive space complying with 802.6.1 if other options are not feasible.

807.20 Judges Chambers. Provide a turning space complying with Section 304, room circulation complying with Section 403.5.3 and work surfaces complying with Section 902, kitchen and kitchenettes complying with Section 804, and a single occupant toilet room or bathroom complying with Section 603.1.1 or 603.1.2.

807.21 Jury Deliberation Rooms. Provide a turning space complying with Section 304, room circulation complying with Section 403.5.3, work surfaces complying with Section 902, kitchen and kitchenettes complying with Section 804, a single occupant toilet room complying with Section 603.1.1, an infrared or induction loop assistive listening system to maintain privacy complying with Section 706, and applicable portions of meeting rooms complying with Section 812.

807.22 Holding Cells. Holding Cells should comply with Section 806.

807.23 Communications. Provide assistive listening system complying with Section 706, signage complying with Section 703, remote infrared audible sign systems complying with section 703.7.3, telephones complying with Section 704, Two-way communications complying with Section 708, Signage system complying with Section 709, Public information display types complying with Section 710, directories complying with Section 711, room identification systems complying with Section 712, and emergency signage systems complying with Section 713.

807.24 Wayfinding. Wayfinding should comply with Section 714.

808 Waiting Areas

808.1 General. Waiting areas should comply with Section 808. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906. Many different types of buildings contain waiting areas such as institutional and business but they are a common element throughout the various classifications. They may be open or enclosed areas and should be accommodating and comfortable to all.

808.2 Location. The waiting area should be served by an inclusive route. Locate waiting areas immediately adjacent to the space(s) that it is serving or within close proximity (e.g. an office suite). The route should be adjacent and should not intersect the waiting area (e.g. a waiting space in an airport). A waiting area should not conflict with other areas, should be kept away from congested areas and not subject to peak occupancy loads such as adjacent to elevators or entrances.

808.3 Seating. Provide seating areas for adults and children complying with Section 903.

808.3.1 Clear Floor Space. Provide at least one clear floor space complying with Section 305.

808.4 Queuing. Provide a queuing system for tracking the sequence of visitors and to provide approximate waiting period for each visitor to reduce anxiety and to provide time frames if one needs to leave the waiting area for any period of time. Queuing lines should be a minimum of 48 inches (1220 mm) minimum and comply with Sections 403.5.2.1, 403.5.2.1.1 and provide cane detection. Queuing should be provided in a variety of formats depending upon the type of facility and includes: monitors, digital number and letter displays, lights, audio announcing names or a sound for the next visitor, and other forms such as ticket dispensers that should be coordinated with the other systems. An induction loop and use of hearing aid T-coil for queuing is very helpful (see 706 Advisory).

808.5 Lighting. Lighting levels may vary depending upon the type of facility. Institutional facilities typically require paperwork and reading during a waiting period and should contain adequate lighting levels for task work. Other types of facilities such as a restaurant may need a lower lighting level that is appropriate for the setting.

808.6 Amenities. Amenities should be within, immediately adjacent or in close proximity to the waiting area depending upon the type of facility. This includes restrooms, telephones, drinking fountains or water cooler. Monitors with closed captioning and reading materials should always be provided.

808.7 Children's Accommodations. Depending upon the types of facility, seating for children should be provided complying with Section 903. An adjacent and separate play area may be appropriate for children with direct lines of sight. Monitors should be placed at heights for children's viewing complying with Section 310.3 and Section 310.4.

809 Service Areas.

809.1 General. Service areas should comply with Section 809. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906. Many different types of buildings contain service areas such as institutional and mercantile but they are a common element throughout the various classification. They should provide accommodating equitable interaction between the visitor and those providing the service.

809.2 Location. Locate service areas adjacent to and not intersected by an inclusive route and within close proximity of the entrance(s). A service area should not conflict with other areas, should be kept away from congested areas, and not subject to peak occupancy loads such as adjacent to elevators.

809.3 Clear Floor Space. Provide a clear floor space at the service desk complying with Section 305, for forward and parallel approach. Knee and toe clearance should be provided.

809.3.1 Circulation. Provide sufficient circulation space to allow configuration of queuing lines and groupings to allow subdivision and sub-areas that have a dedicated or temporary usage. Queuing lines should be a minimum of 48 inches (1220 mm) minimum and comply with Sections 403.5.2.1, 403.5.2.1.1 and provide cane detection. Service areas should provide space for staff to interact on the visitor side or provide separate seating areas for consultation.

809.4 Work Surfaces. Work surfaces should comply with Section 902. Consider adjustable height surfaces complying with Section 902.3.1.

809.5 Acoustics. The visitor should be provided the ability to communicate at normal conversation levels. Provide acoustic barriers, partitions, and other means such as, sound absorbing material, etc., to keep noise levels at a normal level. This may also require the reconfiguration of user patterns to relocate and subdivide groups to reduce noise.

809.6 Privacy. Depending on the nature of the service area, certain types of activities and conversations should be kept confidential (e.g. a conversation with a bank teller serving a blind customer, or a medical facility in which personal medical information needs to be discussed). Consider providing service cubicles or private offices or spaces.

809.7 Customer Assistance. Customer assistance includes some of a personal nature such as toileting, eating, or dressing, but also includes transactions that impede on confidentiality such as banking. Assistance should be available for people with sight, mobility, and hearing disabilities and provided in visual, tactile and audible formats.

809.7.1 Etiquette. Etiquette is critical for common decency and respect for all people. Staff should be trained how to interact with those visitors who may appear to have a disability. This will help providers to understand what is appropriate. First impressions may be completely wrong. Many disabilities are not obvious and cannot be accurately determined by the service provider. It is inappropriate to request information about a person's disability unless it is relevant to the service that the person is seeking (e.g., medical treatment) . Therefore, assumptions should not be made about an individual's abilities, especially for people with hidden disabilities

809.7.1 Advisory. See the United Spinal Association's *Disability Etiquette* at their website: http://www.unitedspinal.org. There is a wealth of information here and many free publications.

809.7.2 Communications. Means of communication should comply with Chapter 7 and should be visual, audible and tactile to address a variety of needs and preferences. Some redundancy is helpful. Means of communications includes, but is certainly not limited to the following: visual, tactile, audible signage; Assistive Listening System (ALS); TTY; Internet, audio descriptors; open captioning, cd's; closed captioning; sign language interpretation; two-way visual electronic communication; remote infrared signs, telephone, cellphone, PDA's, etc.. Communications also includes providing specific types of service options (e.g., sign language interpreter, language translation, relay service, and reading assistance, see 708.5).

809.7.3 Programmatic. Sometimes programmatic means must be used to provide a service, such as accommodations needed or preferred by a person who uses a mobility device, but cannot be physically provided (e.g., a service window does not accommodate a person and a private desk or office must be used).

810 Dining Areas.

810.1 General. Dining areas should comply with Section 810. In addition, comply with the applicable recommendations in the following sections: 301-310, 402, 403, 404, 405, 505, 706, 902, 903, and 904. Provide adequate maneuvering clearance at food service lines and at seating areas. The eating environment should be equally accommodating, all areas usable and an equitable dining experience.

810.2 Seating Locations. Inclusive seating locations should be provided throughout. These should be distributed so that all distinct areas within a dining area provide inclusive spaces.

810.2.1 Seating. Seating should comply with Section 903.11, should be comfortable and easy for people to use. Larger chairs should be available for those who need them. Chairs should have supportive backs or arms to assist those with diminished dexterity and upper body strength and other types of diminished abilities (e.g. to help the elderly to stand). Seating may be fixed or portable, but a range of seating options should be provided to accommodate all. Provide seating for children complying with Section 903.

810.3 Circulation. The route to and from inclusive locations should be maintainable so that navigation to and from a table is not obstructed by table relocation or chair movement. Consider defining a route with surface material or with architectural elements that prevents arbitrary relocation of furniture. Consider tactile surface characteristics complying with Section 302.6 and Section 302.10.

810.3 Advisory. Getting to one's table should not turn into a scene by staff clearing a path and asking other diners to move out of the way. Equality also means equally enjoyable by all. It is disrespectful and embarrassing for a diner to create a scene entering or leaving or using a restroom. Often restaurants try to maximize the usable customer floor space and in so doing may trap or limit customers who uses a mobility device, within the table layout.

810.3.1 Multi-level Dining Areas. Ramps, lift or elevator should connect all levels of dining area.

810.4 Dining Surfaces. Dining surfaces should comply with Section 902. Provide, as necessary, dining surfaces for children complying with Section 902.4 and Section 902.5.

810.5 Food Service Lines. Food service lines should comply with Section 904.5 and check out aisles should comply with Section 904.4. Line should contain a level of flexibility to reconfigure traffic patterns as necessary. Food service lines should be 42 inches (1065 mm) minimum in width.

810.6 Concessions. Concessions should comply with Sections 904 and Section 902. Concessions may be individually located, multiple locations or grouped into court arrangements, depending on the size and type of facility. They should be convenient to all.

811 Offices.

811.1 General. Offices should comply with Section 811. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906. Offices should be flexible and adaptable to suit a variety of needs, tasks, and accommodate peoples needs and preferences.

811.2 Doors. Doors and openings should comply with Section 404.

811.3 Work Surfaces and Seating. Work surfaces and seating should comply with Sections 811.9, 902 and 903. Adjustable work surfaces increase depth, the space underneath work surfaces and accommodates individual needs and preferences. Modular systems allow for adjustable heights for shelves, lighting, electrical outlets, storage units, and all the accessories that enhance the usability of the work area.

811.4 Lighting. Lighting consists of artificial and natural light, both direct and indirect general lighting and task lighting. The lighting system should provide sufficient amount of light and should be flexible to accommodate changing needs and functions of a space. Glare should be reduced as much as possible, shadows reduced or eliminated, and lighting levels fairly consistent. Task lighting should be balanced with ambient lighting. Ambient lighting should not be used as task lighting. Direct and indirect light sources should be considered. Daylight should be used to the maximum extent possible and supplemented and balanced with artificial light. Lighting should replicate the natural spectrum as close as possible.

811.4.1 Artificial Lighting. All controls should comply with Section 309 and should be simple to understand and easy to use. The layout and location of the controls should relate to the actual ceiling plan, so that occupants can easily identify the relevant switches. The use of dimmers and a variety of different and adequate number of fixtures should increase options, balancing, and fine tuning of the system to accommodate specific and changing needs of the occupants. Timer controls and motion detector switches should be considered.

811.4.2 Natural Light. Use of natural light should be maximized. Provide the maximum allowable window surface permitted. Windows should comply with Section 506. Control glare to reduce eye fatigue with architectural elements, glazing options and window treatments. Consider automatic control systems with sensors to balance natural and artificial light. Blinds are an effective and efficient means of controlling daylight. Consider smart windows and chromogenic glazing (see 500 Introduction).

811.4.3 Task Lighting. Provide adjustable task lighting to accommodate individual needs and preferences and various types of tasks. Task lighting should be balanced with ambient lighting. Adequate task lighting and choices should be provided to help reduce eye fatigue and provide a more efficient work environment.

811.5 Environment. The environment should be comfortable, healthy and accommodate individual needs and preferences. This includes temperature, humidity, air filtration, and distribution of heating, cooling, and humidity.

811.5.1 Controls. All controls should comply with Section 309 and recommended to comply specifically with section 309.3.1. Consider individual user controls at each work station that may provide localized control within the general office environment.

811.5.2 Zones. The work environment may contain multiple zones and micro-zones for individual control. General environment should be adequate for most, but some groups may require an increase or decrease in cooling or heating (e.g. elderly may require a higher temperature, or workers that are constantly moving may require a cooler environment). Another group may need or prefer a drier or more humid environment (e.g. people with sinus conditions). Work locations within a specific zone may be critical depending upon the type of distribution and quality of the equipment. Heat and cooling sources create micro conditions that may require modification of the system discharge or reconfiguration of the office layout especially for existing conditions.

811.5.2.1 Micro-zones. Micro-zones are designed to accommodate an individual in the general environment or within a zone. This includes individual control over their immediate environment. This may not be viable within the general HVAC system and require supplemental equipment such as individual humidifier and dehumidifiers, individual ac units, individual heat sources, fans.

811.5.3 Air Quality. Office air quality should provide an environment that controls dust, chemicals, organic contaminants (e.g. mold and pollen). The system should provide consistent filtration. If the general environment is inadequate for the needs of some they should be accommodated in a separate enclosed area where additional measures can be taken.

811.6 Acoustics. Provide an environment with a variety of sound characteristics that includes general, zones and individual work spaces. This includes background noise levels, sound transmission and absorption and reverberation levels. Provide sound isolated areas or areas for privacy. Provide spaces or rooms that reduce sound levels from a noisy general environment including meeting rooms, individual offices, lounge areas, waiting areas, etc.

811.6.1 Alarms. Alarms should be clearly distinguishable and decibel levels that are sufficiently above ambient noise levels. Alarms should be multisensory complying with Section 309.9.

811.7 Storage. Storage should be properly sized, located, and distribute throughout office for both general and individual needs and preferences, ease of use, efficiency, and safety.

811.7.1 Locations. Storage should be provided where needed and relate to and complement the task. Depending upon the type of work, it may be best to provide one or more primary storage facilities with smaller storage facilities distributed.

811.7.2 Reach Ranges. Reach ranges should comply with Section 308 and recommend the comfort zone complying with Section 309.3.1 and 309.3.2.

811.7.2.1 Compartments. Bulky and heavy items should be stored within the reach ranges complying with Section 811.7.2. The heaviest items should be stored as low as possible and moved by cart, hand truck or mechanical means. Lighter and smaller items that are not frequently needed should be stored higher and may be obtained manually or with a device. Consider manual and automatic operation of storage compartments that includes mechanical shelving and pull out storage compartments.

811.7.3 Personal Storage. Provide storage for each worker that includes closets, lockers or compartmentalized zoned storage that is adjacent or within close proximity.

811.8 Lounges. Offices should be provided an open or enclosed lounge area usable by all, that may contain a kitchen or kitchenette complying with Section 804, comfortable seating and dining surfaces complying with Section 902 and 903, storage, adequate lighting for a variety of tasks, monitor, adjustable environmental controls and ventilation. The types (e.g. eating, multiple function, etc), size, number, locations, privacy or interaction level etc. depends on the specific work environment.

811.9 Workstations. Work stations may be designed for a seated or standing position with an adjustable height work surface complying with Section 902.3.1.

811.9.1 Standing Workstations. Provide an adjustable height work surface and an adjustable office chair complying with Section 903.10. Provide adjustable height computer monitor and lights. Position objects and materials to reduce bending. Provide a footrest.

811.9.2 Sitting Workstation. Provide an adjustable height work surface between 28 inches (715 mm) and 34 inches (865 mm) complying with Section 902 and an adjustable office chair complying with Section 903.10. Provide adjustable height computer monitor, lights. Objects and materials should be placed within the 24 inch (610 mm) to 48 inch (1220 mm) comfort zone. Knee and toe clearance should comply with Section 306. Provide a footrest.

811.9.3 Office Chairs. Office and work chairs are critical and should contain a wide range of features that allow adjustment for different users, changing individual preferences as and when needed, complying with Section 903.10. Features include: 360 degree rotation, variable height, back height adjustment, seat depth adjustment, removable and adjustable arms, adjustable lumbar support, center tilt, synchronized tilt, and tilt lock. Office chairs should be provided in various sizes, seating material and wheeled and non-wheeled bases and even fixed locations. The industry has a wide and accommodating range of available furniture that contains all or many of these features.

811.10 Temporary Workspaces. Temporary workspaces are intended primarily for public areas (e.g., building lobbies, conference facilities and transportation hubs) but could also be used in a wide variety of facility types. They are intended for short duration usage (e.g., 15-60 minutes). They may be open spaces, cubicles or enclosed spaces (e.g., small rooms and closets). Enclosed spaces may be manual or automatic and may be fee based (similar to pay toilets) or complimentary. Where temporary workspaces are provided, at least one, but not less than 20% of the total spaces should be type "A" at each location. Enclosed spaces are recommended in high traffic areas to provide an isolated quiet work environment. Enclosed spaces should be provided with an automatic door (sliding recommended) with a 50% minimum transparent safety glazing area (see Section 404.2.10 Vision Lites). This increases safety, reduces inappropriate usage and allows other guests to confirm if the space is in use. Temporary workspaces should not be located within close proximity of food vendors to avoid usage conflict. Provide visual, tactile and auditory signage.

811.10 Advisory. Temporary workspaces are essentially an updated version of the traditional telephone booth that provides two-way communications and a work surface that can be used for a variety of purposes (e.g., office work, computer usage and study). The workspace type(s) should be appropriate for the building classification. Enclosed spaces are recommended for visual and auditory privacy, especially in high traffic locations and where the ambient noise level is high.

811.10.1 Type "A" Temporary Workspaces. Type "A" temporary workspaces should provide a circular turning space complying with Section 304, a fold-up fixed or adjustable height work surface complying with Section 902 and knee clearance complying with Section 306.3. Work surface may overlap turning space. Enclosed spaces should contain an automatic sliding or swing out door complying with Section 404 and glazing as per Section 811.10. Consider a fold-up shelf above the work surface within reach ranges complying with Section 308. An enclosed type "A" space may accommodate two users, but it is primarily intended for those who require the turning space (e.g., people who use scooters and other types of mobility devices). The type "A" spaces is larger than the type "B" and provides more work surface and can accommodate a movable chair(s).

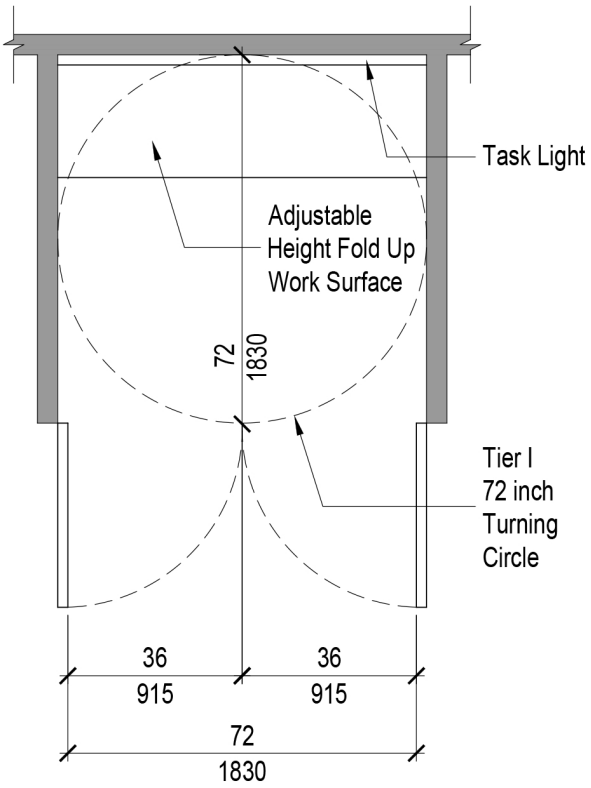


Fig. 811.10.1
Type "A" Temporary Workspace Example

811.10.2 Type "B" Temporary Workspaces. Provide a clear floor space complying with Section 305, based on approach, a fold-up fixed or adjustable height work surface complying with Section 902 and knee clearance complying with Section 306.3. Work surface may overlap clear floor space. Enclosed spaces are recommended with automatic sliding or swing-out door complying with Section 404. Consider a fold-up shelf above the work surface complying with Section 308. Enclosed type "B" spaces are for single use. Since the space may not accommodate both a mobility device and chair, consider a fold-up wall mounted seat with back complying with Section 903.

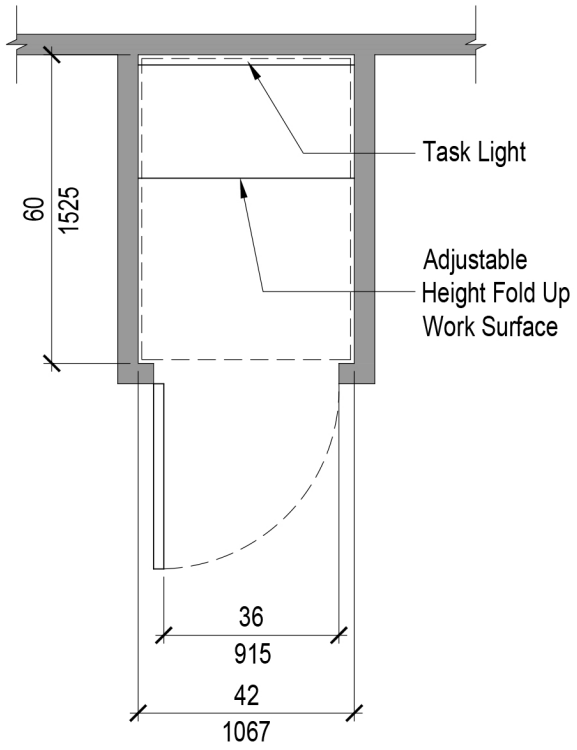


Fig. 811.10.2
Type "B" Temporary Workspace Example

811.10.3 Features. Temporary workspaces should provide a range of features to accommodate guest's needs and preferences. These include: visual/tactile/auditory signage, movable or fold-up seating complying with Section 903, an automatic adjustable height work surface complying with Section 902.3.1, adjustable climate controls and adequate air changes, adjustable general and task lighting, coat hooks, and pull down or fixed shelf above work surface within reach ranges complying with Section 308; telephone and TTY complying with Section 704, a variety of electronic conveniences (e.g., internet wireless and hard connections, fixed speakers, fixed monitor and two-way visual communications), operable parts complying with Section 309, smoke detector, and emergency alarm complying with Section 702. Consider a rear view mirror to see behind and consider grab bars.

811.10.4 Visible and Audible Signals. Visible and audible signals should be provided for each enclosed space. These include: guest greeting, payment (if required), total usage duration, one minute time remaining, and exit message that asks the occupant to vacate.

812 Meeting Rooms.

812.1 General. Meeting rooms should comply with Section 812. In addition, comply with the applicable recommendations in the following sections: 301-310, 403, 404, 405, 505, 506, 602, 609, 702, 703, 704, 706, 708, 709, 710, 902, 903 and 906. Meeting rooms should be flexible, multi-purpose spaces that can accommodate a range of occupants and events.

812.2 Location. Locate along an inclusive route that provides convenient access to amenities (e.g. rest rooms, telephones, drinking fountains), concession or newsstand, waiting area or gathering space, entry lobby, or other adjacent space or within close enough proximity either interior or exterior, to provide a waiting area for the anticipated number of participants without causing congestion or obstructing the functioning of the rest of the facility.

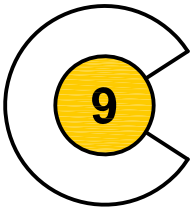
812.3 Flexibility. The meeting room should be as flexible as possible to accommodate a wide range of uses, group sizes and the needs and preferences of the widest range of participants as possible. Certain facilities may limit the uses due to the classification and type of building, but the maximum flexibility should be built into the design to accommodate unanticipated uses and changing needs by the various occupants. The architectural elements should not restrict flexibility such as window or door placement that does not permit, or does not allow easy and logical subdivision of the room. Partitioning should be automatic movable walls that provide acoustic and visual barriers. Material should match or compliment the materials of the room.

812.4 Acoustics. Meeting room should contain an acoustical environment that addresses a wide range of tasks and functions. This includes background noise levels, sound transmission, absorption and reverberation levels. Provide sound isolation for privacy or to reduce the noise levels to increase communication levels and understanding. If space is used for social gatherings, parties, or other events with high noise levels, the structure and materials should reduce sound transmission.

812.5 Storage. Adequate and flexible storage should be provided. This may include electronic equipment, furniture, seating, presentation boards, etc. Comply with Section 905.

812.6 Electronic Equipment. Electronic equipment is so varied and so rapidly changing that the only valuable guidance regarding meeting rooms is to accommodate the widest range of needs and types of presentations, accommodate the widest range of participants taking into account diminished visual and auditory abilities, and preferences and to provide adequate space and location to physically accommodate the equipment. Provide an induction loop system that works with hearing aid T-coils (see 706 Advisory). Neck loops are also useful.

812.7 Furniture. Furniture should consist of movable seating complying with Section 903.10 and Section 903.11. Tables should comply with Section 902.



Furnishings and Equipment

900 Introduction. Chapter 9 includes: dining, work surfaces, seating, sales and service counters, product and storage facilities, trash/recycling receptacles, typical and alternate refuse disposal/storage rooms. The needs and preferences of adults, as well as usability and comfort for children, are covered. Children's components should be properly scaled by age group appropriate for their smaller and varied sizes.

Dining surfaces and work surfaces address clear floor space, fixed or adjustable height options and width. Supplemental recommendations are included for children and people of short stature.
Seating addresses various types, features and configurations. Ergonomic design increases comfort, safety and health while reducing fatigue. Benches are designed for both the typical transfer bench and other benches, such as those for outdoor applications. A table is provided for the comparison of code requirements with the *IDG* recommendations that contains 23 items. Seating types include: office, bench, dining, arena, grandstand, bleacher, auditorium, children's classroom, toilet and bathroom, elevator landing/cab, shelters, route, lobby, building entrances, areas of rescue assistance, telephone and universal kinetic furniture. Seating takes into account a variety of user sizes. Armrests provide stability and comfort to help people sit and rise and also provide support for those using them to lean against. Features may include, depending upon the type of seat: 360 degree rotation, variable height, back height adjustment, seat depth adjustment, removable and adjustable arms, adjustable lumbar support, center tilt, synchronized tilt and tilt lock. Seating also includes features that are relevant to the venue (e.g. monitors, task lighting, work surfaces, cup-holders and outlets). Two relevant publications are identified and discussed for medical care: US Department of Justice (DOJ) Access to Medical Care for Individuals with Mobility Disabilities, and the US Access Board's Part 1195 Standards for Accessible Medical Diagnostic Equipment.

Sales and service counters address parallel and forward approach. Provide privacy where and when needed to communicate important and critical personal information. Food service lines address self-service shelves and dispensing devices, tray slides and children's usage. Product and storage facilities address clear floor space, height, operable parts, circulation, turns, signage, lighting and consumer assistance. Eye levels complying with Section 310 are important to allow people to examine goods and to read labels.

Trash and recycling receptacles address clear floor space, height, operable parts, locations, surface characteristics and signage. Foot operation and other alternatives are discussed along with automatic operation. Consider automatic operation when contamination is a concern, such as in a hospital environment and at food preparation areas. Consider loading options (e.g. top, vertical and sloped front). Trash receptacle should be grouped with other amenities to increase overall convenience and usage. Typical and alternate refuse disposal/storage rooms are provided and contain the following: maneuvering clearances, clear floor space, door, threshold, room identification, occupancy sensor, storage and refuse areas, chute height, operable parts, receptacles and other features.

901 General

901.1 Scope. The provisions of Chapter 9 should apply where recommended by the scoping provisions adopted by the administrative authority.

902 Dining Surfaces and Work Surfaces

902.1 General. Dining surfaces and work surfaces should comply with Section 902.

EXCEPTION: Dining surfaces and work surfaces primarily for children's use should comply with Section 902.4 and Section 902.5

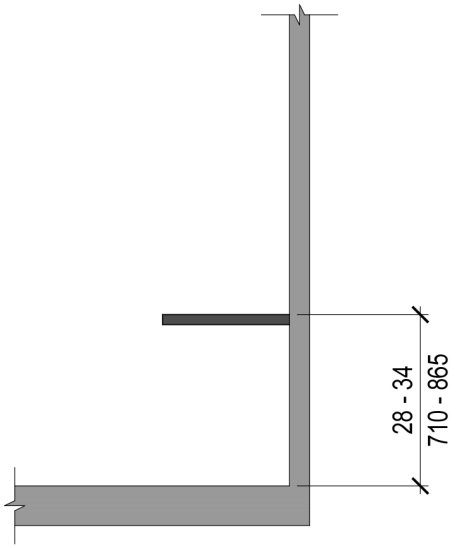
902.1 Advisory. Dining surfaces and work surfaces are broken down into three distinct groups: adults, children 5-12 and children 5 and younger. The ranges will overlap, especially since the growth rate fluctuates for children. Some larger children will require adult accommodations. It is also not clear exactly what eating and work positions a child will assume (e.g. sitting straight, bent over, standing, kneeling, even squatting). The percentage that is applied to each group relates to the primary users, and building classification.

902.1.1 Table Placement. Provide a designated fixed route to and within dining areas, so that table arrangements will always provide an unobstructed route to the various features and amenities: restrooms, bar, exits and entrances, performance area, etc. (See 810.3 Advisory.)

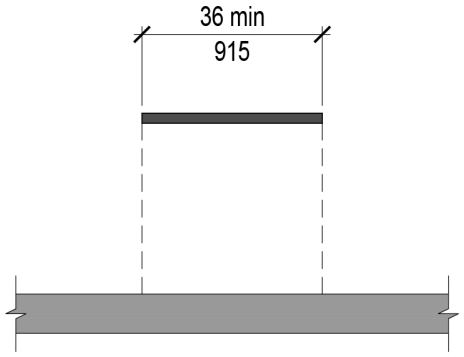
902.2 Clear Floor Space. Tier I clear floor space complying with Section 305, positioned for a forward approach, should be provided. Tier I knee and toe clearance complying with Section 306 should be provided.

902.2 Advisory. Clear floor space for dinning surfaces and work surfaces for adults is based on a rectangle 36 inches wide and 60 inches long. Knee and toe clearances complying with Section 306 takes into account raised feet positions.

902.3 Height and Width. The tops of dining surfaces and work surfaces should be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum in height above the floor and 36 inches (915 mm) minimum width.



(a)
Height



(b)
Width

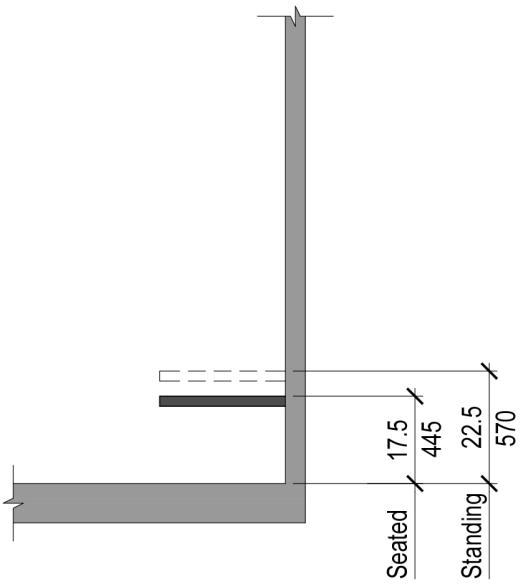
Fig. 902.3
Adult Dining and Work Surfaces
Height and Width

902.3 Advisory. The adult height range is 28-34 inches, The minimum knee clearance height is 27 inches as per Section 306. A minimum of 1 inch thickness for a top is possible with the difference between the 27 knee clearance and 28 inch minimum work surface height.

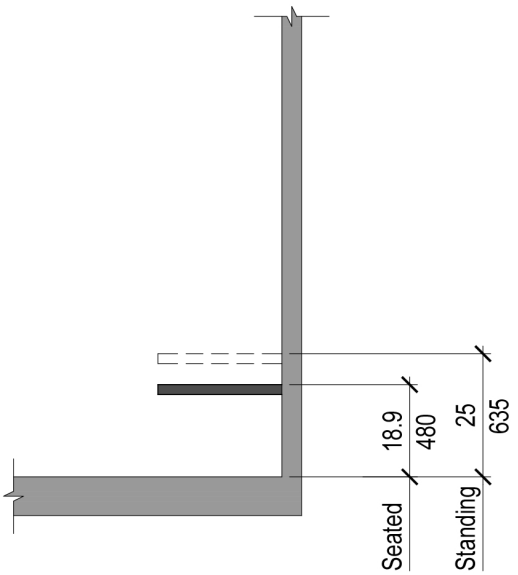
902.3.1 Depth. Refer to Section 308.2.2 Obstructed Forward Reach, Section 308.3.2 Obstructed Side Reach, regarding depth of dining and work surfaces.

902.3.2 Adjustable Height Surfaces. Adjustable height surfaces are recommended where appropriate. An automatic means is suggested, but if this is not feasible, provide manual operation complying with Section 309. Height range should comply with Section 902.3.

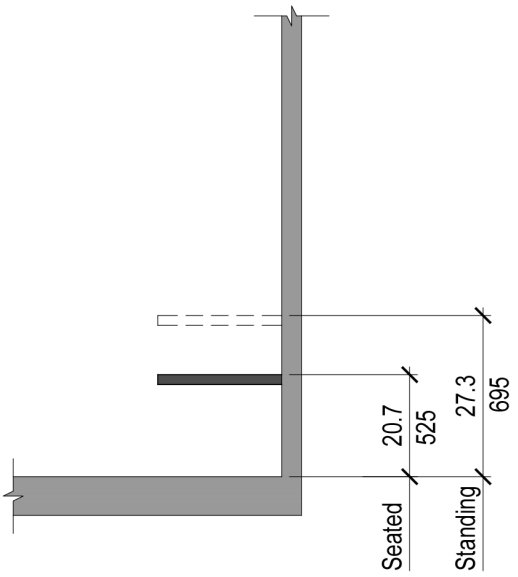
902.4 Countertop and Tabletop Surfaces for Children's Use, Ages 5 to 12. Dining surfaces and work surfaces primarily for children's use, ages 5 to 12 should comply with Section 902.4.



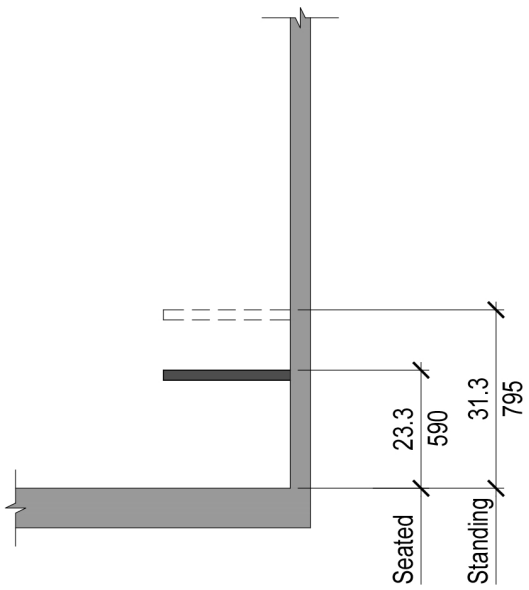
(a)
Age 5+



(b)
Age 7



(c)
Age 9



(d)
Age 12

Fig. 902.4
Height of Contertop and Tabletop Surfaces for Children's Use, Ages 5 to 12

902.4.1 Inclusive Space. Tier II clear floor space 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width, positioned for forward approach, should be provided. Knee clearance 24 inches (610 mm) minimum above the floor should be provided. Toe clearance 12 inches (305 mm) above the floor should be provided. Provide an adjustable height surface or a surface 26 inches (660 mm) minimum and 30 inches (760 mm) maximum.

902.4.2 Typical Height of Countertops for a Standing Child. The heights of countertops for a standing child should accommodate the particular age group: Age 5+, 22.5 inches (570 mm); Age 7, 25 inches (635 mm); Age 9, 27.3 (695 mm); Age 12, 31.3 inches (795 mm).

902.4.3 Typical Height of Countertops and Tabletops for Ages 5 to 12 for a Seated Child. The heights of countertops and tabletops for a seated child should accommodate the particular age group: Age 5+, 17.5 inches (445 mm); Age 7, 18.9 inches (480 mm); Age 9, 20.7 (525 mm); Age 12, 23.3 inches (590 mm).

902.4.4 Adjustable Height Surfaces. Consider adjustable height surfaces, especially for inclusive spaces and to accommodate size variations within each age group. Height ranges should comply with Section 902.4.

902.5 Young Children's Countertop and Tabletop Surfaces for Ages 5 and Younger. Dining surfaces and work surfaces primarily for children's use, ages 5 and younger should comply with Section 902.5.

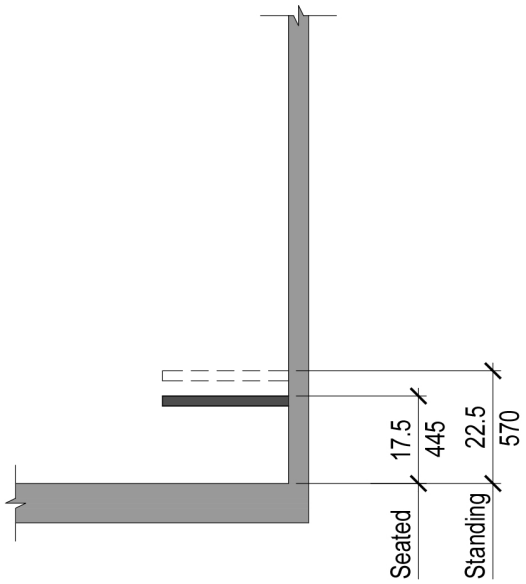


Fig. 902.5
Young Children's Contertop and Tabletop Surfaces for Ages 5 and Younger

902.5.1 Inclusive Space. A clear floor space 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width, positioned for forward approach, should be provided. Knee clearance 24 inches (610 mm) minimum above the floor should be provided. Toe clearance 12 inches (305 mm) above the floor should be provided. Provide an adjustable height surface or a surface 26 inches (660 mm) minimum and 30 inches (760 mm) maximum.

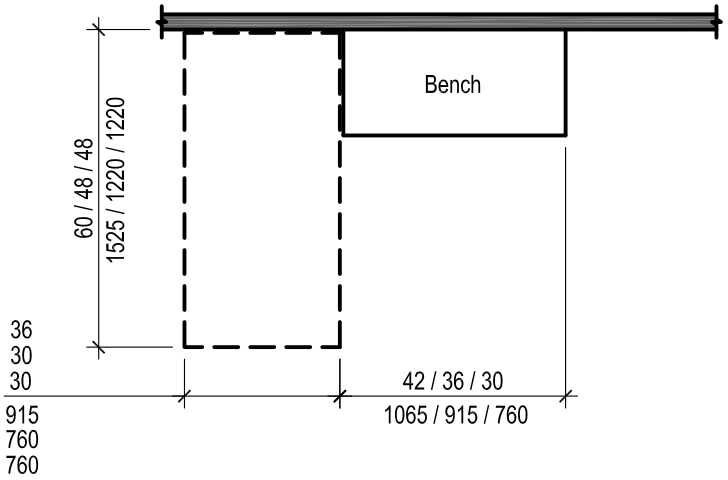
902.5.2 Typical Height of Countertops and Tabletops for a Standing Child. The height of countertops for standing child. should be a maximum of 22.5 inches (572 mm).

902.5.3 Typical Height of Countertops and Tabletops for a Seated Child. The height of tabletops and counter tops for a seated child should be a maximum of 17.5 inches (445 mm).

902.5.4 Adjustable Height Surfaces. Consider adjustable height surfaces to accommodate size variations within this group. Height range should comply with Section 902.5.

903 Seating

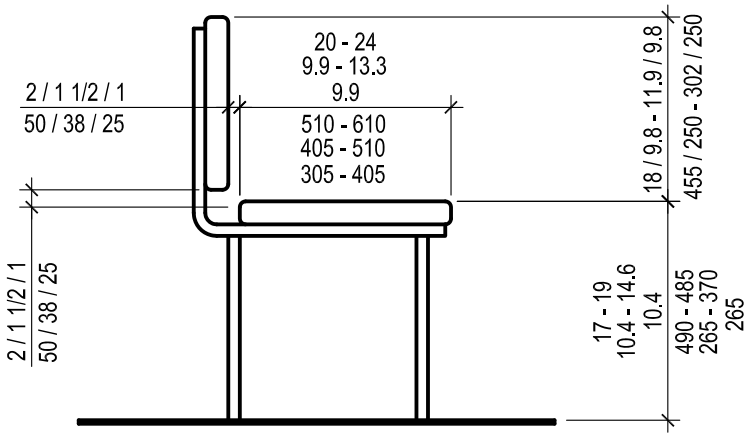
903.1 General. Seating should comply with Section 903. Seating should be ergonomically correct and adjustable where practical to provide proper support. Ergonomics increases comfort, safety and health while reducing fatigue. Compressible surfaces should be carefully considered to not only maintain recommended heights and ergonomics, but the affect on usability, transfer and exiting features include: 360 degree rotation, variable height, back height adjustment, seat depth adjustment, removable and adjustable arms, adjustable lumbar support, center tilt, synchronized tilt, and tilt lock.



(a)
Clear Floor Space and Size

Size / Age:	
	(a)
	(b)
(a) / (b) / (c) in	(c)
(a) / (b) / (c) mm	(a)
	(b)
	(c)

(a) Adult
(b) Children ages 5 - 12
(c) Children ages 5 and younger



(b)
Bench Back Support and Seat Height

Fig. 903
Typical Transfer Bench

903.1 Advisory. Seating should be waterproof for some interior applications and also vandal and weather protected for exterior applications. Seating is referenced in various sections such as 802.8 for assembly areas, Section 603 single and multiple occupant rest rooms and bathrooms, Section 405.7.4.2 rest areas for ramps, etc.

903.2 Clear Floor Space. A clear floor space complying with Section 305, positioned for parallel approach to an end of the bench seat, should be provided.

903.3 Adult Seats.

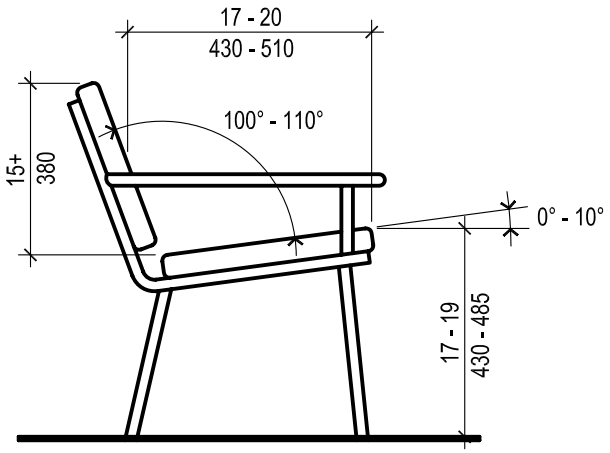


Fig. 903.3
Adult Bench[11]

903.3 Advisory A. The *2014 NYCBC* utilizes the *ICC A117.1-2009* edition of the reference standard. Bench requirements are contained in Section 903. These bench requirements are intended for use in saunas, dressing and locker rooms, holding and housing cells (see *ICC A117.1-2009 Commentary*). They are not intended for outdoor benches nor other types of seating, such as a couch. That would restrict creativity and egonometric design among other considerations. The *Final Guidelines for Outdoor Developed Areas* published in the Federal Register 9/26/13 provides some accessible scoping requirements. The final rule does not contain a design for an outdoor bench.

903.3 Advisory A Cont'd. The US Access Board issued requirements that are now part of the Architectural Barriers Act (ABA). Accessibility Standards that apply to national parks and other outdoor areas developed by the federal government. These requirements do not apply to outdoor areas developed with federal grants or loans. Where outdoor constructed features are provided in common use and public use areas that serve camping and picnic units with mobility features, at least 20 percent , but not less than one, of each type of outdoor constructed feature must comply with the applicable technical requirement for each feature.

Although there are no detailed technical requirements for the bench itself, providing a bench with at least one armrest and back support that runs the full length of the bench is helpful for people who need the support or have difficulty standing up from a seated position. However, armrests on both ends of a bench could prevent a person using a mobility device from transferring onto the bench. An option is to provide a bench with a backrest and hinged raisable armrests. Another is to locate an armrest in the middle of the bench, or place a single armrest on the end of the bench furthest from the clear ground space to allow both perpendicular , parallel and diagonal transfer choices.

This Section 903 addresses the lack of design information, provides missing details and recommendations based on information provided by Kenneth Lynch & Sons, and Landscape Forms, Inc. This is based on their research and dozens of designs that are widely used and tested. Landscape Forms Inc. website contains *ADA Criteria for Benches* that confirms lack of federal criteria.

11 Bench recommendations by Landscape Forms, Inc.

903.3 Advisory B. Fig. 903b is a transfer bench for people transferring from a wheelchair outdoors. The key things are to provide an appropriate route(s) and wheelchair spaces integrated with other seating. The unrefined minimum transfer bench in Figure 903b is not necessarily desirable for people with limited mobility because it contains a level seat and vertically plumb back and does not have armrests it may be uncomfortable and less usable than the more refined bench . Armrests are recommended as per Section 903.3.3, but for transferring they should contain a folding or retractable arm. People with limited mobility, but who do not use a wheelchair, will appreciate a bench that is easy in and easy out. Generally this can be accomplished by:

a. Providing armrests that extend out to a spot roughly even with the front edge of the seat;

b. Having the front edge of the seat bottom 17"-19" above the ground (see 903.5);

c. Having a slightly slopped horizontal seat bottom (0-10 degrees of slope - Kenneth Lynch & Sons) or (7-11 Landscape Forms, Inc.) ;

d. Providing a backrest with a midpoint about 17"-20" back from the front edge of the seat bottom, rising 15" or more above the seat bottom, and forming an angle with the bottom of 100-110 degrees;

e. Providing open space under bench for foot placement while rising helps one to balance.[12]

903.3.1 Bench Seats. Accessible benches should have seats 42 inches (1065 mm) minimum in length, and from 20 inches (510 mm) minimum to 24 inches (610 mm) maximum in depth. Other benches may provide a recommended depth of 17 inches (430 mm) to 20 inches (510 mm). This relates to the seat back (see 903.4). The user's legs should also be elevated slightly at the front of the bench; an angle of 7-11 degrees from the horizontal helps to push the body weight into the correct position on the seat.[13] (See 903.3.1 Advisory for alternate seat bottom angle recommendations.)

903.3.2 Single Seat Size. Single seat width and depth apply to the seat surface and not the overall dimensions of the chair and vary depending on the type and use (e.g. office and lounge chairs). The ratio of width to depth also is affected by the style of the chair, back angle and the various features. Consider a standard office seat 16 inches (405 mm) to 18 inches (455 mm) in width; and 15 inches (380 mm) to 16 inches (405 mm) in depth.

903.3.2.1 Large Single Seat Size. Large single seat width and depth apply to the seat surface and not the overall dimensions of the chair and vary depending on the type and use (e.g., waiting area seating). Consider a large seat size 24 inches (610 mm) minimum in width and from 17 inches (430 mm) to 20 inches (510 mm) in depth. Depths greater than 20 inches will increase the level of difficulty getting in and out of the seat.

903.3.3 Armrests. Armrests are recommended to help people sit, rise and to lean against for support and comfort. If only one bench is provided it should include armrests. Where multiple benches are provided, 50% of the benches should have armrests. Where armrests are provided on seating adjacent to clear floor spaces, folding or retractable armrest should be provided to allow transfer from a mobility device. Suggested top surface of armrest height is a range of 25"-27" (635-686 mm) aff based on the overall design. They may be fixed, hinged rotation, adjustable height or removable. The suggested height places the top surface of the armrest 8" (203 mm) above the front edge of the seat at 17" (432 mm) aff. Length of arm is suggested to align with the front edge of the seat for easy push off to rise from bench.

12 Bench recommendations by Landscape Forms, Inc.

13 Bench back and seat angle ranges recommendations by Kenneth Lynch & Sons.

903.4 Bench Back Support for Adults. The bench should provide for back support and should be 42 inches (1065 mm) minimum in length and should extend from a point 2 inches (51 mm) maximum above the seat surface to a point 18 inches (455 mm) minimum above the seat surface [benches that are not required to be accessible, consider 15 inches (380 mm) minimum above the seat surface]. Back support should be 2 1/2 inches (64 mm) maximum from the rear edge of the seat measured horizontally. Seat back angles are an important consideration. Back shape and angle are directly related to the seat shape and angle. From the point on the seat where the user's weight, directly below the torso, is supported to the most flat part of the seat back should be 95-100 degrees.[14] (see 903.3.1 Advisory for alternate angle recommendations)

903.4.1 Single Seat Back Support. Single seat back support varies in angle, features and height depending upon the type of seat and use (e.g. office chair). Consider a standard office chair back 15 inches (380 mm) to 16 inches (406 mm) above the seat surface.

903.5 Height of Adult Seats. The top of the seat should be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the floor, measured to the top of the seat.

903.6 Structural Strength for Adults. Allowable stresses should not be exceeded for materials used where a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener mounting device, or supporting structure.

903.7 Wet Locations. Where provided in wet locations the surface of the seat should be slip resistant and should not accumulate water.

903.8 Best Practice and Active Design. Best practice is to provide self-selection choices for various users that address a range of sizes, posture and other factors. Benches are important for Active Design because rest ,when needed, allows sustained and increased activity. This includes children by properly sizing features and components. Accommodate the aging with assistive features that increase independence and safety. Armrests of different heights and a variety of locations are helpful, especially a swing-up armrest at the end of a bench for those who prefer to transfer from a wheelchair rather than just locate themselves adjacent to a bench. An accessible seat top height of 17-19 inches (432-483 mm) may be too high for some, resulting in dangling feet. A 20-inch (508 mm) seat depth may be too deep for some that keeps one's knees from bending resulting in slouching.

903.8.1 Priority Locations. In order to support walking and transit, DOT's CityBench priority locations include: bus stops without shelters; sidewalks near transit facilities (e.g., subway stations), senior centers; hospitals and community health centers; commercial zones and shopping districts; municipal facilities (e.g., public libraries, schools). Benches are for use by the general public and are not restricted to tenants of any particular building or patrons of any particular business. Benches cannot be used to displace street vendors.

903.8.2 Sidewalk Placement. For safety and engineering reasons, DOT CityBench provides basic requirements for bench placement on a sidewalk. Benches with backs placed along the curb, the minimum sidewalk width is 12 feet (3.7 m) from building to curb. Backless benches placed along the curb, the minimum sidewalk width is 14 feet (4.3 m). Benches placed against a building, the minimum sidewalk width is 10 feet, 6 inches (3.2 m). Benches cannot be placed directly opposite a building entrance or a cellar door. Where there is a sidewalk cafe, the sidewalk width is measured from the outside of the cafe to the curb.

14 Bench back and seat angle ranges recommendations were provided by Kenneth Lynch & Sons.

903.9 Comparison of Code Requirements with the *IDG* Bench Recommendations. Below is a chart that compares bench components under the codes (*ICC A117.1-2009 and the 2010 ADA Standards*) to the *Inclusive Design Guidelines, 2nd Edition*. It is intended to be used as a tool for designers to help refine their designs by identifying some parameters. Some of the items are specifically intended for the dense New York City urban landscape, such as sidewalk clearance criteria.

ITEM #	*A117.1-2009* and *2010 ADA*	*IDG* 2nd ed.
1. Clear Floor Space	30” x 48” (760 x 1220 mm) Parallel and perpendicular.	36” x 60” (915-1525 mm) Parallel and perpendicular.
2. Bench Length	42” (1067 mm) min.	48” (1220 mm)min. to accommodate a min of two individual seats.
3. Bench Depth	20”-24” (508-610 mm).	17”-20” (432-508 mm) Provide 20% at 20 inches (508 mm) the rest below this depth.
4. Bench Height	18” (458 mm) min. above top of seat.	15”-18” (380-457 mm) min above top of seat. Provide 20% at height of 18” (508 mm).
5. Seat Height	17”-19” (432-483 mm) aff.	17”-19” (432-483 mm) aff.
6. Structural Strength	250 pounds (1112 N) min.	250-350 (1112-1558 N)pounds as per usage. 350 lbs (1558 N) for 20% of benches.
7. Seat Angle	Silent	0-10 degrees or 7-11 degrees as appropriate for design.
8. Back Angle	Silent	100-110 degrees from seat surface.
9. Seat Depth	20”-24” (508-610 mm)(Fig 903 misleading since it indicates a 2-1/2” max. space bet. seat edge and back).	17”-20” (432-508 mm) Provide 20% at 20”-24” (508-610 mm).
10. Armrest	Silent	Fixed, removed, swing-up and adjustable height. Swing-up or adjustable or one end armrest removable for transfer.
11. Armrest Height AFF to Top of Armrest Surface	Silent	25”-27” (635-686 mm) aff.
12. Armrest Height, Top of Seat to Top of Armrest Surface	Silent	8” (203 mm) above the front edge of the top of seat. Armrest should not exceed 25”-27” (635-686 mm) aff.
13. Armrest Length	Silent	17”-20” (432-508 mm) for those that require hand placement aligned with front of seat for lifting provide 20% min.
14. Space Beneath Bench	Silent	Provide space beneath for foot placement to aid balance while rising.
15. Clear Floor Space Distance From Curb Line	Silent	12” (305 mm) min. from curb line (drop off) to edge of clear floor space. Edge protection not permitted at curbs, thus a minimum of 12” (305 mm) provides a minimum buffer to drop-off and potential back flipping.

16. Clear Floor Space Distance From Back of Bench	Silent	12” (305 mm) between edge of clear floor space and face of wall *IDG* head/ shoulder alignment allows for easier and safer transfer. This increases the overall distance from seat back to drop-off. See also item #17.
17. Individual Seat Width	Silent	24” (610 mm) min. Benches may comprise individual seats.
18. Minimum Sidewalk Width for Benches w/Backs Placed Along Curb	Silent	13’ (4 m). The NYC DOT min of 12 is increased by 12” (305 mm) to set back clear floor space for enhanced transfer. It is 24’ (610 mm) from back to curb drop-off.
19. Minimum Sidewalk Width for Bench Without Backs	Silent	Provide a min of 20% benches with backs. 14’ min. established by NYC DOT.
20. Minimum Sidewalk Width for Benches Placed Against Buildings	Silent	11’-6” (3.5 m) NYC DOT min. is 10’-6” (3.2 m).
21. Clear Floor Space Transfer Locations	Parallel w/ side and parallel w/ front.	Parallel w/side, parallel w/front, diagonal w/ end corner. Utilize diagonal transfer that is similar to a typical WC transfer method that is common for people who use a wheelchairs.
22. Tactile Surfaces	Silent	Provide tactile surface around the perimeter. Raised ribbing, groves, or enhanced surface texture (not truncated domes that are too aggressive). Helps people who are blind to locate the bench. Slip resistance will stabilize footing while rising.
23. Lighting	Silent	Provide enhanced lighting at bench area. Aids in locating bench, for reading and safety.

Table 903.9 Comparison of Code Requirements with *IDG* Bench Recommendations.

903.10 Seating for Children, Ages 5 to 12.

903.10.1 Clear Floor Space. A clear floor space 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width positioned for parallel approach to an end of the bench seat should be provided.

903.10.2 Bench Size. Benches should have seats 36 inches (915 mm) minimum in length. The bench depth should accommodate the particular age group: Age 5+,9.9 inches (250 mm); Age 7, 10.8 inches (275 mm); Age 9, 11.8 inches (300 mm); Age 12, 13.3 (340 mm). See Section 903.3.1 and Advisory for recommended seat angles.

903.10.2.1 Single Seat Size. Single seat width and depth apply to the seat surface and not the overall dimensions of the chair. Single seat size should accommodate the particular age group: Age 5+, 11 inches (280 mm) width and 9.9 inches (250 mm) depth; Age 7, 12 inches (305 mm) width and 10.8 inches (275 mm) depth; Age 9, 13 inches (330 mm) width and 11.8 inches (300 mm) depth; Age 12, 14.5 inches (370 mm) width and 13.3 inches (340 mm) depth.

903.10.3 Bench Back Support. The bench should provide for back support and should be 36 inches (915 mm) minimum in length and should extend from a point 1 1/2 inches (38 mm) maximum above the seat surface to a point above the seat surface that accommodates the particular age group: Age 5+, 9.8 inches (250 mm); Age 7, 10.2 inches (260 mm); Age 9, 11 inches (280 mm); Age 12, 11.9 inches (302 mm). Back support should be 2 inches (50 mm) maximum from the rear edge of the seat measured horizontally. See 903.3.1 Advisory and Section 903.4 for seat back angles.

903.10.3.1 Single Seat Back Support. Single seat back support is measured to a point above the seat surface that accommodates the particular age group: Age 5+, 9.8 inches (250 mm); Age 7, 10.2 inches (260 mm); Age 9, 11 inches (280 mm); Age12, 11.9 inches (302 mm).

903.10.4 Height. The height of the top of the seat above the floor should accommodate the particular age group: Age 5+, 10.4 inches (265 mm); Age 7, 11.4 inches (290 mm); Age 9, 12.8 inches (325 mm); Age 12, 14.6 inches (370 mm).

903.10.5 Structural Strength. Allowable stresses should not be exceeded for materials used where a vertical or horizontal force of 150 pounds (670 N) is applied at any point on the seat, fastener mounting device, or supporting structure.

903.10.6 Wet Locations. Where provided in wet locations, the surface of the seat should be slip resistant and should not accumulate water.

903.11 Seating for Children, Ages 5 and Younger.

903.11.1 Clear Floor Space. A clear floor space 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width positioned for parallel approach to an end of the bench seat should be provided.

903.11.2 Bench Size. Benches should have seats 30 inches (760 mm) minimum in length, and 9.9 inches (250 mm) maximum in depth. See Section 903.3.1 and Advisory for recommended seat angles.

903.11.2.1 Single Seat Size. Single seat size should be 11 inches (280 mm) maximum in width and 9.9 inches (250 mm) maximum in depth.

903.11.3 Bench Back Support. The bench should provide for back support or should be affixed to a wall. Back support should be 30 inches (760 mm) minimum in length and should extend from a point 1 inch (25 mm) maximum above the seat surface to a point 9.8 inches (250 mm) maximum above the seat surface. Back support should be 1 1/2 inches (38 mm) maximum from the rear edge of the seat measured horizontally. See 903.3.1 Advisory and Section 903.4 for recommended seat back angles.

903.11.3.1 Single Seat Back Support. Single seat back support is measured to a point above the seat surface and should be 9.8 inches (250 mm) maximum.

903.11.4 Height. The top of the seat should be 10.4 inches (265 mm) maximum above the floor, measured to the top of the seat.

903.11.5 Structural Strength. Allowable stresses should not be exceeded for materials used where a vertical or horizontal force of 100 pounds (445 N) is applied at any point on the seat, fastener mounting device, or supporting structure.

903.11.6 Wet Locations. Where provided in wet locations the surface of the seat should be slip resistant and should not accumulate water.

903.12 Office Chairs. Office and work chairs should contain a wide range of features that allow adjustment for different users and changing individual preferences when needed. Features include: 360 degree rotation, variable height, back height adjustment, seat depth adjustment, removable and adjustable arms, adjustable lumbar support, center tilt, synchronized tilt, and tilt lock. Office chairs should be provided in various sizes, materials, wheeled and non-wheeled bases. Provide footrests integrated with the chair or a separate adjustable unit. Consider massage features to reduce fatigue.

903.13 Dining Seating. Dining seating may be fixed or movable, benches, or individual chairs. Due to the level and range of creativity regarding the design of dining venues, there are hybrids. Bench seating should comply with Section 903 and should accommodate children where appropriate. Chairs should be provided in at least two sizes (See 903.3 and 903.3.1.1) to accommodate large individuals or provided with armless chairs, but this does not necessarily provide comfort. Lumbar support back, should be provided and high enough to provide support. Weight should not be so extreme as to make repositioning of the chair a strenuous effort (e.g. heavy metal chairs).

903.14 Arena Seating. Arena, grand stand, bleacher and auditorium seating should provide proper support to prevent fatigue and should be ergonomically correct and adjustable where practical. Adjustments may include height, back angle, lumbar support, firmness with folding or retractable arms and seat. Amenities should be provided that are appropriate for the type of assembly space and the primary users. This may include physical and wireless computer connections, monitors located in the back of the seats, task lighting, flip up work surface, cup holder, etc. If an assembly space is to be used for a wide range of uses then it should be provided with the greatest range of amenities.

903.15 Children's Classroom Seating. Children's classroom seating should comply with Section 903.8 and Section 903.9.

903.16 Toilet and Bathroom Seating. Seating for single occupant rooms, multiple occupant rooms should comply with Section 603.8.1, 603.8.2, 608.4, and 610.

903.17 Elevator Landing Seating. Elevator landing seating should comply with Section 903.3 through 903.7 and Section 407.2.1.8. Consider benches for children complying with Sections 903.8 and 903.9 in facilities that a primarily intended for children.

903.18 Shelter Seating. Shelter seating should comply with Section 903.1 through 903.7 and Section 402.4.7. Consider benches for children complying with Sections 903.8 and 903.9 for facilities that are primarily intended for children.

903.19 Route Seating. Route seating should comply with Sections 402.4.6 and 903.1 through 903.7. consider benches complying with Sections 903.8 and 903.9 for facilities that are primarily intended for children.

903.20 Lobby and Waiting Area Seating. Lobby and waiting area seating should comply with Sections 404.1.1 and 903.1 through 903.7. consider benches complying with Sections 903.8 and 903.9 for facilities that are primarily intended for children.

903.21 Area of Rescue Assistance Seating. Area of rescue assistance seating should comply with Section 903.3 through 903.6 and Section 504.11.

903.22 Telephone Seating. Telephone seating should comply with Sections 903.3 through 903.7 and Sections 704.13.

903.23 Universal Kinetic Furniture[15]. Universal kinetic furniture is furniture design for home care and aging in place created by Touch Graphics, Inc. It has the functionality of a hospital bed without the cost or the negative appearance. It adjusts to different functions and forms easily, with simple, inexpensive technology that is extremely durable. The system is modular and allows one to purchase components as needed. The furniture acts as its own shipping container. Assembly at home is easy with just a screwdriver and clear diagrams.

15, Universal Kinetic Furniture by Steven Landau, Touch Graphics, Inc.

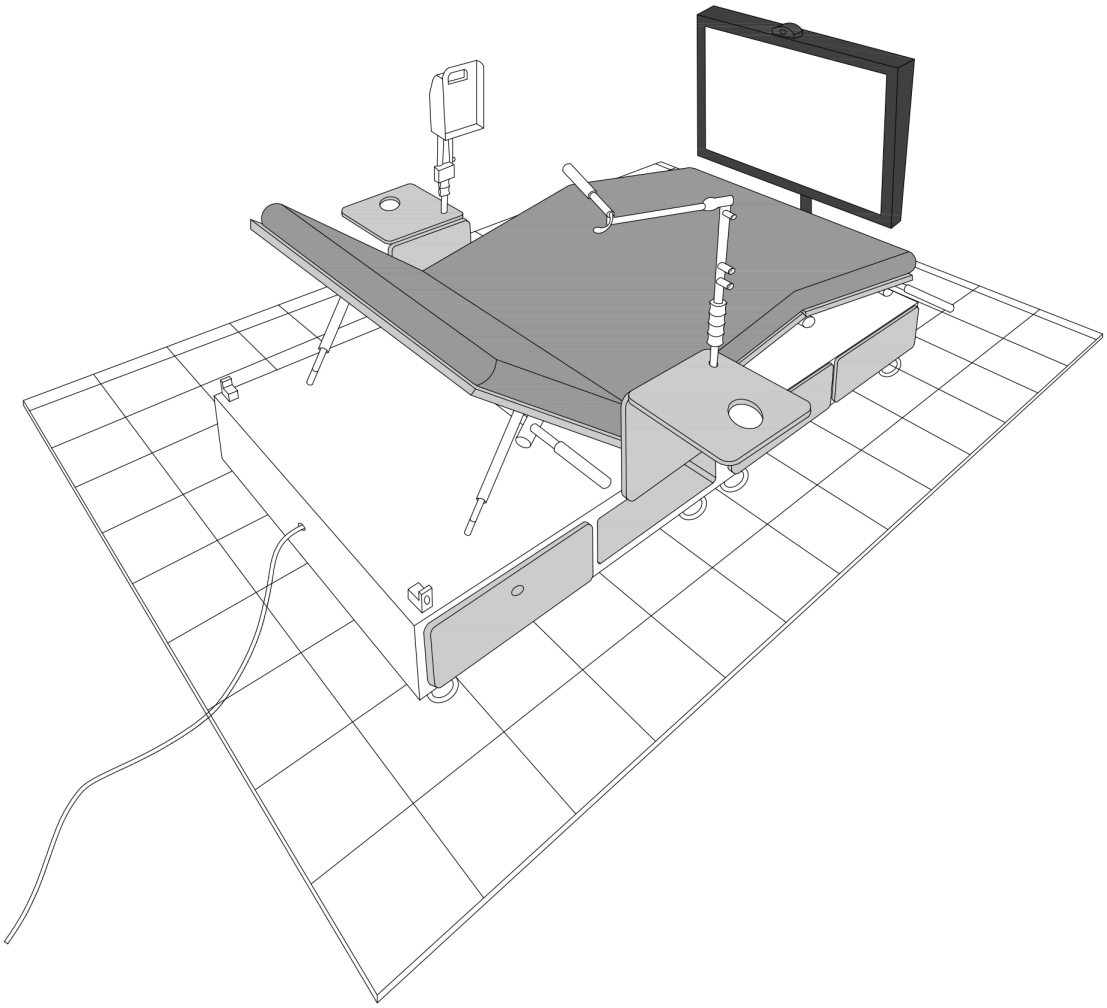


Fig. 903.23
Universal Kinetic Furniture Example

903.24 Medical Examination Chairs. Medical examination chairs should comply with the US Department of Justice publication *ADA Access to Medical Care for Individuals with Mobility Disabilities, and* the US Access Board's proposed standards *Part 1195 Standards for Accessible Medical Diagnostic Equipment that* contains additional detailed information.

903.24 Advisory. The US Department of Justice publication *Access To Medical Care For People With Mobility Disabilities*, is viewable on the *ADA* website: www.ada.gov. It contains four parts: Part 1, Overview and general requirements; Part 2, Commonly Asked Questions; Part 3, Accessible Examination Rooms; Part 4, Accessible Medical Equipment. The DOJ document utilizes the *2010 ADA Standards*. Consider applying *IDG* Chapter 3 Building Blocks containing Tier III Institutional recommendations.

The US Access Board's proposed standards *Part 1195 Standards for Accessible Medical Diagnostic Equipment* is viewable on their website: http://www.access-board.gov As per the preamble: "The standards contain technical criteria for medical diagnostic equipment that is accessible to and usable by patients with disabilities. The standards contain Chapter 1, Application and Administration; Chapter 2, Scoping; Chapter 3, Technical Criteria: patients in supine, prone, or side-lying, seated and standing positions, communication and operable parts. Consider applying *IDG* Chapter 3 Building Blocks containing Tier III Institutional recommendations.

904 Sales and Service Counters

904.1 General. Sales and service counters should comply with Section 904 as applicable.

904.2 Approach. Counters should be located adjacent to a walking surface complying with Section 403.

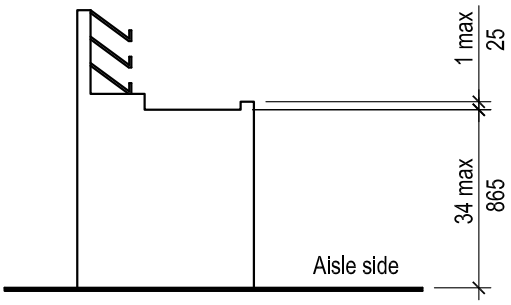


Fig. 904.4.2
Height of Checkout Counters

904.3 Sales and Service Counters. Sales and service counters should comply with Section 904.3.1 or 904.3.2.

904.3.1 Parallel Approach. A portion of the public use side of the counter surface 42 inches (1067 mm) minimum in length and 26 inches (660 mm) to 34 inches (865 mm) maximum in height above the floor complying with Section 308 and specifically with Section 308.3.2. A clear floor space complying with Section 305, positioned for a parallel approach adjacent to the counter, should be provided.

904.3.2 Forward Approach. A portion of the public use side of the counter surface 36 inches (915 mm) minimum in length and 34 inches (865 mm) maximum in height above the floor complying with Section 308. A clear floor space complying with Section 305, positioned for a forward approach should be provided. Knee and toe clearance complying with Section 306 should be provided under the counter.

904.4 Checkout Aisles. Checkout aisles should comply with Section 904.4.

904.4.1 Aisle. Aisles should comply with Section 403.

EXCEPTION: Aisle should be 42 inches (1070 mm) minimum in width.

904.4.2 Counters. The checkout counter surface should be 34 inches (865 mm) minimum and 36 inches (915 mm) maximum in height above the floor. The top of the counter edge protection should be 1 inch (25 mm) maximum above the top of the counter surface on the aisle side of the checkout counter.

904.4.3 Check, bill and Credit Card Receipts Writing Surfaces. Where appropriate, writing surfaces should comply with Section 902.3

904.4.4 Credit Card Swipe. There is no industry wide swiping standardization. It is recommended to place the credit card reader height to allow swiping for both a standing and seated position complying with Section 309.3.3 and a maximum depth of 24 inches (610 mm).

904.5 Food Service Lines. Counters in food service lines should comply with Section 904.5.

904.5.1 Self-Service Shelves and Dispensing Devices. Self-service shelves and dispensing devices for tableware, dishware, condiments, food and beverages should comply with Section 308.

904.5.2 Tray Slides. The tops of tray slides should be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum above the floor.

904.5.3 Tray Slides for Children's Use. The tops of tray slides should be 26 inches (660 mm) minimum and 30 inches (760 mm) maximum above the floor.

904.6 Security Glazing. Where counters or teller windows have security glazing to separate personnel from the public, voice and visual communication should be provided complying with Section 708. Telephone handset devices, if provided, should comply with Section 704.3.

905 Product and Storage Facilities

905.1 General. Product and storage facilities should comply with Section 905, and should provide access to all products offered.

905.2 Clear Floor Space. A clear floor space complying with Section 305 should be provided.

905.3 Height. Storage elements should comply with reach ranges specified in Section 308. Eye levels are important to examine products and read labels and should comply with Section 310.

905.3 Advisory. The entire range of products should comply with Section 308, but it is also recommended that they should be available at the comfort reach range between 24 inches (610 mm) and 48 inches (1220 mm) above the floor so that they are reachable from either a standing or sitting position. Heavier items should be located at the lower height for easier retrieval. Featured products or those on sale should be located so they can be easily obtained near entry (e.g. at the front of aisle, near checkout areas).

905.4 Operable Parts. Operable parts of storage facilities should comply with Section 309.

905.5 Circulation. All circulation paths should be 42 inches (1065 mm) minimum width for one way traffic and 72 inches (1830 mm) minimum width for two-way traffic complying with 403.5 and dead ends complying with Section 403.5.3.

905.5 Advisory. Care should be taken when considering display location or product stacking, especially in supermarkets. These may create obstructions and an instability hazard.

905.5.1 Turns. Provide at least a 42 inch (1065 mm) wide aisle and 48 inch (1220 mm) turning aisle for a turn around an obstruction (e.g., display case) and aisle terminating less than 48 inches (1220 mm) wide. Provide at least a 42 inch (1065 mm) wide aisle for a 90 degree turn no less than 48 inches (1220 mm) wide for a 180 degree turn around an obstruction.

905.6 Signage. Provide signage to aid wayfinding above each aisle listing contents, 80 inches minimum above the floor complying with Section 307.2, so that products can be easily found. Consider providing signage at ends of aisles at eye level complying with Section 310.5.

905.7 Lighting. Provide adequate lighting levels with a natural light spectrum to be able to generally examine products, read ingredients, examine color and texture of material, read pricing and other relevant label information, and to have enough illumination to help make a purchase determination.

905.8 Consumer Assistance. Provide bar code readers with adequately sized readout, scales to verify weight, large size labels for easier reading, small carry baskets, electric scooter/shopping carts, and customer assistance hands free operation two way communications complying with Section 708.4.

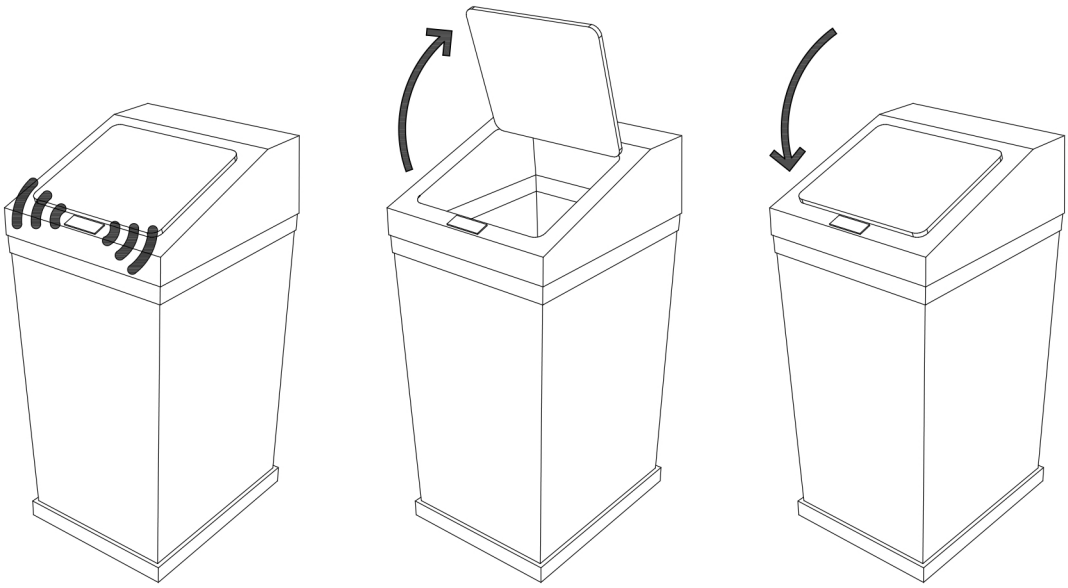
906 Trash and Recycling Receptacles.

906.1 General. Receptacles should comply with Section 906.

906.2 Clear Floor Space. A clear floor space complying with Section 305 should be provided.

906.3 Height. Reach ranges should comply with Section 308. Protruding objects should comply with Section 307. Receptacle openings should be reachable by adults and children. Children's reach ranges should comply with Section 308.4.

906.4 Operable Parts. Operable parts should comply with Section 309, with one hand operation without requiring tight grasping pinching or twisting of the wrist. Consider foot operation and other alternatives complying with Section 309. Receptacle should have easy to use lids. Consider top, vertical or sloped front loading operation. Consider automatic operation when contamination is a concern such as a hospital environment and food preparation areas.



(a)
Sensor Activated

(b)
Automatically Opens

(c)
Automatically Closes

Fig. 906.4
Receptacle with Automatic Operation

906.5 Locations. Locate on smooth level surfaces to prevent tipping. Locate throughout a facility so that receptacles are within short distances. Provide in lobbies, intersections, restrooms and other amenities, adjacent to any concession that will generate waste, rest areas or places that people may eat, etc. Proper placement and adequate receptacles will avoid carrying heavy or bulky items long distances.

906.6 Surface Characteristics. Consider surface characteristics complying with Section 705 and Section 307.6 to help people with low vision identify the location of the receptacles.

906.7 Signage. Provide pictograms complying with Section 703.5, tactile signage complying with Section 703.3 and emergency assistance alarm complying with Section 702. Signage should identify room, each receptacle, operation and information regarding recycling.

907 Typical Refuse Disposal/Storage Room. A typical refuse disposal room should comply with Section 906.8

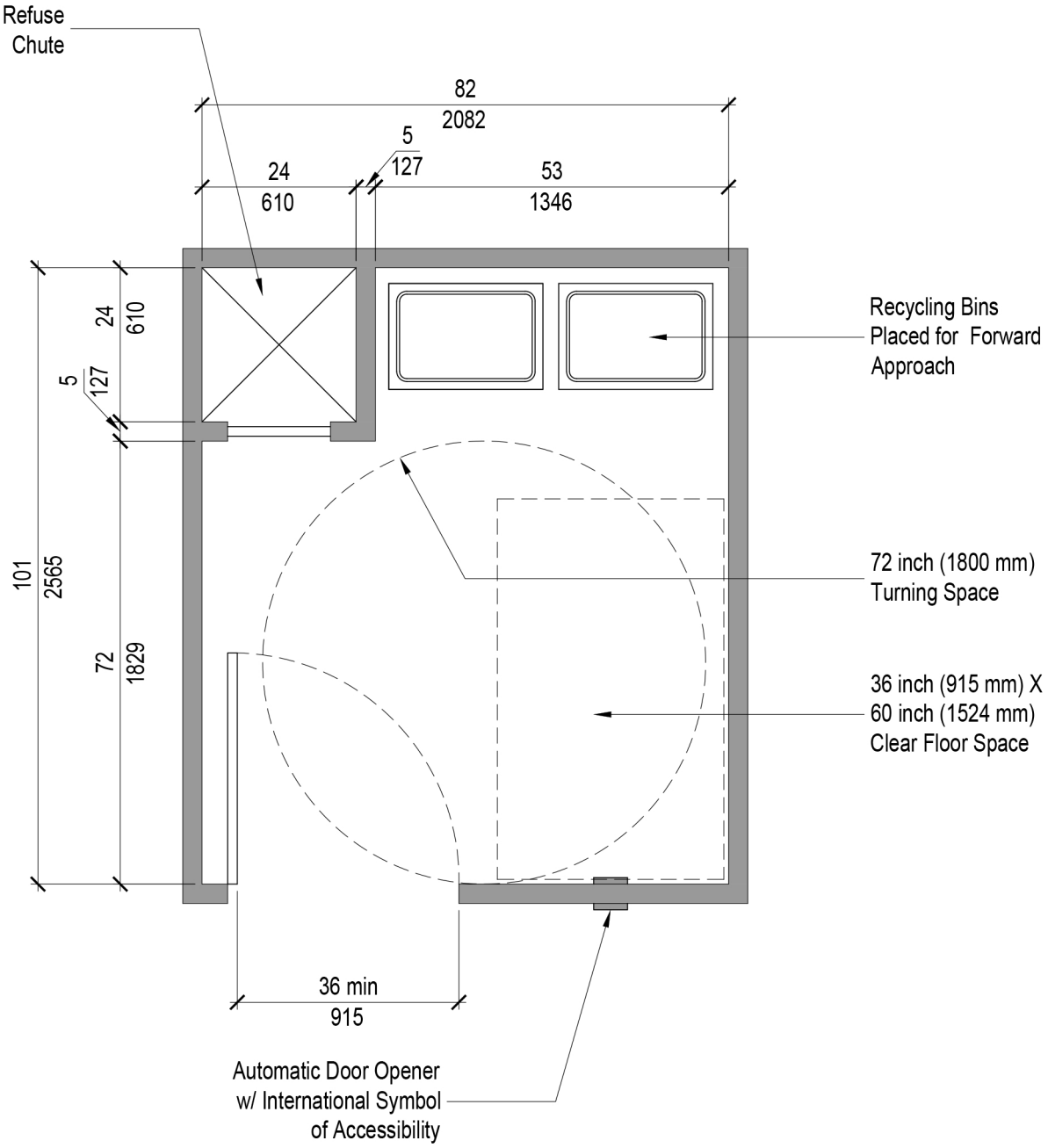


Fig. 907
Typical Refuse Disposal/Storage Room

907 Advisory. The typical trash/recycling room and alternative are based on designs by Keith Wen, RA, DOB for accessible common-use refuse disposal/storage rooms. Common-use refuse/storage rooms pursuant to Administrative Code Section 27-292.5(c), Sections 27-292.10 and Table 4 of Reference Standard RS 4-6 complying with /Section 4.2 through 4.32 include, but are not limited to, turning space, clear floor or ground space, and maneuvering clearances at the door. An alternative example is provided in Section 908 for locations where it is not viable to use the standard design example or similar variation.

907.1 Turning Space. Provide a typical Tier I adult circular turning space with a 72-inch (1800 mm) diameter complying with Section 304.3.1.

907.2 Clear Floor Space. Provide a typical Tier I clear floor space 60 inches (1525 mm) minimum in length and 36 inches (915 mm) minimum in width placed away from the door-swing. Clear floor space may overlap the turning space. Provide a clear floor space for forward approach adjacent to the refuse chute and receptacles.

907.3 Door. Provide a fully automatic door complying with Section 404.3. Provide a clear opening width of 36 inches (915 mm) minimum complying with Section 404. Provide a 2 hour fire rated self-closing door. Door may swing in or out. Out-swinging is preferred to avoid any potential obstructions or accidental entrapment within the room.

907.3.1 Activator. Door activator should comply with Section 404.3. See Section 404.3.5.1 for wall switch control location and Section 404.3.5.2 for floor mat location.

907.4 Threshold. Threshold should be flush with the surrounding floor surfaces. If a raised threshold is provided it should comply with Section 303.

907.5 Room Identification. Room identification should contain tactile characters with a Braille strip complying with Section 703.3. Provide the international symbol of accessibility complying with Section 703.6.3.1.

907.6 Occupancy Sensor. Provide an occupancy sensor within the room to detect the presence and the absence of occupants. Upon the detection of an occupant in the room the door should be maintained in the open position during he entire period of occupancy of the room. Upon the absence of an occupant in the room, the door should automatically return to the closed position. The automatic door should return to the closed position in case of a power failure, upon the activation of the fire alarm (if a fire alarm system is provided in the building), or upon the activation of smoke detectors.

907.7 Storage and Refuse Chute Height. The placement of the storage bins and/or shelves and the location of the refuse chute access opening should comply with forward reach ranges complying with Section 308.

907.8 Trash and Recycling Receptacles. Trash and recycling receptacles should comply with Section 906 and should be placed for forward approach.

907.9 Operable Parts. All controls and operating mechanisms should comply with Section 309.

907.10 Additional Features. Provide ventilation, general lighting and task lighting. Provide an emergency alarm complying with Section 702.

908 Alternate Refuse Disposal/Storage Room. An alternate refuse disposal/storage room should comply with Section 906.8.

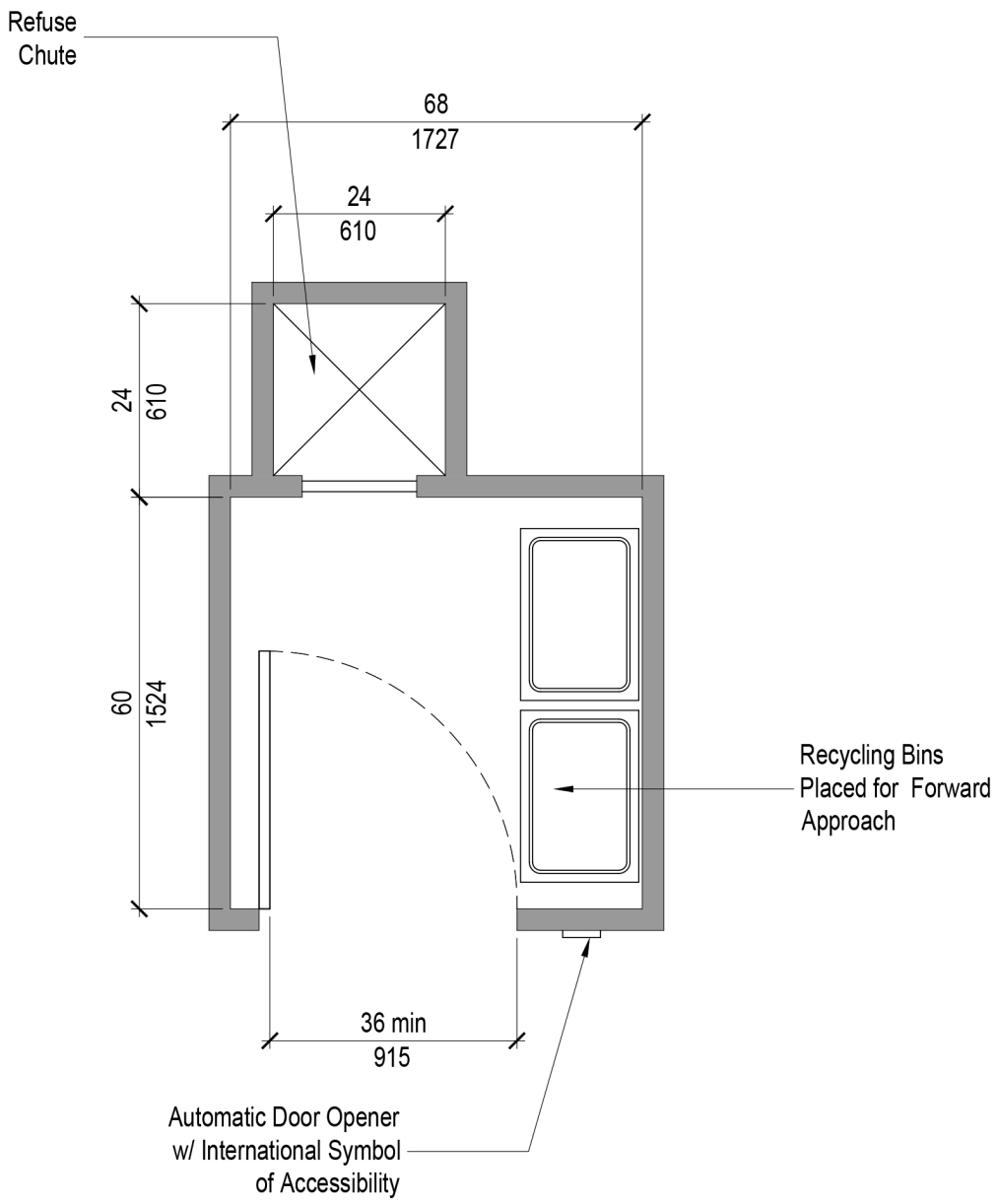


Fig. 908
Alternate Refuse Disposal / Storage Room

908.1 Turning Space. The alternate refuse disposal/storage room is provided to accommodate limited existing conditions and as such uses only a clear floor space and not the larger turning circle.

908.2 Clear Floor Space. Provide a typical Tier I clear floor space 60 inches (1525 mm) minimum in length and 36 inches (915 mm) minimum in width placed away from the door-swing. Provide a clear floor space for forward approach adjacent to the refuse chute and receptacles.

908.3 Door. Provide a fully automatic door complying with Section 404.3. with an occupancy sensor to maintain door in open position while the room is occupied. Door must return to a closed position if the room is not occupied or in case of power failure, complying with Section 908.6 Provide a clear opening width of 36 inches (915 mm) minimum. Provide a 2 hour fire rated self-closing door. Door may swing in or out. Out-swinging is preferred to avoid any potential obstructions or accidental entrapment within the room.

908.3.1 Activator. Door activator should comply with Section 404.3. See Section 404.3.5.1 for wall switch control location and Section 404.3.5.2 for floor mat location.

908.4 Threshold. Threshold should be flush with the surrounding floor surfaces. If a raised threshold is provided it should comply with Section 303.

908.5 Room Identification. Room identification should contain tactile characters with a Braille strip complying with Section 703.3. Provide the international symbol of accessibility complying with Section 703.6.3.1.

908.6 Occupancy Sensor. Provide an occupancy sensor within the room to detect the presence and the absence of occupants. Upon the detection of an occupant in the room the door should be maintained in the open position during the entire period of occupancy of the room. Upon the absence of an occupant in the room, the door should automatically return to the closed position. The automatic door should return to the closed position in case of a power failure, upon the activation of the fire alarm (if a fire alarm system is provided in the building), or upon the activation of smoke detectors.

908.7 Storage and Refuse Chute Height. The placement of the storage bins and/or shelves and the location of the refuse chute access opening should comply with forward reach ranges complying with Section 308.

908.8 Trash and Recycling Receptacles. Trash and recycling receptacles should comply with Section 906.

908.9 Operable Parts. All controls and operating mechanisms should comply with Section 309.

908.10 Additional Features. Provide ventilation, general and task lighting. Provide an emergency alarm complying with Section 702.

909. Charging Stations

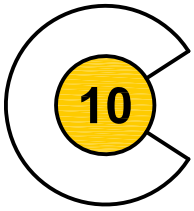
909.1 General. A charging station for powered mobility devices should consist of a grounded duplex outlet.

909.2 Clear Floor Space. A clear floor space complying with Section 305 should be provided at the charging station.

909.3 Height. Charging stations should comply with reach ranges specified in Section 308.

910 Gaming Machines and Tables.

910.1 Clear Floor Space. Inclusive gaming machines and tables should have a clear floor space complying with Section 305 positioned for transfer or for use by an individual seated in a wheelchair. Clear floor spaces required at gaming machines and tables should be permitted to overlap.



Dwelling and Sleeping Units

1000 Introduction. Chapter 10 is a book within a book, containing 31 sections and over 200 subsections. It includes: entry, routes, level changes, surfaces, doors, storage, vertical circulation, laundry areas, toilet and bathing facilities, windows, kitchens, bedrooms, living rooms, garages and other types of spaces, landscape elements, communication features, safety systems and visitability. Dwelling and sleeping units primarily affect Institutional Group I and Residential Group R (see *2014 NYCBC*, Chapter 3, Sections 308 and 310) that includes the use of a building or structure or a portion thereof for dwelling or sleeping purposes.

Automation is recommended for many important reasons including enhanced usability and better hygiene. Automation assists with access to more features and addresses individual needs and preferences, for example allowing differential left and right hand use. It increases the number of operational scenarios by interfacing multiple devices, thus varying the sequence, and it permits the optional use of preset individual customization.

An inclusive unit should accommodate the various changing needs and preferences of the greatest range of occupants. It should be safe, intuitive, multisensory, secure, flexible and easily able to be modified. Adaptability includes: pre-finished surfaces that may be exposed later; components that can be easily added, deleted or expanded; adjustable fixtures; adjustable storage; and multipurpose elements (e.g. bathing compartment). Children's changing needs and preferences should be accommodated. Provide child proofing for young children. Elements may need to be modified as children grow, then be converted back when they are older. Kitchen counter tops may need to be higher or lower. Multiple height surfaces may be preferred for working at various positions. Space beneath elements may be required for sitting. Toilet and bathroom facilities should provide a variety of choices for bathing and toileting, seating, grooming, dressing and recreation (e.g. saunas and steam rooms). Landscape elements should be treated with the same flexibility as interior elements.

Entrances should comfortably accommodate adult and child occupants and visitors. One should be able to use the entry unassisted and securely. Recommendations address entry landings, door clearances, stairs, ramps and lifts. Safety and security elements are included (e.g. dual-height peepholes), as are communication features (e.g. intercoms, annunciators and CCTV) and mailboxes. Weather protection is important. An ice melt system should be considered in critical locations subject to snow and ice accumulation.

Adequate clearance and maneuverability is provided for routes, based on a single-user width. Door swing conflicts, turning spaces and reinforcement are addressed. Raised and sunken areas are examined because design options should not be restricted to one level. Elevation changes are not the problem; it is how they are navigated.

Vertical circulation choices are examined: elevators, LULA's, residential elevators, enclosed and unenclosed vertical platform lifts, inclined platform lifts, stairlifts, as well as, maximum size, speed and height limitations. Practicality is critical for mechanical solutions. There are reasonable and cost-effective solutions but there are trade-offs regarding the choices. An aligned closet platform lift conversion is something that a lot of people can afford and do use.

Ramps are effective for navigating small elevation differences, but they become problematic with length. It may be impractical to have a significant run length within a unit. A viable solution may be an inclined hallway which is essentially a dual function ramp. Provide intermediate landings for long ramp runs, turns, and door maneuvering clearances. Pocket doors may be advantageous. Lifts should be considered when there are no other viable solutions or are preferred by the occupant.

Within the bathroom(s), an inclusive bathing compartment is recommended. A wetroom is an alternative that increases maneuvering clearances in tight bathrooms. A personal assistance alarm system for safety and security should be hard-wired into the unit for current or future use. Bidets are encouraged to enhance hygiene. Seating, work surfaces and other features make a bathroom more usable and comfortable. Children's changing needs and preferences should be accommodated.

Kitchen configuration, work surfaces, sinks, storage, trash and recycling, appliances, windows, ventilation, furniture, office area, seating, lighting and some electronic features are covered. Cabinetry is modular with a wide range of options. Multiple kitchen functions are addressed, such as: food preparation, serving, eating, family activities, work, study, storage and entertainment.

Bedrooms and bed criteria, alternate sleeping accommodations, living rooms, dining rooms, dens, home offices, multipurpose rooms and spaces, basements, attics, utility rooms, balconies, decks, lofts, garages and general storage are covered.

Landscape elements are treated in similar fashion to interior elements. These include: route, seating, containers, water supply, storage, operable parts, drainage, tree grates, pools, fencing, garden areas with raised and below-grade planting beds, cooking and emergency assistance alarms. Consider hydroponic gardening. Flexibility of these water systems accommodates individual needs and preferences. Height, reach ranges and clearances can be adjusted to provide direct access to plant material, lighting and controls from seated and standing positions. Decks consist of route, circulation, seating, water supply, cooking storage, operable parts and drainage.

Communications features include a variety of components: alarm systems comprising unit detectors, building system tie-in and visible notification appliances. Primary entrances may include: notification, visual identification, vision lites, CCTV, voice communications, peepholes, public or common use interface and closed-circuit communication systems. Additional features include detectable surfaces and warnings, intercom, phone, emergency assistance alarm, fire, electrical, water safety, lighting, HVAC and soundproofing.

Automatic remote home monitoring systems are becoming more sophisticated as demand increases. It is now practical for many people to comfortably remain in their homes and safely age in place. Visitability is met and inclusive by complying with the recommendations of Section 1031. Some background and a brief description of the covered dwelling units are provided. The following are addressed: primary functions, multi-level units, entrance, route, interior stairs, interior doors, operable parts, habitable space, bathroom, clear floor space, sink and toilet, reinforcement, kitchen area, sleeping area, storage and windows.

1001 General

1001.1 Scoping. The provisions of Chapter 10 should apply where recommended by the scoping provisions adopted by the administrative authority.

1001.1 Advisory. The key to a truly inclusive unit is that it can adapt to the occupants. It should provide a comfortable, safe, secure environment. For many, their dwelling unit is their sanctuary. It should be a place that is intuitive, without obstacles and accommodates the greatest range of users. Adaptable features should be fluently integrated. Accommodating the occupant(s) should be simply to accomplish, without causing damage to the surfaces and materials. Each occupant has their own requirements and preferences that change over time.

1002 Entrance(s). The entrance(s) should be on a route complying with Section 402, from public and common areas. Entrances and routes should not contain steps, but they may be supplemental. Consider common spaces that may feed multiple entrances to address elevation changes and to reduce complexity of numerous routes. Doors should comply with Section 404. Consider a clear opening wider than 36” (915 mm) such as 42”- 48” (1067-1220 mm). Consider automatic operation or provide pre-wired electrical supply at the door frame for future installation of automatic door opener. Provide automatic lighting with motion detector actuation for hands free operation. Higher lighting level emphasizes location and helps those with reduced visual abilities. Use shielded light sources to avoid direct visual exposure to light source. Provide seating (and hooks) for waiting, resting and placing items. Entrances should comply with Section 1025.5 and should not be to a bedroom. Communication features should be provided at the unit primary entrance complying with Section 1025.5.

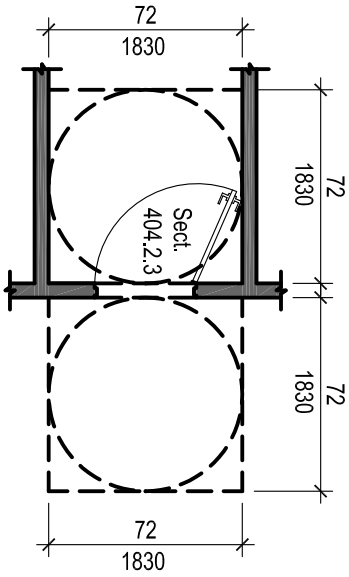


Fig. 1002
Entrance

1002.1 Exterior Entrances. Doors and doorways should comply with Section 404. Thresholds should be flush and comply with Section 404.2.4.2. Exterior entrances should include lite annunciator with multisensory verification (visual, auditory, tactile), intercom, CCTV or other two-way communication system complying with Section 1025.5, shade and weather protection, ice melt system in entry landing, bench, adequate lighting for and lite house numbers. Landing should provide a turning space complying with Section 304. Doors should not swing out into the exterior turning space. Consider increasing pull side clearance to 24 inches (610 mm). Doorways adjacent to ramp landing should comply with Section 405.7. In addition, the entry door should contain dual height peepholes with a 200 degree direct view optical lens with a minimum 1- inch viewing area or glazing complying with Section 404.2.10. The suggested average upper height is 60 inches (1525 mm) and the average lower height is 43 inches (1093 mm) above the floor. See Section 1025.5.2.4 Peepholes.

1002.2 Interior Entrances. Interior entrances include public hall entry to a unit. Doors and doorways should comply with Section 404. Thresholds should be flush and comply with Section 404.2.4.1. Interior entrances should include lite annunciator with multisensory verification (visual, auditory, tactile), intercom, CCTV, or other two-way communication systems and comply with Section 1025.5. Provide a turning space complying with Section 304. Doors should not swing into this turning space. Doorways adjacent to a ramp landing should comply with Section 405.7. In addition, the entry door should contain dual height peepholes or glazing complying with Section 404.2.10. The upper peephole should be placed at 62 - 65 inches (1575 -1650 mm) and the lower peephole should be placed 46 - 48 inches (1170 -1220 mm) above the floor.

1002.3 Entrance Vestibules and Foyers. If provided, entrance vestibules and foyers should provide door maneuvering clearance complying with Section 404.2.3. Door may be centered and may swing into the maneuvering clearance. Provide greater than 90 degree swing to avoid or limit conflict with the turning circle within the maneuvering clearance. Doors should comply with Section 404. Vestibule or foyer containing two doors in series should comply with Section 404.2.5. Provide a closet within entry vestibule or foyer, if space permits or within close proximity. Door swings should not overlap or conflict with each other; consider sliding or pocket doors.

1002.3 Advisory. Locate a closet so that it becomes part of the intuitive sequence of entering a unit. Closets are not just for clothes and may provide storage for mobility devices, baby strollers or used for a variety of other purposes.

1002.4 Mail Boxes. Mail boxes or slots provided at the entrance should comply with Section 309. Mail box installation should not conflict with US Postal Service requirements.

1002.4.1 Ganged Mailboxes. Ganged Mailboxes should provide a clear floor space positioned for a parallel approach and comply with Section 307, Section 308 and Section 309.

1002.4.2 Mail Rooms. Mail rooms should comply with Section 307, Section 308 and Section 309. The distance between opposing mail boxes should be 72 inch (1830 mm) minimum. Provide general and task lighting,a work surface, two-way visual/audible communications, and an emergency alarm for isolated locations.

1003 Route. Routes within units should comply with Section 1003, Section 302 and Section 303.

1003.1 Location. At least one route should connect all spaces and elements that are part of the unit, including (if provided) finished attic, basement, and garage. Where only one route is provided, it should not pass through kitchens, bathrooms and toilet rooms, closets and similar spaces. Routes should be accomplished through hallways, but due to some types of units with open floor plans (e.g. lofts), the route may have to pass through rooms or spaces.

1003.1 Advisory. If the route must pass through a room, the design should intuitively direct the circulation toward one side of the space. This may be accomplished by functions, door locations, amenities, and furniture placement. Open floor plans (e.g. converted lofts), may be easier to navigate and more usable for some, than a hallway. Color and contrast between floor and wall base helps people with diminished sight.

1003.2 Turning Space. All rooms, spaces, dead-ends, and landings should be provided with a 72 inch (1830 mm) turning space complying with Section 304.

1003.2 Advisory. The turning space is typically required at the interior side of room doors as per Section 1005 (door swinging into room). This does not eliminate all circulation problems. If the circulation pattern within the room creates a dead-end, a turning space should be provided at that location. This could be simply resolved in many situations by repositioning furniture.

1003.3 Components. Routes should consist of one or more of the following elements: walking surfaces with a slope not steeper than 1:20, ramps, elevators, limited use limited application (LULA) elevators, platform lifts and stair lifts. Stairs should not be part of the primary route and are considered supplemental to the route. Stairs should comply with Section 504.

1003.4 Clear Width. Route width should be 48 inches (1220 mm) clear minimum.

1003.4 Advisory.

1. The 48 inches should be sufficient to make a turn into a room. This is considerably less than the 72 inch width specified in Section 403.5 for practical reasons. The wider route is appropriate for institutional and commercial applications. The 48 inches should provide enough maneuvering clearance for mobility devices, as well as addressing the range of user scenarios.

2. The 72 inch maneuvering clearance, only on the swing side of doors as per Section 404.2.3 should be used. Doors should swing into rooms or pocket doors used to avoid triggering the increased maneuvering clearance in the hallways . Maneuvering clearance must not fall below *ANSI A117.1-2009* Section 404.2.3.

3. Maneuvering clearance at doors affects the width of the hallway. It is generally more practical to make the hallway a continuous width rather than recessing for the extra maneuvering clearance at each door. 48 inches should accommodate minimum code maneuvering clearances for doors swinging into rooms. Front approach/pull side; and hinge approach/pull side should comply with *ANSI A117.1-2009*, Fig.404.2.3.

1003.4.1 Circulation Width. Provide a 48 inch (1220 mm) wide route width within a room if the unit route is required to run through the room. Provide a 48 inch (1220 mm) wide route around or through furniture arrangement as needed.

1003.4.2 Stairs. Stairs are supplemental to the inclusive primary route and should comply with Section 504. Stairs within a unit should be 42 inches (1070 mm) minimum in width. This will allow for future installation of devices. Switchback stairs should provide a landing the width of the two stairs. Top and bottom landings should provide a 72 inch (1830 mm) turning space complying with Section 304. Provide handrails on both sides of stair complying with Section 505 and adequate ambient lighting that reduces shadows.

1003.4.2 Advisory. The stair should be 42 inches (1067 mm) minimum in width to accommodate a variety of devices (chair lifts, inclined platform lifts, cane usage, etc.) as needed by current or future occupants. 36 inches (915 mm) clear width is possible using the recommended 1-1/2 inch (38 mm) minimum space between the handrail and wall and a 2 inch (51 mm) handrail diameter.

1003.5 Reinforcement. Reinforcement should be provided for adaptable installation of handrails complying with Section 505, along entire route as well as the requirements for specific locations within the unit, including bathrooms.

1003.5 Advisory. Some may wish to limit reinforcement to just typical areas required by code such as bathrooms, but if one considers the very elderly for example, with diminished mobility, hand rails may be necessary throughout the unit or where critical for support and safety.

1003.6 Level Changes within a Floor. Level changes within a floor should be accessed by ramp complying with Section 405. Stairs are supplemental to a ramp installation. A lift and stair are only suggested if the room or space cannot be configured to accommodate a ramp assembly. Level changes for new construction in Type B+ NYC units should at least comply with the *2014 NYCBC*, Section 1107.2.6 regarding raised or sunken floor area in R-2 occupancy.

EXCEPTION: Dwelling unit ramps may comply with *ANSI A117.1-2009*, Section 405 since the *IDG* in this respect addresses larger scale buildings and is excessive for dwelling units. Ramp slope may be 1:12 minimum and a landing may be the width of the ramp and 60 inches in length. A change in direction should be accomplished with a 72-inch turning circle complying with Section 304 and Section 405.7.

1003.6 Advisory. Elevation changes within the dwelling unit are discouraged, but are not restricted since they may be necessary to address existing conditions (e.g. in a warehouse, commercial or industrial space, converted to dwellings). Renovation of the unit may include relocation or addition of a bathroom requiring "above floor plate" waste lines. This may require raised areas within the unit. Elevation changes in themselves are not a problem - it is how they are navigated. Inclusive design should not narrowly limit design options. A properly designed route should provide the means to make the elevation change easily and safely by the widest range of occupants.

1003.6.1 Sunken Areas. Route within the room containing the sunken area should comply with recommendations in Section 1003.6. Provide a route within the room that connects the means of accessing the sunken area. Provide adequate circulation adjacent to one or more sides above the sunken area at the floor plate elevation. Dead ends should be provided with a turning circle complying with Section 304. Elevation drop-offs must be protected with a wall, low partition, a curb, railing or other means to prevent a fall and comply with Section 302.9. Sunken areas should be adaptable so that they may be in-filled, if so desired. All components such as a fireplace in a living room, receptacles, etc. should be raised so they are usable with an in-filled floor. Adaptability should be included in the construction documents with all necessary details and clearly labeled for an occupant in the future to in-fill the sunken space.

1003.6.2 Raised Areas Route. Raised area route within a room should comply with recommendations in Section 1003.6. Circulation within the room containing the raised area should comply with route requirements in Section 1003. Provide a route within the room that connects to the means to access the raised area.

1003.6.3 Inclined Hallways. Elevation changes along the route may be accommodated with an inclined hallway with a running slope no steeper than 1:12. Hallways with ramped floor should contain wall reinforcement for handrail installation if needed. Ramp segments should not exceed a vertical rise of 30 inches. Provide landings complying with Section 405.7 where possible, but due to restricted space within dwelling unit provide a landing as wide as the hall and 60 inches (1525 mm) minimum in length. Any doors or openings along a ramped hallway must be provided with a landing.

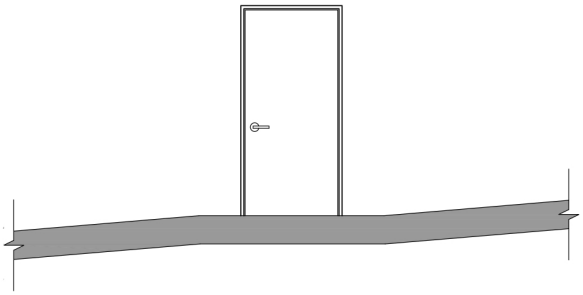


Fig.1003.6.3
Inclined Hallways

1003.7 Lighting. Provide adjustable general lighting and task lighting where necessary. Provide higher levels of lighting where there are potential hazards, such as level changes, entry and landing areas and stairs.

1004 Walking Surfaces. Walking surfaces should comply with Section 403. Secure rugs or any type of coverings to floor. Secure edging or any other potential slipping or tripping hazards.

1005 Doors and Doorways. Doors should comply with Section 404. Thresholds should be flush including sliding door tracks. If necessary recess track into floor or increase surrounding floor surface height. Doors should swing into rooms. Maneuvering clearance is only required on the swing side of the door (both sides for 2-way swinging doors) provided that the hallway width is 48 inches minimum complying with *IDG* Section 1003.4 and *A117.1-2009* Section 404. Manoeuvering clearance on both sides of doors is recommended to increase usability. Consider automatic operation or pre-wired electrical supply at the door frames for future installation of automatic door openers.

EXCEPTIONS:

1. Passage doors swinging into a hallway should be provided with maneuvering clearance on both sides of the door complying with Section 404.

2. Maneuvering clearances complying with Section 404 are not required at closet doors but recommended.

3. Bathroom doors should comply with Section 1011.2.

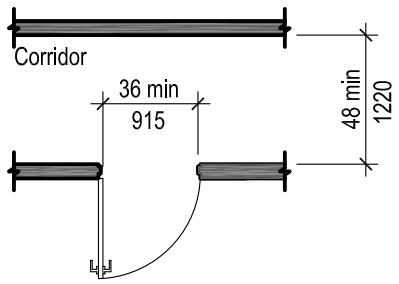


Fig.1005
Doors and Doorways

1005.1 Closet Doors. General storage and closets should comply with Section 1024. Closet doors may swing into the route but maneuvering clearances should comply with *ANSI A117.1-2009*, Section 404.2.3. Pocket doors are suggested especially for hinge approach, pull side, to avoid widening hall to meet legal requirement *(A117.1-2009)*, Fig. 404.2.3.2 Maneuvering Clearances at Manual Swinging Doors; c and d Hinge Approach Pull Side).

1006 Ramps. Ramps should comply with Section 1003.6. Ramps less than 6 inches in vertical rise do not require handrails and other standard features but should be provided if needed by occupant. Hallways may be used as ramps and should comply with Section 1003.6.3 Doors that swing into a ramped hallway, should be provided with a landing that complies with Section 404.2.3.

1007 Elevators. Elevators within the dwelling unit should comply with Section 1007.

1007.1 Standard Elevators. Standard elevators within the dwelling unit should comply with *A117.1-2009*, Section 407.4.

1007.1 Advisory. This type of installation is excessive unless it is an ultra luxury unit. Use of the *A117.1-2009* minimum requirements is a reasonable compromise. For a large luxury dwelling unit that warrants this type of installation, a LULA or a typical residential elevator is even more reasonable.

1007.2 Limted-Use-Limited-Application-Elevators (LULA). LULA within the dwelling unit should comply with Section 408.

EXCEPTION: LULA cabs should provide a clear floor area 42 inches (1067 mm) minimum in width and 60 inches (1524 mm) minimum in depth. Car doors should provide a clear opening width of 36 inches (915 mm). Car door should be positioned at a narrow end of car. Provide reach ranges complying with Section 308 and operable parts complying with Section 309. Provide handrails complying with Section 505.

1007.2 Advisory. A LULA is recommended for installation within a dwelling unit. LULA's have a 25' height limitation, typically good for up to three stories. Controls, slow speed and components are less inclusive than a standard elevator. The maximum platform size is 18 square feet. allowing a 60"x 42" platform. Mechanical equipment generally requires less space than a standard elevator installation, less pit depth and less overhead clearance.

1007.3 Private Residence Elevators. Private residence elevators should comply with Section 409 and *ASME A17.1* listed in Section 105.2.5. Elevator operation should be automatic.

1007.3 Advisory. Private residence elevators should only be considered if a standard elevator, or a LULA are not viable choices. Platform lifts may be used for only two contiguous floors and may be enclosed. A private residence elevator is not limited to two floors, but it has a smaller maximum 15ft^2 platform. The *2014 NYC Building Code* references ASME *A17.1*. The 15ft^2 platform allows a 36" x 60" inclusive clear floor space complying with Section 305. This is larger than the legal minimum and addresses various concerns such as maneuvering, accommodates most mobility devices and user with assistant.

1008 Platform Lifts. Platform lifts within the unit should comply with Section 410. Platform lifts may be enclosed in construction having the required 2-hour fire-resistance rating and connecting not more than two contiguous floors complying with the *NYC Building Code* and *ASME A18.1.*

1008 Advisory. Platform lifts can also be used, but not encouraged to navigate level changes within one story only if a ramp is not feasible (see 1003.6). The maximum platform allowed by *ASME/ANSI A18.1*, Section 5.6.5, is 18 sq. ft. This can accommodate up to a 42 x 60 platform. Controls, speed, mechanical requirements (especially for inclined platform lifts) and ease of use are drawbacks. An adaptable enclosed platform lift is an affordable option. Refer to Section 410.1.1.1. This requires two vertically contiguous closets with a removable ceiling/floor assembly. Maximum vertical travel is limited to 14 feet for residences.

1008.1 Vertical Platform Lifts. Vertical platform lifts should comply with Section 410.1.

1008.1.1 Enclosed Vertical Platform Lifts. Enclosed vertical platform lifts should comply with Section 410.1.1.1.

1008.1.2 Aligned Closet Platform Lift Conversion. Vertically aligning closets with a removable ceiling/floor can be an adaptable means to convert two closet into a shaft for the installation of a vertical platform lift as a low cost alternative to a residential elevator that integrates seamlessly into a multi-level dwelling unit. Comply with Section 410.1.1.2.

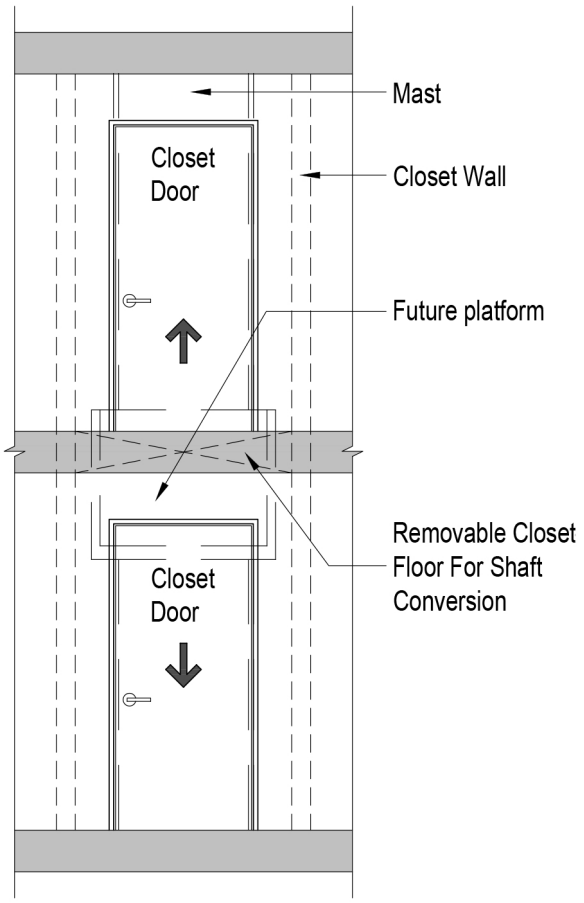


Fig. 1008.1.2
Aligned Closet Platform Lift Conversion

1008.2 Inclined Platform Lifts. Inclined platform lifts should comply with Section 410 and stairs complying with Section 1003.4.2.

1008.2 Advisory. The width of inclined platform lifts are limited due to the cantilever action of platform. Space required for making turns requires large landings to accommodate the swing arc of the unit. Refer to the *2014 NYCBC* Section 1009.1, Exception 4 for installations regarding Group R-2 and Group R-3 occupancies.

1008.3 Stairlifts. Stairlifts are not recommended but may supplement the inclusive means. Stairlifts should only be installed on stairs 42 inches (1070 mm) minimum in width complying with Section 504.

1008.3 Advisory. Stairlifts are an economical, relatively simple solution for some people with diminished mobility. It is inappropriate as a means of accessibility for someone who uses a wheelchair. People who use a wheelchair would have to transfer at the lower and upper landings which may be impossible or extremely difficult and dangerous for some. Refer to the *2014 NYCBC* Section 1009.1, Exception 4 for Group R-2 & R-3 occupancies regarding clear passage: ....” a clear passage width not less than 20 inches (508 mm) shall be provided. If the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

1009 Operable Parts. All operable parts should comply with Section 309. Avoid the use of knobs, and use push latch or magnetic latches for closed fist usage. Use of visual, tactile and auditory characteristics complying with Sections 309.6, 309.7 and 309.8. Consider automatic operation, alternate operation and whole house automation with a system that utilizes voice, touch and gesture recognition (Section 309.4.1.1).

1009 Advisory. Some components such as manual ceiling or upper wall HVAC diffusers, may not comply because they are mounted beyond the reach ranges of Section 308. Consider automatic and remote controls.

1009.1 Childproofing. Childproofing is critical to prevent injury and death and should comply with Section 309.5. See also 309.5 Advisory for U.S. Consumer Product Safety Commission and Section 105.3, for additional information.

1009.1 Advisory. Section 309.5 is an abbreviated set of childproof recommendations. There are many websites that contain a thorough analysis of the dwelling unit environment that exposes the ubiquitous dangers of the typical home environment. Every parent must take the time to examine this fully researched material and not rely on their instincts only. This is especially important for toddlers. Many young children are severely injured or even die from items in the home environment that are so common that one’s instincts are not triggered. A few general examples of childproofing include: locks; dampers; stops; guards; edge protection; anti-tipping devices; elimination of poisonous plant material; secure storage or relocation of chemicals; protection from electrical, heating and plumbing components; etc.

1010 Laundry Areas. Washing machines and clothes dryers should comply with Section 611. Sloped face washer and dryer are recommended. Provide storage, folding work surface, ironing board, movable bins and a bench complying with Sections 902, 903, and 905. Provide multisensory alarms complying with Section 309.9 (e.g., water leakage, gas, open appliance). Provide adjustable general and task lighting. Operable parts should comply with Section 309. Provide water, gas, electrical local shutoffs immediately adjacent to the appliances that are redundant to main shutoffs.

1010 Advisory. Provide components and equipment to perform all laundry tasks. The height of the openings is based on standard reach range requirements. Adjustable bases for both the washer and dryer are recommended to provide the proper height complying with Section 611. Storage is necessary for soiled laundry, detergents, iron, ancillary equipment. A working surface should be provided and may be stationary, rollout or pull-out depending on the design and space restrictions. A movable bin is good for transfer of clothing and may act as a hamper. Provide a built-in ironing board or storage for ironing board and iron. Provide adequate ambient and task lighting.

1011 Toilet and Bathing Facilities.

1011.1 General. All toilet and bathing facilities should comply with Section 1011, Toilet and bathing fixtures should be in a single toilet/bathing area, such that travel between fixtures does not require travel through other parts of the unit. If only one bathroom is provided, it should not be accessed directly through a living, sleeping area or kitchen. Bathrooms should be intuitive, provide adequate space to maneuver, bathe, dry, dress, contain storage, and be easy to maintain with sufficient cleaning clearance around components and avoidance of tight and difficult to reach spaces. Provide cove bases and slip resistant surfaces complying with Section 302. Provide water detection and other alarms complying with Section 309.9. Provide separate HVAC controls within bathroom and a supplemental heat source.

EXCEPTION: Water closets may be in a separate compartment complying with Section 1011.7.

1011.1 Advisory. The space requirements for an inclusive bathroom are larger than a minimum code compliant bathroom. The inclusive bathroom is more usable, should accommodate current and future occupants and their changing needs, and addresses visitability as per Section 1030.

1011.2 Doors. Doors should not swing into the clear floor space or clearance of any fixture, comply with Section 1005. Door maneuvering clearances are not required to comply with Section 404.2.3, (72” x 72” inch clear floor space at door) within the bathroom.

1011.2.1 Clear Floor Space. Provide a clear floor space complying with Section 305.3 within the room beyond the arc of the door swing. This space allows a person to position themselves out of the way of the door swing. Show the location of this space on the floor plan.

1011.3 Turning Space. It is recommended to provide a turning space complying with Section 304 within the bathroom.

EXCEPTION: Doors may swing into the turning space provided that a clear floor space complying with Section 1011.2.1 is provided.

1011.3 Advisory. The turning space may appear excessive, but it is an important component of the inclusive bathroom. The 36”x 60” clear floor space beyond the door swing allows the door to swing into the turning space unobstructed. Once the door is closed the full turning space is usable.

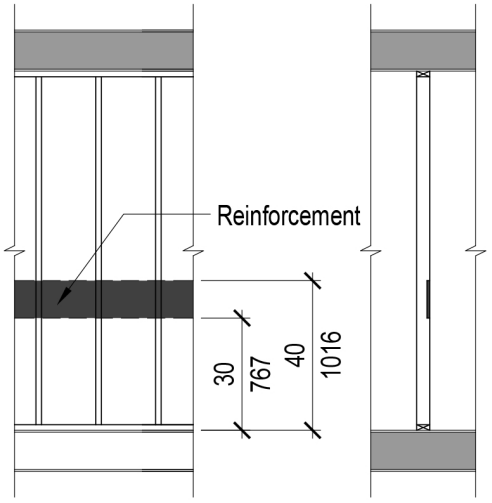
1011.3.1 Overlap. Clear floor spaces, clearances at fixtures and turning spaces are permitted to overlap. Mobile storage cabinets complying with Section 1011.12 may be temporarily placed in the clear floor spaces.

1011.3.1 Advisory. Overlaps should not reduce the clearance for any fixture. Mobile storage cabinetry such as under lavatory cabinets allow under cabinet knee clearance. This flexibility provides increased temporary storage.

1011.4 Grab Bar Wall Reinforcement. Reinforcement should be provided for grab bars for water closets, bathtubs and shower compartment and shower seat complying with Sections 604.5 (toilets grab bars), 1011.10 (bathtubs), 608.3 (shower) and 608.4 (seats). It is recommended to provide a continuous reinforcement strip throughout the bathroom to provide maximum adaptability. This will make it very easy to install grab bars and other equipment wherever they are needed.

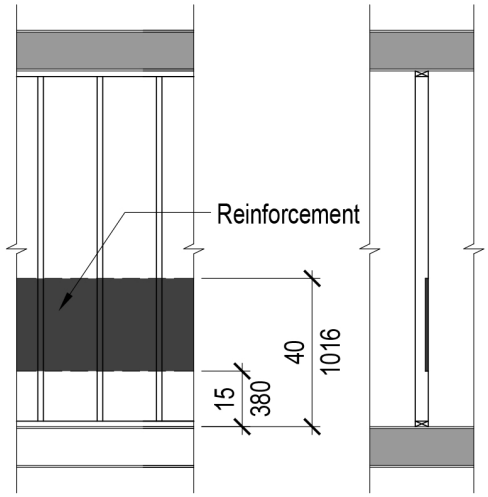
1011.4 Advisory. Reinforcement may be configured many ways including framing and 3/4 inch plywood, ganged studs, 1/8-inch steel plate, etc. Steel plate allows direct installation without notching studs, but attachment may include drilling, tapping and use of sheet metal screws or drilling and use of gimlet point or thread cutting sheet-metal screws. See also Section 1003.5 Advisory.

1011.4.1 Horizontal Grab Bar Reinforcement Location. Locate wall reinforcement from 30”-40” (762-1016 mm) aff. to accommodate horizontal grab bars as per code requirements 33”-36” (838-914 mm) aff. as per Section 607.4, 608.3, and 608.9. Dual horizontal grab bars located at bathtubs require the lower horizontal grab bar to be located 8”-10” (205-255 mm) above the top edge of the tub and the upper grab bar to be located 33”-36” (838-914 mm) aff. To accommodate both, locate the reinforcement from approximately 15”-40” (380-1016 mm) aff. Tub rim height varies based on make and model and will determine the exact lower height. Reinforcement allows for height above and below attachment locations to avoid screw placement to close to edge.



(a) Elevation **(b) Section**

(A) Single Grab Bar

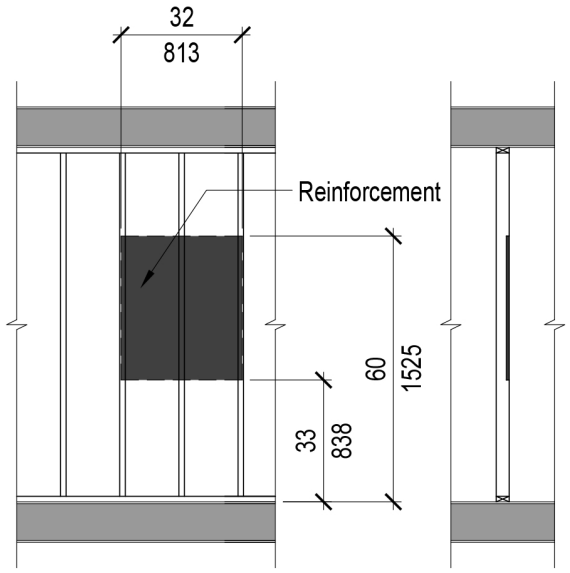


(a) Elevation **(b) Section**

(B) Dual Grab Bars

Fig. 1011.4.1
Horizontal Grab Bar Reinforcement Location

1011.4.1.1 Vertical Grab Bar Reinforcement Location. Wall reinforcement should span three typical studs or 32” (813 mm) horizontally in width. Vertical height should be 33”-60” (838-1524 mm) to accommodate the 3” (76 mm) above the horizontal grab bar or 58” (1473 mm) with 2” (51 mm) of additional height for proper attachment based on Section 309.3.2 Standing Comfort Reach Zone.



(a)
Elevation

(b)
Section

Fig. 1011.4.1.1
Vertical Grab Bar Reinforcement Location

1011.4.2 Standard Grab Bars. Standard grab bars should be continuous and should comply with Section 609.

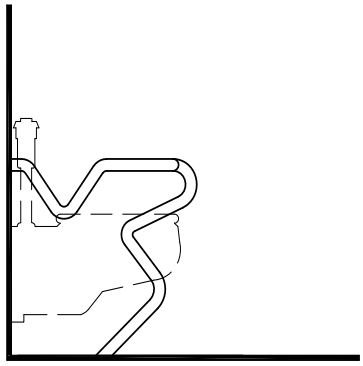
EXCEPTION: A space between the horizontal and vertical grab bar is legally required to avoid gripping surface obstruction.

1011.4.2.1 Fixed Side Wall Grab Bars. Fixed sidewall grab bars shall be 42 inches (1065 mm) minimum in length, located 12 inches (305 mm) maximum from the rear wall and extending 54 inches (1370 mm) minimum from the rear wall. In addition, a vertical grab bar 18 inches (455 mm) minimum in length shall be mounted with the bottom of the bar located between 39 inches (990 mm) and 41 inches (1040 mm) above the floor, and with the center line of the bar located between 39 (990 mm) and 41 inches (1040 mm) from the rear wall.

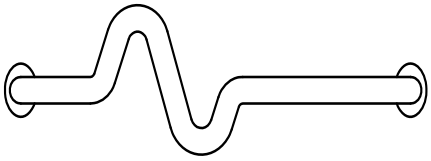
1011.4.2.2 Rear Wall Grab Bars. The rear wall grab bar shall be 36 inches minimum in length, and extend from the centerline of the water closet 12 inches (305 mm) minimum on the side nearest to the wall, and 24 inches (610 mm) minimum on the transfer side.

1011.4.2.3 Swing-up Grab Bars. Swing-up grab bars should comply with Section 604.5.3.

1011.4.3 Alternate Grab Bar Configurations. Consider alternate grab bar configurations that are anthropometrically based and not just intended to enhance aesthetics. The configuration should allow for more efficient and beneficial movement of its user in regards to their general movement patterns and large muscle groups.[16] Grab bar cross section, spacing, average heights, surface hazards, fittings, installation and structural strength should comply with Section 609.



(a)
Toilet Grab Bar Example



(b)
Bathing Compartment Grab Bar Example

Fig. 1011.4.3
Alternate Grab Bar Example Configurations

16 The description and alternate grab bar configuration examples, Move + Grab = Bar(s), were provided by Pedestrian Studio and INFORMdesign

1011.4.3 Advisory. The alternate configurations cannot be used in public facilities since they will be in conflict with federal requirements. Dwelling units should accommodate the current occupants. If a unit is adaptable, reinforcement is provided for installation of grab bars as needed. Strictly speaking, grab bars in NYC should be in accordance with *ANSI A117.1-2009* but some people may find that standard configurations do not address their needs and preferences. Alternate configurations may be a viable option, especially for unit owners. Renters who replace the standard bars with an alternate configuration may have to agree to put the original code compliant set back when they vacate the unit. The codes are meant to help people, not to force them to conform to environments that are unusable or unaccommodating.

1011.5 Lavatories. Lavatories should comply with Section 606. Consider an adjustable height lavatory for those that find conventional fixed units are accommodating. Consider placing dual height lavatories at different heights, or one fixed and the other adjustable. Dual lavatories should comply with Section 1011.7.3.

EXCEPTION: Cabinetry should be permitted under the lavatory, provided that:

a. cabinetry can be removed without removal or replacement of the lavatory;

b. floor finish extends under such cabinetry;

c. walls behind and surrounding cabinetry are finished;

d. wheels can be installed to make the unit mobile without alteration to the cabinetry;

e. handles are provided as needed on the cabinet complying with Section 309.4;

f. exposed pipes and under counter surfaces should comply with Section 606.6;

g. local shutoffs provided and location of the main shutoffs;

h. supply and waste lines should be easily replaced with flexible lines for an adjustable height lavatory, if needed;

i. lavatory assembly is easy to replace;

j. wall behind lavatory is reinforced to support wall mounted lavatory assembly if cabinetry is removed;

k. push/open spring loaded and automatic open doors, drawers and work surfaces;

l. drawers provided with full-extension locking glides rather than a cabinet, to increase access.

1011.5 Advisory.

1. Finished surfaces are required throughout since the cost and matching the materials later will be very difficult. A small quantity of the finish material should be retained for repairs and modifications.

2. Wheels provided at the time of initial cabinet installation provides any user with the option of placing the cabinet where it suites their needs. The cabinetry must accommodate supply and waste lines.

3. Consider doors in lower cabinetry that open to provide the 36 inch wide clear floor space.

1011.5.1 Faucets. Lavatory faucets should be single lever or hands free automatically controlled and comply with Section 606.4. Where enhanced reach range is desired, should comply with Section 606.5. Provide pressure balanced anti-scalding valves that balance the drop in cold water pressure if other fixtures are used to avoid a surge in hot water. A thermostatic mixing valve mixes cold and hot water automatically to a set temperature. Valves that utilize both pressure and a temperature are recommended. Consider a separate or retractable spray head for washing hair.

1011.5.1 Advisory. Faucets should be easily repositioned to accommodate the needs of the current occupant. This may include relocation to the side of the sink top or side faces or placed on the vertical front face. Control locations traditionally used for range top front controls could be applied to faucet locations. Indicate in the design documents alternative placements. Automatic (hands free) controls are a consideration, but water flow and temperature adjustment may be a problem.

1011.5.2 Lighting. Provide task lighting that exceeds ambient lighting within the lavatory area. See Section 1027 and Section 311.

1011.5.3 Work Surface. Consider a work surface that is part of the lavatory or adjacent to a lavatory that is 36 inches (915 mm) minimum in width. Consider a pull-out or push open or automatic work surface similar to Section 1012.3.4. Provide a clear floor space, positioned for a forward approach to the work surface. Knee and toe clearance should comply with Section 306. The clear floor space should be centered on the work surface. The surface should comply with Section 902 and should be 28-34 inches (710-865 mm) above the floor. Provide at least one work surface, preferably automatic.

1011.6 Mirrors. Mirrors should comply with Section 1011.6.

1011.6.1 Upper Torso Mirrors. Mirrors with a tilt mechanism located above the lavatories, sinks or counters, should be mounted with the bottom edge of the reflecting surface 40 inches (1015 mm) maximum above the floor.

EXCEPTION: if mirror is mounted on a medicine cabinet, it may not be required to tilt, but is suggested.

1011.6.2 Full Length Mirror. Provide a full length mirror in or near the bathroom preferably adjacent to the turning circle. Consider a center mounted tilt mechanism to tile up or down to accommodate the various user heights. Provide a reflecting surface 24 inches (610 mm) minimum in width and 60 inches (1525 mm) minimum in height, unobstructed and mounted with the bottom edge of the reflecting surface 18 inches (458 mm) above the floor.

1011.7 Water Closet. Water closets should comply with Section 1011.7.

1011.7.1 Location. The water closet should be positioned with the wall to the rear and to one side. The centerline of the water closet should be 16 inches (405 mm) minimum and 18 inches (455 mm) maximum from the sidewall.

1011.7.2 Clearance. A clearance around the water closet should be 60 inches (1525 mm) minimum, measured perpendicular from the side wall, and 60 inches (1525 mm) minimum, measured perpendicular from the rear wall. A mobile storage unit may be temporarily placed in the clearance during use but should be provided with a permanent parking location. The unit is not considered a permitted obstruction.

1011.7.2 Advisory.

1. The clearance is based on the clear floor space in Section 305. This should accommodate a range of mobility device and allows enough space for an assistant and for parking of the device.

2. A side wall may include any type of wall as long as it is structurally sound, sized and reinforced for the installation of grab bars.

3. A mobile storage unit is recommended since it can be easily relocated to provide the full clearance if required.

4. If placement does not properly address left or right hand preferences equally, it is suggested to provide a swing up grab bar complying with Section 604.5.3. It also provides an ambulatory configuration if needed.

1011.7.3 Overlap. The required clearance around the water closet should be permitted to overlap grab bars, paper dispensers, coat hooks, shelves, accessible routes, clear floor space required at other fixtures, and the wheelchair turning space. No other fixtures or obstructions should be located within the required water closet clearance.

EXCEPTION: An adaptable lavatory complying with Section 1011.5 may be provided on the rear wall 18 inches (455 mm) minimum from the centerline of the water closet. Temporary storage may also be provided. It is recommended to provide a dual lavatory configuration, with the unit adjacent to the water closet adaptable. If occupant requires the full clear floor space for the water closet, the adaptable lavatory, cabinetry, supply and waste lines should be removable and connections capped. Finish all surfaces.

1011.7.3 Advisory. Allowing a single adaptable lavatory within the water closet maneuvering clearance, keeps the size and the configuration of the bathroom viable. A double sink arrangement, that is fairly common feature, provides increased flexibility. Elimination of one of the sinks should not be a significant inconvenience, to allow an occupant to utilize the space adjacent to the water closet if not needed.

1011.7.4 Height. The top of the water closet seat should be 15 inches (380 mm) minimum and 19 inches (485 mm) maximum above the floor, measured to the top of the seat.

1011.7.4 Advisory. An automatic adjustable height toilet with manual override would accommodate adults and children. This concept is developing and should be considered. A portable step, if needed, should be provided for young children. Accesible seat height range is 17”-19” (432-482 mm) but if children occupy unit, 15” (380 mm) is one compromise and an insert may be used for wheelchair transfer if needed. Section 604.4 provides a solution if the occupant requires greater height ranges.

1011.7.5 Flush Controls. Consider automatic flush controls complying with Section 604.6 if required by occupant. It is suggested to provide concealed conduit/wiring and junction boxes for future installation of a remote control complying with Section 603.5.1 if needed or preferred. Provide continuous flow alarm complying with Section 309.9.

1011.7.5 Advisory. The suggested location is more convenient then the conventional tank handle location since the occupant does not need to twist behind to flush the toilet.

1011.7.6 Toilet Tissue Dispenser. Toilet paper dispensers should comply with Section 308 and Section 309.4. Locate the dispenser 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser should be located 19 1/2—30 inches (495 - 760 mm) above the floor and should not be located behind grab bars. A suggested outlet height is 24 inches (610 mm) above the floor.

1011.7.7 Lighting. Consider automatic adjustable ceiling fixture above the water closet and task lighting.

1011.7.8 Visual Audible Alarms. Visual, audible alarms should comply with Section 702.2..2, but does not need to be vandal proof.

1011.8 Bidet. A bidet is recommend to enhance hygiene and should comply with Section 1011.8. Provide towel rack, soap dish and storage for other toiletries adjacent to the bidet or on the rear wall for rear facing operation units. Consider a continuous flow alarm complying with Section 309.9. Storage area may be a wall recess. Location of rack should comply with Section 1011.17 and storage should comply with Section 308.

EXCEPTION. Controls should comply with Section 309. Controls should be placed in a location similar to the flush controls complying with Section 1011.7.5.

1011.8 Advisory. Bidets or personal hygiene systems (phs) that are integrated with the toilet or the seat are highly recommended for easier improved personal hygiene. This is a much more efficient use of space, instead of a separate bidet fixture with proper maneuvering clearances. Bidet requirements are similar to a water closet. If the toilet has proper maneuvering clearance and the bidet has it as well, a person who uses a wheelchair may find it impractical to tranfer from the toilet to the bidet. Thus, the integrated bidet is a good solution.

1011.8.1 Lighting. Provide a ceiling fixture above the bidet.

1011.9 Multipurpose Bathing Compartment. Multipurpose bathing compartments should comply with Section 608.2. The compartment is a multiple configuration space that accommodates a variety of user needs and preferences. The space may be an alcove or a designated open area in one corner of the bathroom. Floor surface should be slip resistant and comply with Section 302. A shower may be an integral part of a wet room with a waterproof floor, and drainage complying with Section 608.3.

EXCEPTIONS:

1. Adaptable counter tops and cabinetry should be permitted at the control end of the clearance, provided such counter tops and cabinetry can be removed and the floor finish extends under such cabinetry.

2. Showers may be provided with an adaptable enclosure that may be completely removed if the occupant requires the entire length of opening.

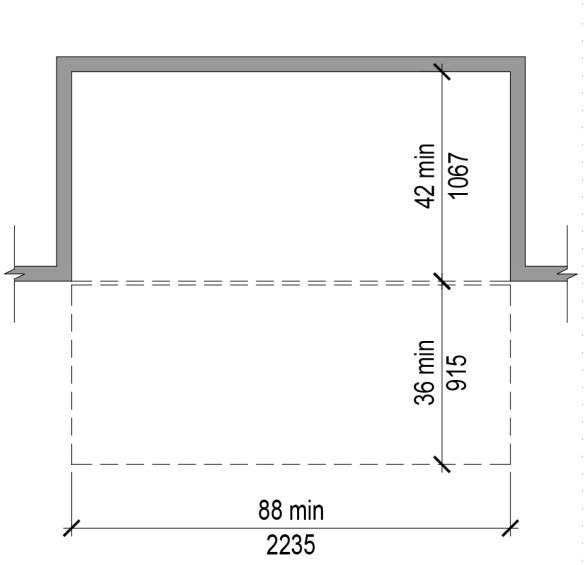


Fig. 1011.9
Multipurpose Bathing Compartment

1011.9 Advisory. The bathing compartment exceeds Section 305.7 Alcoves, to provide the maneuvering room to position within a shower. The exceptions are included to allow smaller bathroom configurations. It is important that the bathroom can be easily reconfigured to accommodate the current occupants. The adaptable inclusive bathing compartment allows a bathtub; or a transfer shower, or storage; or various combinations. The control area for some options differ. Lines could be run to locations containing a knock out panel for the various control locations. The alcove may also be used as a changing area. Adaptability is most appropriate for dwelling units since the modifications are necessary to address the needs of the current occupant. All surfaces of the bathing compartment should be fully finished.

1011.9.1 Faucet. Provide controls complying with Section 608.5 and provide a detachable hand shower complying with Section 608.6.

1011.9.2 Grab Bars. Grab bars should comply with Section 608.3 and Section 609. Grab bars are adaptable and are not required to be installed unless needed by the occupant. Provide reinforcement for future installation of grab bars complying with Section 1011.4.

1011.9.3 Floor Drainage. Raised thresholds are not recommended. Proper construction including sloping of the floor should accommodate ease of passage through the space.

1011.9.3 Advisory. The surface outside of the shower area should comprise waterproof material in case of accidental overspray. An additional bathroom floor drain complying with 1011.19 should be considered for any wet area as a back-up, incase of overflows.

1011.9.4 Enclosure. If the shower compartment is enclosed, the enclosure should be adaptable for easy removal without any damage to any material. Fasteners should be non-corrosive and can be easily extracted. All glass should be tempered shatter resistant glass with the shower door opening out to avoid entrapment.

1011.9.5 Storage. Provide a recessed storage space within the shower for storage of bathing products and toiletries including medical equipment, a hook for hanging brushes and/or wash clothes, soap, etc.

1011.9.5.1 Location. Recessed storage space should be located on the back wall below the control area 20 inches (508 mm) minimum above the floor to a maximum of 1 1/2 inches below grab bar.

1011.9.6 Lighting. Provide a water resistant ceiling light fixture within the shower.

1011.9.7 Wet Room. A wet room is an alternate bathroom containing a bathing area open to the room complying with Section 608.3. It increases maneuvering clearances in tight bathrooms.

1011.10 Bathtubs.

1011.10.1 General. Bathtubs are not usable by many people due to entry/ exit difficulties and safety concerns. If a bathtub is used it can be located in the inclusive bathing compartment. Bathtubs comprise standard complying with Section 607.1, and walk-in/transfer complying with Section 607.2. The multi-purpose bathing compartment may be configured for a variety of uses complying with Section 1011.9.

1011.10.2 Bathtub Door/Wall Openings. Bathtub door/wall openings may allow walk-in or transfer entry for a standard bathtub or a sit-tub vertical unit. Roll-in capability is not typically feasible due to bathtub maneuvering clearance requirements. Some units may fit within transfer-type shower compartment dimensions and provide another optional use of the bathing compartment space.

1011.11 Storage. Bathroom storage should comply with Section 1011.11. Storage should be a variable composition of general, compartmentalized and dedicated spaces that accommodates user needs and preferences.

1011.11.1 Clear Floor Space. A clear floor space 36 inches (915 mm) wide and 60 inches (1525 mm) long complying with Section 305, positioned for parallel or forward approach, should be provided at each storage facility. Clear floor space may overlap.

1011.11.2 Height. A portion of the storage area of each facility should comply with the reach ranges specified in Section 308.

1011.11.3 Operable Parts. Operable parts on storage areas should comply with Section 309. Hardware should comply with Section 309.4. Provide full-extension locking glides on all drawers. Usability may be increased with either spring loaded or electric motor drive automatic operation for self-opening doors, drawers, movable shelves, pull-out cabinets with adjustable shelves and work surfaces. Manual or automatic 360 degree rotating shelves or offset hinged pull-out shelves for corner and other units can increase access and efficiency. Consider top-hinged doors for upper cabinetry, roll-down shutters, sliding doors and other types of enclosures that reduce the door swing arc obstruction.

1011.11.4 Closets. Permanent closets should be provided as required that include: shelving, clothes rack, compartments, drawers, etc. Comply with 1024. At least 50% of the hanging storage should be no higher than 48 inches (1220 mm) aff. Shelving should comply with Section 308. Consider an adjustable pole height for occupant or multiple poles at different heights. Provide lighting within the closet placed so that contents are illuminated with a switch located immediately outside of closet on latch side complying with Section 404.3.5.1.

1011.11.5 Cabinets. Cabinets should comply with Section 1011.12.2 Hardware should comply with Section 309.4. All edges and outside corners should be eased to prevent hazard. Clear or translucent faces can help locate items.

1011.11.5.1 Medicine Cabinet. Medicine cabinets may be located above the lavatories, sinks or counters with the bottom edge 40 inches (1015 mm) maximum above the floor. Alternate location may be a side wall or return wall. Provide task lighting.

1011.11.5.1 Advisory. The maximum reach range height is 48 inches as per Section 308. Interior shelving above this height will not be usable by some people. Consider a more usable alternate location for the medicine cabinet other than over the sink.

1011.11.5.2 Freestanding Cabinets. Freestanding cabinets should contain shelving complying with Section 308 and a latch if provided complying with Section 309. Freestanding cabinets should not be placed in the clear floor space area. Stable mobile cabinets may be allowed to be placed in the clear floor spaces temporarily.

1011.11.5.2 Advisory. A narrow tall freestanding cabinet is not stable and can easily fall creating an obstruction and a potential entrapment in the room. It is suggested that this type of cabinet is not used. The under lavatory mobile cabinet is lower and wider providing better stability.

1011.11.5.3 Recessed Cabinets. Recessed cabinets should contain a clear floor space complying with Section 1011.11.1. It is recommended to recess cabinets into a wall to reduce obstructions.

1011.11.5.3 Advisory. A parallel clear floor space may be provided without having a serious impact on the floor area of the bathroom. A pocket door, sliders or bi-fold doors rather than a single swing door, will reduce the swing arc conflicts.

1011.11.5.4 Pop-Up Cabinets. Consider adaptable pop-up countertop cabinets. Suggested location is adjacent to sink to provide storage for toiletries or as required by occupant.

1011.11.5.5 Work surface. Consider a work surface complying with Section 1011.5.3 l relating to the lavatory or placed in another location within the bathroom.

1011.11.6 Shelves. Shelves for adults and children should comply with Section 308.

1011.11.7 Hamper. Comply with Section 308 Reach ranges and Section 309 Operable Parts. It is recommended to recess the hamper into a wall to reduce obstruction. A pull-out rolling bin is suggested to transport contents to laundry area.

1011.11.8 Trash & Recycling Receptacles. Consider integrated and divided trash & recycling receptacles with pull-out lower cabinetry, removable bins & liner storage.

1011.12 Changing Area. A changing area is recommended if space permits. The roll-in shower may be used as a changing area, but may present a wet/dry conflict. Provide hooks and towel rack complying with Section 1011.17 outside of the shower compartment. Provide seating complying with Section 1011.13. Provide grab bars complying with Section 609.

1011.12 Advisory. In addition to the changing area components listed, some people may need a table, an adjustable height seat or other devices.

1011.12.1 Permanent Seating. Built-in benches and other seating should be provided with unobstructed direct access and complying with Section 903.

1011.12.2 Non-permanent Seating. Provide storage location when not in use.

1011.12.3 Lighting. Provide a light fixture within the changing area and perhaps task lighting.

1011.13 Sauna and Steam Rooms. Sauna and steam rooms should comply with Section 612 and comprise standard units complying with Section 612.1 and transfer units complying with Section 612.2. Transfer units may be located in the multipurpose bathing compartment complying with Section 608.2.

1011.14 Windows. Windows should comply with Section 506 and Section 1023. Bathroom should contain a window. If they do not, as per applicable codes, ventilation is required. It is recommended to provide a supplemental ventilation fan with a window to use as an alternative to opening a window during weather extremes of heat or cold.

1011.14 Advisory. A bathroom window is very important since it is typically used to vent the space. If it cannot be placed in a location for manual operation it should be automatic or a supplemental vent should be provided. The controls should be placed in a location for easy access. Use of vents rather then opening the window is especially important during extreme cold or heat to avoid fluctuating room air temperature. Mechanical ventilation for this reason should always be provided. An automatic skylight is recommended where feasible, for increased air circulation and to provide natural light.

1011.14.1 Skylights. If provided skylights should be automatic with a manual back-up mechanism and should comply with Section 506.

1011.15 Lighting. Provide general lighting with task lighting around sink, water closet, bidet shower, dressing area and closets. Provide water resistant lighting fixtures within shower and if provided, above the bathtub. Lighting should be non-glare and adjustable.

1011.16 Receptacles, Switches, and Controls, Comply with Section 1009. Provide adequate receptacles around sink, and other locations where hair dryers, electric razors and other electronic devices and appliances will be used. Consider timers and automatic shut-off for electronic appliances and provide standard receptacles for recharging small appliances. Provide multiple switch locations including: adjacent to door on latch side both inside and outside bathroom, adjacent to sink, water closet, shower and closets. Comply with the *NYC 2011 Electrical Code* (Local Law 39 of 2011).

1011.16.1 Controls. Provide controls for heating and ventilation and for a sauna, whirlpool, steam room, fan, etc. Comply with Section 309.

1011.16.2 Supplemental Heating. A separate heat source is suggested within the bathroom to supplement the unit's heating system. Controls should be located within the bathroom and include timer, thermostat and emergency shut-off complying with Section 309. Refer to applicable electrical and plumbing codes for requirements. Units may include heat lamp, heat/fan/light unit, radiant floor system, wall heaters, toe kick heaters, etc.

1011.16.2 Advisory. Consider providing the bathroom with a dedicated zone within the unit's HVAC system.

1011.16.3 Blow Dryer. Consider providing a fixed wall mounted blow drier for body drying in lieu of a towel. Provide timers and automatic shutoffs for all equipment.

1011.16.3 Advisory. In commercial and institutional rest rooms, fixed hand dryers are often used for sanitary and maintenance reasons. This type of unit when used in a dwelling unit provides full body drying and hands free hair drying, for those with diminished dexterity and other reasons.

1011.17 Towel Racks and Hooks. Towel racks and hooks should comply with Section 308 Reach Ranges. Locate in various locations in the bathroom including lavatory, shower/bathtub, bidet, back of entry door or wherever it is most convenient for the current occupant. Hardware should comply with Section 309.4.

1011.18 Communication Elements and Features. Provide wiring for emergency assistance alarm complying with Section 702.2, and other multisensory alarms complying with Section 309.9. Provide alarm locations on floor plans and install wiring and boxes at these locations for current or future installation. Alarms should be tied into a central system where possible. Consider installation of a hard-wired two-way communication device complying with Section 1025.

1011.19 Flooring. Flooring should be slip resistant and comply with Section 302.

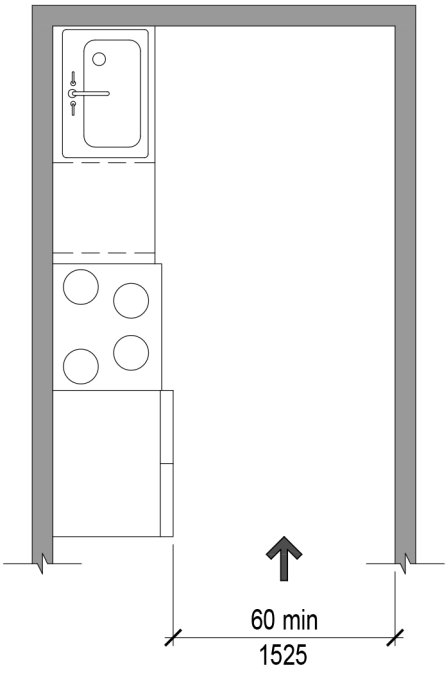
1011.19.1 Floor Drainage. Consider sloping entire floor of the bathroom to a central floor drain with an automatic trap primer. This will prevent an accumulation of water reducing slip hazard. Slope should not exceed 2.08% or 1:48.

1011.19.1 Advisory. It is recommended to provide a central floor drain in addition to the curbless shower drain as an overflow back-up.

1012 Kitchens. Kitchens should comply with Section 1012.

1012.1 Clearance. Clearance complying with Section 1012.1.1 should be provided.

1012.1.1 Galley Kitchen. Clearance between all opposing base cabinets, counter tops, appliances, or walls within the kitchen work areas should be 60 inches (1525 mm) minimum. A turning space complying with Section 304 should be considered. The turning space may be part of the under counter space.



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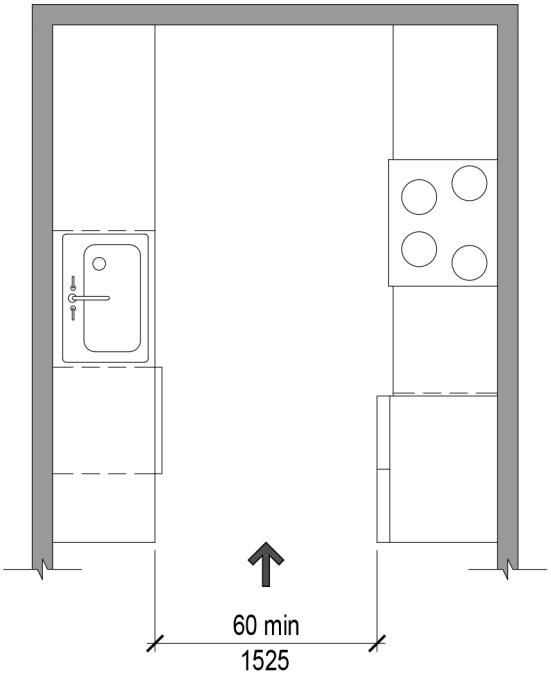

(b)

Fig. 1012.1.1
Galley Kitchen Clearance

1012.1.2 U-Shaped Kitchens. In kitchens with counters, appliances, or cabinets on three contiguous sides, clearance between all opposing base cabinets, countertops, appliances, or walls within kitchen work areas should be 72 inches (1830 mm) minimum.

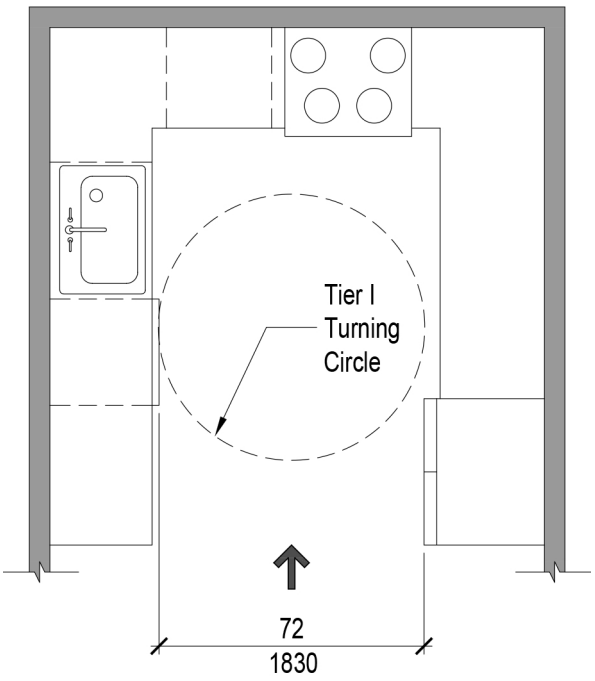

Fig. 1012.1.2
U-Shaped Kitchen Clearance

1012.1.3 Route. Routes should not be located through the kitchen.

1012.1.3 Advisory. Locating a route through a kitchen is allowed by the NYC code but is not recommended because of potential conflicts with the intuitive flow of the kitchen and obstructions such as an open oven or dishwasher door. Avoid any conflicts with a typical work triangle between the refrigerator, cooking area and sink. Routes should comply with Section 1003.

1012.2 Clear Floor Space. Clear floor space required by Sections 1012.3 through 1012.6 should comply with Section 305.

1012.2.1 Floor Surface. Floor surfaces should be non-gloss and comply with Section 302.

1012.3 Work Surfaces. Provide work surfaces 36 inches (915 mm) minimum in width complying with Section 1012.3. Consider providing heat resistant surfaces as needed. Provide task lighting and under cabinet lighting.

1012.3 Advisory. Work surfaces provide a range of uses including: temporary material rest areas, transfer areas or a logical work station that is used as part of the food preparation process. Strategically placed work surfaces will increase safety, especially for handling hot items, and usability of the appliance. Provide a pull-out work surface under or adjacent to appliances. Hardware should comply with Section 309.4 Provide heat resistant transfer surfaces in locations that will accommodate hot food, pans, etc.

1012.3.1 Clear Floor Space. An adaptable clear floor space, positioned for a forward and parallel approach to the work surface, should be provided. Knee and toe clearance complying with Section 306 should be adaptable. The clear floor space should be centered on the work surface.

EXCEPTION: Cabinetry may be provided under the work surface, provided that:

a. the cabinet can be removed without removal or replacement of the work surface;

b. the floor finish extends under such cabinetry;

c. the walls behind the surrounding cabinetry are finished;

d. cabinets should be faced on all sides for use as mobile storage/work surface.

1012.3.2 Height. The work surface should comply with Section 902 and be 34 inches (865 mm) maximum above the floor. Provide at least one work surface no higher than the maximum.

EXCEPTION: A counter that is adjustable to provide a work surface at variable heights 28 inches (712 mm) minimum and 36 inches (915 mm) maximum above the floor accommodating standing height, or that can be relocated within that range without cutting the counter or damaging adjacent cabinets, walls, doors, and structural elements is recommended.

1012.3.3 Countertops. Provide countertops that are 24-inches (610 mm) maximum in depth. Provide a raised edge to contain spills and a backsplash that is either integral with the wall or attached to countertop. Consider heat resistant material for holding and transfer of hot items. There should be no sharp or abrasive surfaces under the exposed portions of counters. Contrast and color helps those who have diminished sight differentiate between countertop and backsplash.

1012.3.4 Pull-out Work Surfaces. Pullout work surfaces should comply with Section 902 and should be drawer type units with hardware complying with Section 309. Exposed work surface should be 36 inches (915 mm) in width and 18 inches minimum in depth. Heavy duty drawer slides should be used to permit loading of the full depth of the work surface. Provide pullout work surfaces for appliance, and logically distributed throughout kitchen at various heights complying with Section 1012.3.2. Usability may be increased with either push/open spring loaded or electronic motor drive automatic operation. Provide task lighting.

1012.3.4 Advisory. Pull-out work surfaces provide a temporary shelf that can be used in many ways: a work station for food preparation and cooking process; a resting surface for a hot item coming out of the oven; and as a transfer station to the countertop. Avoid use conflicts and locate close to appliances and based on intuitive use patterns.

1012.3.5 Mobile Work Surfaces. Mobile work surfaces are recommended. This may include the top surface of a mobile cabinet, a rolling table, other type of mobile unit. Provide a variety of heights complying with Section 1012.3.2. Mobile units must be stable and tilt resistant.

1012.4 Sink. Sinks should comply with Section 1012.4. Provide at least a 36-inch (915 mm) clear countertop space on one side of the sink. Sinks heights may be fixed and adaptable to accommodate an automatically adjustable sink if needed. One section of the counter should move with the sink to provide a work surface. Avoid conflict with dishwasher located adjacent to sink. Consider a supplemental sink in another location. Provide hot water limiter (see Section 608.9). Consider water leak detection complying with Section 309.9. Provide local water supply shutoffs and signage providing location of the main water supply shutoffs. Provide task lighting.

1012.4 Advisory. Consider an automatic adjustable height sink to accommodate children and others that may require this feature. A manual override should be included as back-up in case of automatic mechanism failure. Water supply and waste connections need to be flexible. Ideally a forward approach sink with knee clearance with the dishwasher immediately to the side is very convenient, allowing transfer of dishes temporarily in the sink for loading into the dishwasher.

1012.4.1 Clear Floor Space. An adaptable clear floor space, positioned for a forward approach to the sink should be provided. Knee and toe clearance complying with Section 306 should be provided. The clear floor space should be centered on the sink bowl. Doors may enclose the space provided they do not obstruct the space when open.

EXCEPTIONS: Cabinetry should be permitted to be added under the sink, provided:

a. the cabinetry can be removed without removal or replacement of the sink and sink is supported independently of the cabinetry;

b. the floor finish extends under such cabinetry;

c. the walls behind and surrounding cabinetry are finished;

d. wheels can be installed to make the unit mobile without alteration to the cabinetry;

e. handrails or handles for maneuvering are provided as required by the occupant on the cabinet complying with Section 505.

1012.4.2 Height. The front of one sink should be 34 inches (865 mm) maximum above the floor, measured to the higher of the rim or counter surface. The adjustable height range should be 28 inches (710 mm) minimum and 34 inches (865 mm) maximum with knee clearance complying with Section 306.

1012.4.2 Advisory. For tall people that have difficulty bending or those people that prefer raised arm positions, an adjustable height sink that exceeds the 34 inches would be advantageous.

1012.4.2.1 Adaptable Surfaces. One section of the counter should move with the sink to provide a work surface. Provide a countertop seam with inside finished faces on each side of the sink. Exposed sides of adjacent base cabinets if provided should be finished. The height range should be provided without cutting the counter or damaging adjacent cabinets, walls, doors and structural elements. Provide task lighting.

1012.4.2.1 Advisory. Finished surfaces are required since the cost and difficulty of matching the materials later may not be feasible. A small quantity of the finish material should be retained for repairs and other modifications.

1012.4.3 Exposed Pipes and Under Counter Surfaces. Exposed pipes and under counter surfaces should comply with Section 606.6. Flexible supply and waste lines will be required if an adjustable sink is used. Locate exposed pipes as close to the wall as possible to increase knee clearance and allow additional space for insulation. Water supply and drain pipes under sinks should be insulated or otherwise configured to protect against contact. Provide local shutoffs and location of main shutoffs. Eliminate sharp or abrasive surfaces under the sinks. Protection from exposed pipes may be provided by the use of finished panel enclosures.

1012.4.3 Advisory. Faucets should be easily repositioned to accommodate the needs of the current occupant. This may include placement to the side of the sink, top or side faces or even on the vertical front face. Consider providing hole plugs matching the surrounding material. Indicate in the design documents alternative placements. Also, consider automatic (hands free) controls.

1012.4.4 Accessories. Accessories in the sink area may include instant hot water dispensers, filter equipment, soap dispenser, retractable spray, and drain control. Provide locations for these items. Provide a soap dispenser that is easy to use and refill. It is recommended to provide filler plugs matching the countertop material for item relocation. Locate accessories for short reach for easy access for a seated occupant, preferably to the side of the sink; maintain knee clearance requirements.

1012.4.4 Advisory. Caution should be exercised when considering the location of the instant hot water dispenser, since a side location may be easily reached by children creating a hazard.

1012.4.5 Faucets. Faucets should comply with Section 606.5 and easily replaceable. Single lever controls are simple and easy to use. Provide a retractable spray for both washing and to be used as a means to fill pots with water. Consider a pot filler faucet for improved ease. Consider faucets with retractable heads. Provide high temperature cut-off complying with 608.9. Provide local shutoffs and main location. Consider hands free or tap controls. Provide pressure balanced, temperature limiting valves.

1012.5 Kitchen Storage. Kitchen storage should comply with Section 1012.5. It should comprise general, compartmentalized and dedicated spaces that accommodate user needs and preferences.

1012.5.1 General Storage. A clear floor space, positioned for a parallel or forward approach to the kitchen cabinets should be provided. 50% of the storage area in the cabinets should comply with Section 905. Provide the greatest variety of storage facilities within the required reach ranges that includes upper and lower cabinets, drawers and roll out spaces, bins, racks, adjustable/removable shelves, swing out/ roll-out work surfaces, carousels, bins, racks, dividers; and additional item specific storage (e.g. eating utensils, glasses, pots and pans). Non-glare finishes are recommended. Operable parts for storage should comply with Section 309. Hardware should comply with Section 309.4. Provide full extension locking glides on drawers. Usability may be increased with push/open or electronic motor automatic operation for self opening doors, drawers, movable shelves and work surfaces. Manual & automatic 360 degree rotating shelves & offset hinged pullout shelves for corner and other units can increase access and efficiency. Consider topped hinged doors for upper cabinetry, roll down shutters, sliding doors and other types of enclosures that reduce the door swing arc obstruction. Clear or translucent faces can help to locate items.

1012.5.1 Advisory. To supplement traditional wall cabinet storage, operable manual or automatic storage units can allow access to storage below and above reach ranges while allowing the occupant to retrieve an item at their most convenient height. Tall cabinets are still viable when fitted with a mechanical system.

1012.5.1.1 Upper Cabinets. Upper cabinets should be provided with at least one shelf that can be accessed by the maximum reach range of 48 inches in height complying with Section 308. Upper cabinets should be removable. Any potentially exposed face should be finished. Hardware should comply with Section 309.4 Consider manual pull down or automatic storage. Cabinet doors should be easy to remove. Provide under cabinet lighting.

1012.5.1.1 Advisory. For some occupants, the upper cabinetry is useless since they will not be able to access the shelves above the 48-inch reach range. This may lead the occupant to install more lower cabinets or tall units with mechanized shelves. It is not recommended to install a full height vertical storage unit that divides countertop or creates an obstruction to the work triangle or intuitive functioning of the kitchen.

1012.5.1.2 Lower Cabinets. Lower cabinets should be removable and should be easily converted into a mobile unit and provided with work surfaces complying with Section 1012.3.4. and Section 1012.3.5. A kick plate 9-inches (230 mm) minimum in height is recommended. Any potentially exposed face should be finished. Mobile units should have all faces finished. Hardware should comply with Section 309.4. Drawer units are recommended to increase access. Drawer slides should be full extension type. Consider push/open or automatic drawers, doors and work surfaces. Provide hinges that allow doors to swing a full 180 degrees so that the doors when open can be flush with the face of the cabinet and will not obstruct route. Adaptability of the cabinetry includes the following:

a. each cabinet can be removed without removal or replacement of the counter and adjacent cabinets.

b. the floor finish extends under cabinetry.

c. the walls behind and surrounding cabinetry are finished.

d. wheels can be installed to make the unit mobile with minimal alteration to the cabinetry. Mobile units should be stable and tip resistant.

e. provide grips, handles or handrails if needed on the cabinetry complying with Section 505.

f. provide at least one adaptable section of countertop capable of being lowered to a minimum of 28" aff. Provide seam in the countertop with both inside faces finished to match front face material.

g. corner cabinets may be more functional by providing a rotating or offset hinged adjustable storage shelves or beveled corner with feature to accept drawers.

h. provide /storage area with adjustable height components.

i. provide a support for the end of counter that is finished and wide enough to support the countertop and is aesthetically appropriate if the base cabinet is removed.

j. under counter clear space may be enclosed with doors for aesthetic reasons, but must be easily operable and comply with Section 309.4.

k. cabinet doors should be easy to remove providing open storage if needed.

l. consider drawers rather than doors for easy access.

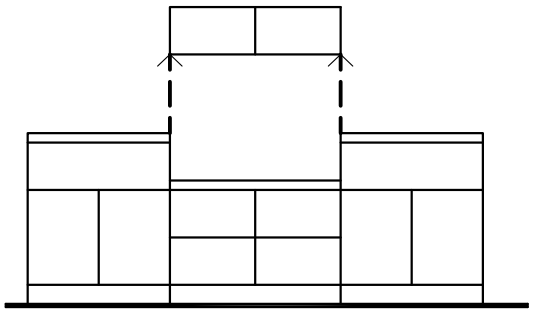

Fig. 1012.5.1.2
Example of Adaptable Lower Cabinets

1012.5.1.2 Advisory. The lower cabinets should be adaptable where viable to provide a variety of lower fixed work surfaces at various locations to accommodate the occupant. The alternate solution is to provide fixed location pull out work surface complying with Section 1012.3.4.

1012.5.1.2.1 Islands. Kitchen islands should comply with Section 1012.5.1.2. Clearance around island should not conflict with Section 1012.1.1. and Section 1012.1.2 Route around island should be 48 inches (1220 mm) clear minimum. Island should be adaptable and the floor finished under the island if an occupant requires removal. Island should be located to avoid conflicts with traffic flow. Consider multiple counter heights or adjustable height work surface to accommodate children complying with Section 308.4. Provide work surfaces complying with Section 1012.3.

1012.5.1.2.1 Advisory. Consider installation of a small sink and range top. An island may be configured to also act as a work desk and office area. Consider an under counter small refrigerator and other components that may allow the island to supplement and provide alternate height and user scenarios. Lower surfaces will address children's needs.

1012.5.2 Pantry. Pantry, if provided, should comply with Section 1024. Provide shallow shelves with a maximum depth of 12 inches (305 mm) to avoid hard to reach items and roll-out shelves when possible. Component storage should also comply with Section 1012.5. Pantry may be closet with adjustable shelves, pull out storage, rollout storage, manual and automatic operation of storage compartments. Pantry may be divided into a multipurpose use and contain combinations of drawers, bins, shelves and other specific type of storage. Hardware should comply with Section 309.4 Provide a lower location within pantry for bulk and heavy item storage. Provide task lighting.

1012.5.2.1 Walk-in Pantry. A walk-in pantry should comply with Section 1012.5.2 and provide a clear floor space complying with Section 305. Provide automatic ceiling light and task lighting.

1012.5.3 Sink Cabinet Storage. Sink cabinet storage should be adaptable and comply with Section 1012.4.

1012.5.3 Advisory. Typical under sink cabinetry should be easily removable to provide a clear floor space under the sink. Section 1012.4.1 provides the details. Doors that swing flush to adjacent cabinets are a consideration for aesthetic reasons.

1012.5.4 Cooking Equipment and Dish Storage. Provide equipment storage as required by occupant. Access to equipment in addition to reach range requirements should be easy. Upper cabinets should be adaptable and removable and replaced with open shelves, hooks, or other means for storage of cooking equipment, complying with Section 309 and 309. Consider other storage facilities complying with Section 1024. Provide dedicated storage for plates, cups and glasses for easy access.

1012.5.4 Advisory. Hard to reach objects and heavy objects present a creative challenge for the kitchen designer. Heavy items should be stored at lower levels. Placement may need to be very user specific for both usability and safety.

1012.5.4.1 Book Shelves. Bookshelves or bookcases are recommended even if only one dedicated shelf is provided, 48 inches (1220 mm) maximum aff and should comply with Section 308.

1012.5.5 Trash/Recycling Storage. Provide separate storage for trash and recycling. Recycling should be provided with two separate storage units, one for metal and plastics, the other for paper waste or as required by applicable recycling rules and regulations. Storage should be drawer or roll-out units complying with Section 308 and Section 309. Consider additional storage for bulky waste items. Receptacles should be integrated drawer or tilt type and should not require extensive lifting to remove them from their storage locations or should accommodate liner bags that can be easily removed from the waste receptacle. Provide liner bag storage within the garbage/recycling storage area or within close proximity. Provide automatic ceiling light and task lighting.

1012.5.5 Advisory. Consider waste receptacle units on wheels as part of the movable storage to locate as needed. Also, see Section 906, Trash and Recycling Receptacles.

1012.6 Appliances. Where provided, kitchen appliances should comply with Section 1012.6. Do not overlap appliances and do not allow appliance or cabinet doors or other components to obstruct the operation of another. Cabinetry adjacent to an appliance should be removable to provide adequate work area as required by the occupant complying with Section 1012.5. Provide timers, automatic shutoffs and alarms for cooking and cleaning appliances.

1012.6.1 Operable Parts. All appliance controls should be front mounted and comply with Section 1009. Operation should be simple and intuitive. Appliance doors and door latching devices should comply with Section 309 and contain open door alarms. Handles should extend the full width and/or height of appliance. Bottom-hinged appliance door should comply with Section 309.3 when in the open position. Consider large type for both printed and digital readouts. Provide interior lighting. Hardware should comply with Section 309.4 through 309.8 for visual, tactile and auditory characteristics. Alarms should comply with Section 309.9.

1012.6.1.1 Child Safety. Provide childproofing, if unit will be used by young children. Provide child safety lockout devices and anti-tipping for appliances, among other recommendations complying with Section 309.5 Childproofing. Alarms are also critical to alert adults to an emergency. Provide Multiple step actuation and lockout devices. Provide location and label all shutoffs.

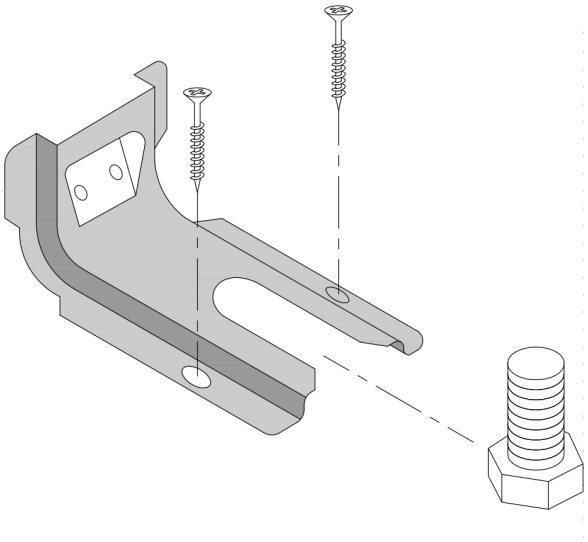

Fig. 1012.6.1.1
Anti - Tipping Device (Bracket)

1012.6.1.2 Eye Level. Eye levels are critical for some and should comply with Section 310.

1012.6.2 Clear Floor Space. A clear floor space, positioned for parallel or forward approach, should be provided at each kitchen appliance. Clear floor spaces may overlap.

1012.6.3 Dishwasher. A clear floor space, positioned adjacent to the dishwasher door, should be provided. It is recommended to locate the dishwasher adjacent to the sink or within one clear floor space of the sink. Provide control lock-out for child safety. Provide full width or height handles. Dishwasher should be usable from the left or right side of the appliance. Provide timers, automatic shutoffs and alarms complying with Section 309.

1012.6.3 Advisory. Placing a dishwasher adjacent to the sink works well if the occupant requires a clear under sink floor space. Place a maximum of 36 inches (915 mm) from the sink space.

1012.6.3.1 Height. Bottom edge of door opening is recommended at 19 ½ inches (495 mm) minimum above the floor and should comply with Section 308.3.1. Provide a base, if necessary, to raise opening.

1012.6.4 Range or Cooktop. A clear floor space, positioned for a parallel or forward approach to the space for a range or cooktop, should be provided. Provide 36 inches (915 mm) minimum of counter space on each side of the appliance. Where the clear floor space is positioned for a forward approach, knee and toe clearance complying with Section 306 should be provided. Where knee and toe space is provided, the underside of the cooktop should be insulated or otherwise configured to protect from burns, abrasions, or electrical shock. Height of the cooktop surface should comply with Section 902.3. Consider adjustable height or placement at the lower end of the height range to enhance sight lines for short people and those that use a wheelchair and to increase safety. The location of controls should not require reaching across burners. Controls should require only minimum dexterity. Consider alternate operation and intuitive multisensory functionality complying with Section 309.10 with enhanced visual, tactile and auditory characteristics complying with Sections 309.6, 309.7, and 309.8. Provide child protection devices (e.g., anti-tipping clips, burner shield, controls lockout) complying with Section 309.5. Provide timers, automatic shutoffs and alarms complying with Section 309.9.

1012.6.4 Advisory. Range or cooktop should not be placed below a window due to air drafts and window operation conflicts over the heating elements. Consider magnetic induction. Provide range in close proximity to the sink area for food preparation and for hot items.

1012.6.4.1 Exhaust Hood. Provide an exhaust hood with a light. Also, provide a switch that is within reach ranges complying with Section 308.

1012.6.5 Oven. Oven should comply with Section 1012.6.5. It should contain a clear floor space positioned for a parallel or forward approach, depending upon door height, if knee clearance is provided (e.g. wall oven). Ovens should have controls on front panels, on either side of the door and should comply with Section 308. Comply with Section 1012.6.4.1 as applicable. Provide full width or height handles. Provide anti-tipping clips. Provide timers, automatic shutoffs and open door alarms complying with Section 309.

1012.6.5.1 Advisory. Side-hinged doors allow the occupant to access oven contents easier than bottom hinged door, increasing safety. The pull-out work surface allows easy and safe placement of hot items.

1012.6.5.1 Side-Hinged Oven Doors. Side-hinged oven doors should have a countertop positioned adjacent to the latch side of the oven door. It is recommended to provide a pull out work counter complying with Section 1012.3.4 immediately under a wall oven with a side-hinged door. Door should comply with Section 308; controls should comply with Section 309.

1012.6.5.2 Bottom-Hinged Door Ovens. Bottom hinged door ovens should have a countertop positioned adjacent to one side of the door. Door should comply with Section 308. Controls should comply with Section 309. Open inside face of door may be usable as a transition rest area for hot food provided anti-tipping clips are securely fastened to floor or wall for free standing units.

1012.6.6 Microwave. A microwave oven is inherently an inclusive appliance. A clear floor space, positioned for a parallel or forward approach should be provided. Location should comply with Section 308. Do not locate microwave over a cooking surface for safety reasons. Provide alternate locations to accommodate occupant's needs. Provide a work surface that also acts as resting and transfer surface complying with Section 1012.3. Provide full width or height handles. Auto open or use large push buttons provided within reach ranges complying with Section 308. Timers, automatic shutoffs and alarms should comply with Section 309.

1012.6.6 Advisory. Placing the unit at the eye level of a seated person seems to make sense since it is also usable for a standing person. Eye level of a seated person using a mobility device may be between 43-51 inches. Refer to Section 310.5. Top of the operable door should be a maximum of 48 inches above the finish floor. Some occupants may prefer a unit located at the bottom of the forward reach range placing the bottom of the unit at 18 1/2 (474 mm) inches.

1012.6.7 Refrigerator/Freezer. Combination refrigerators and freezers should have at least 50 percent of the freezer compartment 48 inches (1220 mm) maximum above the finished floor. A side by side refrigerator/freezer is recommended. A clear floor space, positioned for parallel approach to the space dedicated to a refrigerator/freezer, should be provided. The centerline of the clear floor space should be offset 24 inches (610 mm) maximum from the centerline of the dedicated space. Do not locate refrigerator in an inside corner. Provide open door, temperature, power failure and water flow alarms complying with Section 309.9 Provide water and ice dispenser on the door for easy access. Provide full width and/or height handles &180 degree door swing.

1012.6.8 Trash Compactor. A clear floor space, positioned for a parallel or forward approach to the trash compactor should be provided.

1012.6.9 Washer/Dryer. Washing machines and clothes dryers should be front loading and comply with Section 611. Consider sloped door faces. Provide full width and/or height handles. Provide timers, automatic shutoffs, water leak, high temperature and other alarms complying with Section 309. Provide local water, gas and electrical shutoffs and main shut-off locations.

1012.7 Windows. Windows should comply with Section 506. Kitchens should contain an operable window. It is recommended to provide a ventilation fan as an alternative to opening window(s) during weather extremes of heat or cold. It is not recommended to place a cooking surface directly below an operable window due to smoke and fire hazards, and flame blowout on gas stoves, but primarily because of the hazard of reaching over a cooking surface that can result in sever physical harm. If existing conditions require it, place bottom of operable sash no lower than 24 inches above the cooking surface.

1012.7 Advisory. A kitchen window is very important specially when it is used to vent the space. If it cannot be placed in a location for manual operation it should be automatic. The controls should be placed in a location for easy access. This is especially important during extreme cold or heat to avoid fluctuating room air temperature. A back-up ventilation fan is always recommended.

1012.7.1 Mechanical Ventilation. Provide mechanical ventilation for all cooking appliances including the range, cooktop, oven, and microwave that exhausts directly to the exterior where possible. Controls should comply with Section 308 and Section 309. Provide minimum clearance of 24 inches (610 mm) between cooking surface and protected surface above or provide a minimum clearance of 30 inches (762 mm) of clearance between the cooking surface and unprotected surface above. Provide a fire activated extinguisher for cook top. Filters should be located within reach ranges complying with Section 308.

1012.8 Smoke Detectors and Fire Extinguishers. Provide smoke detectors and fire extinguishers complying with Section 1025.5. Consider multiple fire extinguishers such as one by the cooktop, oven and doorway.

1012.8 Advisory. Fire extinguishers need not have to hang on every wall, rather they may be placed within cabinets, recessed into the wall, or integrated with the finished cabinetry as long as the reach ranges and access to them complies with Section 307 Protruding Objects, Section 308 Reach Ranges and Section 309 Operable Parts for both cabinetry and the fire extinguisher. It should provide peace of mind for the occupants, knowing that they have some means of extinguishing a fire before it has a chance to spread.

1012.9 Furniture. If eating area is provided within the kitchen it should comply with Section 1012.9. Hardware should comply with Section 309.4.

1012.9.1 Table. Table should comply with Section 902. Table may be mobile, but requires a parking location within the room that complies with Section 1012 and locking rollers or brake for safety and to avoid damage to cabinets. Tables may be parked under counter tops and provide a partially exposed top surface. Tables have multipurpose uses that include: eating, food preparation, home office and school work desk, entertaining, etc.

1012.9.2 Chairs. Chairs should comply with Section 903.5 for seat height. Provide parking space for each chair.

1012.9.2 Advisory. A parking space is a designated stationary space where the chair may be stored when not in use. This prevents potential obstruction caused by random placement of furniture and does not defeat the intended maneuvering clearances.

1012.9.3 Other Furniture and Accessories. Provide a parking space for other furniture and accessories to avoid obstructions (e.g. a mobile computer stand). Provide a step stool or short free standing ladder for access to upper cabinets. Even consider a pole extension with a grabbing mechanism.

1012.10 Kitchen Office Area. If provided, an office area within the kitchen should comply with Section 902, 903, 905 and 1012.9. Provide an adjustable office chair complying with Section 903.10. Book shelves or book case if provided, should comply with Section 308. Office area may be integrated with the kitchen as a closet. Provide parking space for chair under desk. Provide communication features as applicable, especially for computer, audio and video connections, etc complying with Section 1025.

1012.11 Seating. If provided, built-in seating should comply with Section 903. Consider adjustable seating to accommodate children.

1012.12 Lighting. Provide adjustable general and task lighting. Consider task lighting for each work area, work surfaces, at each appliance, above the sink, counter task lighting. Lighting should be non-glare with shielded light sources. Consider voice activated and motion detection switches as required by occupant. See Section 311.

1012.13 Monitor. If provided, locate monitor complying with Section 308 and Section 309. Provide locations complying with Section 308. Consider wall mounted panel monitors with both horizontal and vertical pivoting capabilities. Monitor should be placed to accommodate eating area and other key viewing locations within kitchen. Consider eye levels complying with Section 310.

1012.14 Electronic Equipment. If provided, locate electronic equipment complying with Section 308 and Section 309. Provide remote controls with storage space complying with Section 308.

1013 Bedrooms. Provide a turning circle within the room. If the only feasible circulation route must pass through the space, the design should intuitively direct the circulation toward one side of the room. This may be accomplished by functions, door locations (corners recommended for wayfinding), amenities, and furniture placement. Raised or sunken areas should comply with Section 1003.6. Built-In furniture should comply with Chapter 9. Provide a clear floor space on both sides of the bed complying with Section 305. Provide a minimum of one closet in all bedrooms. Provide a space on at least one wall that will accommodate a range of bed sizes and space on another wall that will accommodate furniture or other free-stranding storage. Storage should comply with Section 1024. Bedrooms should be separated visually and acoustically from other areas of the house. Closets may act as acoustic barriers between rooms.

1013.1 Beds. At least one bed should comply with Section 1013.1.

1013.1.1 Clear Floor Space. A clear floor space complying with Section 305 should be provided on both sides of the bed. The clear floor space should be positioned for a parallel approach.

1013.1.1.1 Tier I Size. Tier I size is the standard or typical clear floor space for adults and should comply with Section 305.3.1.

1013 Advisory. Consider fully automatic beds. Adjustable height will greatly aid both entry and exit. It will also more accurately address the needs and preferences of the user especially to accommodate a medical requirement. Refer also to Section 903.21 Universal Kinetic Furniture.

1013.1.1.2 Tier II Size. Tier II size is the typical clear floor space for children up to age 12 and should comply with Section 305.3.2.

1013.1.1.3 Tier III Size. Tier III size is the typical clear floor space for institutional applications and should comply with Section 305.3.3.

1013.1.2 Bedframe/Mattress. Provide open bedframes containing a space 8 inches (203 mm) minimum beneath the bed for potential storage of a portable patient lift. It also provide space for a lift base when in use.

1013.1.2.1 Fixed Bed Frames. Surface of the mattress should be 17 inches (432 mm) minium to 19 inches (483 mm) maximum from the floor to the top of the compressed mattress surface.

1013.1.2.2 Adjustable Height Frames. Surface of the mattress may vary to accommodate height and angle of body parts. Surface of the compressed mattress at low point should be 17 inches (432 mm) minimum to 32 inches (813 mm) maximum to accommodate varying heights for positioning of head, torso, knees and feet. Back angle should not exceed 65 degrees.

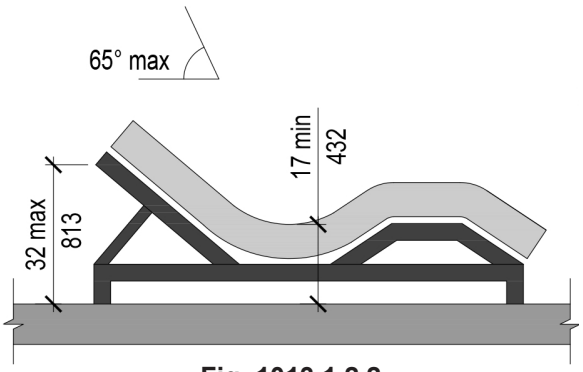

Fig. 1013.1.2.2
Adjustable Height Beds

1013.1.2.3 Features. Bed features may include but are not limited firmness, heating, cooling, message and other options that address visual, tactile and auditory characteristic.

1013.1.2.4 Controls. Controls can hard wired and located on the bed frame, on an adjacent table or a movable remote. Recommended is a wireless remote for greater flexibility and usability. Comply with Section 309. Consider alternate operation such as verbal or gesture commands.

1013.1.2.5 Storage. If space allows, storage may be provided beneath the bed, but should be removable to allow for the base of a portable personal lift.

1013.2 Sleeping Lofts. Sleeping lofts are supplemental to a standard bedroom unless the loft can be accessed by elevator or platform lift, then it should comply with bedroom recommendations. The clear height above and below the loft floor construction should not be less than 7 feet (2134 mm) and habitable space above and below should not be less than 8 feet (2438 mm). See also mezzanines, *2014 NYCBC*, Section BC 505.

1013.3 Alternate Sleeping Areas. Other rooms or areas in the unit that are also used as sleeping areas consider complying with Section 1013.

1013.4 Controls. Provide controls including lighting, fan, video and audio, etc., adjacent to the bed such as typical night stand location and complies with Section 308 and Section 309.4 or consider all wireless controls.

1013.5 Mobility Device Charging Area. A clear floor space complying with Section 1013.1.1 should also serve as a mobility device charging area complying with Section 909 Charging Stations.

1014 Living Rooms. Provide a turning circle within the room. If the only feasible circulation route must pass through the space, the design should intuitively direct the circulation toward one side of the room. This may be accomplished by functions, door locations (corners recommended for wayfinding) amenities, and furniture placement. Raised or sunken areas should comply with Section 1003.6 Built-In furniture should comply with Chapter 9. Storage should comply with Section 1024.

1015 Dining Rooms. Dining rooms that are separate or combined with other living areas should comply with Section 1014. Provide a route complying with Section 1003.4 if the area behind seating will be used as a walkway.

1016 Dens/Multipurpose Rooms. Dens/multipurpose rooms or spaces may be used as a home office, media room, exercise room, guest bedroom, complying with sections relating to their usage.

1017 Home Offices. Home offices that are separate or combined with other living areas or sleeping areas should comply with Section 1012.10. An office area with built-in furniture should comply with Section 902, 903 and 905.

1017 Advisory. Home offices are common. They are not just used as a work environment, they can be multipurpose spaces. It may be used as a guest bedroom, den or other function. It may function as a separate room or a space within another room including living, kitchen, sleeping spaces and other less conventional spaces such as in a hallway, under a stair or even within a bathroom.

1018 Basements, Attics, and Utility Rooms. Provide a route to basement, attic, and utility room complying with Section 1003. Provide an emergency assistance alarm, smoke, carbon monoxide, gas, power outage, water leak, low water cut-off, temperature, equipment failure and other alarms complying with Section 309.9. If stairs are the only viable means of accessing these spaces, stairs should comply with Section 1003.4.2. See Section 309.9 Multisensory Alarms and Section 1025.5.2.

1018 Advisory. Basements and attics may not be large enough or it may not be feasible to provide inclusive access to these areas due to structure, ceiling height, mechanical equipment and configuration of the space. If the only access is a stair it should be provided with handrails on both sides and wide enough to accommodate a stairlift. Provide childproofing complying with Section 309.

1019 Interior Balconies and Lofts. Provide a route complying with Section 1003.

1020 Garage. Provide a route complying with Section 1003. Route should be internal. If an exterior route is the only means to access garage it should be weather protected and provided with an automatic ice melt system if subject to snow and ice accumulation. Provide power operated door. Provide an emergency assistance alarm as required by occupant. Provide detectors complying with Section 1025.5.2.

1021 Exterior Balconies and Terraces. Exterior balconies or terraces should provide an entry area at same grade. If exterior elevation is below the exterior door threshold, provide a ramp or raise surface to match threshold elevation. Provide a turning space complying with Section 304. Handrails should comply with Section 505. Level change should comply with section 303. Provide drainage. Provide general, perimeter and perhaps task lighting. Consider automatic lighting.

1021 Advisory. Refer to the *2014 NYC Building Code*, Chapter 11, Section 1107.4 exceptions regarding access to these areas.

1022 Landscape Elements. Provide landscape elements complying with Section 1022.

1022.1 Route. Routes should be 48 inches (1220 mm) clear width complying with Section 1003.4.

1022.1.1 Circulation Width. Provide 48 inch circulation route width within a yard area if the route is required to run through the area rather providing a route adjacent to the area. Provide 48 inch circulation around furniture where applicable or locate pieces to provide an unobstructed non-circuitous route. Consider grass pavers, consolidated stone, and other paving options where surface is naturally compressible.

1022.1.2 Surfaces. Surfaces should comply with Section 302.

1022.2 Seating. If built-in seating is provided it should comply with Section 903.

1022.3 Planting Containers. If provided, free standing containers, railing boxes and other types of containers should comply with Section 308.

1022.4 Water Supply. If provided, hose bibs should comply with Section 308 and Section 309. Properly slope supply lines and provide valve to drain back system within reach ranges above.

1022.4.1 Irrigation System. Consider an automatic irrigation system with a programmable controller at reach ranges complying with Section 308, for lawn areas, and an automatic drip system for planting beds, and containers with controls complying with Section 309.

1022.5 Storage. If provided, storage should comply with Section 1012.5.

1022.5 Advisory. Provide air tight storage containers for fertilizers, pesticides, or any substance that may affect people with chemical sensitivity. Provide a lock on all storage compartments to keep young children out.

1022.6 Operable Parts. Operable parts should comply with Section 1009 and Section 309.

1022.6 Advisory. Operable parts not only include hardware but such items as light switches, receptacles, plumbing fixture controls.

1022.7 Drainage. Provide proper slope and drainage to prevent the accumulation of water and ice formation to increase safety.

1022.8 Tree Grates. Tree grates should comply with Section 302.3 and Section 303.

1022.9 Pools. Pools should be adaptable as per the occupants needs. Identify on the construction documents, a location that will accommodate a future lifting device if required by occupants. Consider grab railing as needed by the occupant. In addition to code required safety alarms (e.g. motion detectors), provide alarm complying with Section 702 and childproofing complying with Section 309.5 and the US Consumer Products Safety Commission's recommendations in addition to the relevant legal requirements. Provide motion detector, water, security and other alarms complying with 309.9 and remote monitoring system complying with Section 1030. Pool code requirements are found in Section 3109 of the *2014 NYCBC*. All pools installed in NYC must follow the city's safety and quality-of-life standards. The 2014 *2014 NYCBC*, Section 3109 outlines the construction requirements, Section 3109.3 - 3109.5.4.7 outline the technical requirements to construct pools, Including: Electrical Precautions, Accessibility, Materials, Wall & Bottom Slopes, Ladders & Hand holds, Walkways, Depth Marking, Diving Boards & Towers, Fences, Gates & Locks, and Overhead Clearance.

1022.9 Advisory. Consider avoiding the use of chlorine for people with chemical sensitivity and consider other alternatives such as a salt water system.

1022.9.1 Fence. Always enclose pools with fencing with a lock complying with the building code and provide a motion alarm in case the fencing is breached. Provide a climb proof fence that does not provide a foothold.

1022.10 Play Areas. Play areas should comply with Section 1022.10.

1022.10.1 Equipment. Comply with Section 308 and Section 309.

1022.10.2 Seating. Comply with Section 1022.2.

1022.10.3 Surfaces. Comply w/Section 1022.1.2.

1022.10.4 Storage. Comply with Section 1022.5.

1022.11 Garden Areas. Garden areas should comply with Section 1022.11.

1022.11 Advisory. Consider hydroponic gardening. Flexibility of these water systems, accommodates individual needs and preferences. Height, reach ranges and clearances can be adjusted to provide direct access to plant materials, lighting and controls from seated and standing positions.

1022.11.1 Route. Comply with Section 1022.1.

1022.11.2 Raised Planting Beds. Comply with Section 1022.1 and Section 1022.3. Raised planting beds may be terraces, outcropping, etc. The reach ranges specified will make the beds inclusive. Consider beds with clear space below with knee and toe clearances complying with Section 308 for perpendicular approach. Avoid the use of any poisonous plant material and chemicals.

1022.11.2.1 Below Grade Planting Bed Access. Comply with Section 405.

1022.11.3 Vertical Planting. Vertical planting includes trellises, hooks, eyes, grids, poles, and other types of support and framework for small gardens, terraces and along walkways. Consider espaliering trees and shrubs that are trained to grow in a flat vertical plane. Avoid the use of any poisonous plant material and chemicals.

1022.11.4 Water Supply. Provide hose bibs complying with Section 308 and Section 309 with level controls, in various locations. If viable, provide automatic irrigation system that provides general and specific water requirements including horizontal and vertical spray heads, and soaking/drip lines with rain sensor. Control panel should comply with Section 309.4. Consider an outdoor sink. Properly slope supply lines and provide valve to drain back system.

1022.11.5 Cooking. Cooking area should comply with Section 1012 and Section 1024.

1022.11.6 Storage. Provide storage complying with Section 1012.5.

1022.11.7 Emergency Assistance Alarm. If required by the occupant these alarms should comply with Section 702.

1022.11.8 Lighting. Lighting increases usability, safety and security. Provide manual and automatic general and task lighting.

1022.12 Decks. Deck should comply with Section 1022.12. *2014 NYC Building Code* Section 3300 Governs construction safety and applies to decks and porches.

1022.12.1 Route. Routes should be 48 inches (1220 mm) clear width complying with Section 1003.4.

1022.12.2 Circulation Width. Provide 48 inch circulation route width within a deck area if the route is required to run through the area rather providing a route adjacent to the area. Provide 48 inch circulation around furniture where applicable or locate pieces to provide an unobstructed non-circuitous route.

1022.12.3 Seating. If built in seating is provided it should comply with Section 903.

1022.12.4 Planting Areas. If provided, a portion of the planting areas should be built-in or should easily be provided without any modifications to the deck. This includes free standing containers, railing boxes and other types of containers and should comply with Section 308. See also Section 1022.11.2 and Section 1022.11.3. Avoid the use of any poisonous plant material and chemicals.

1022.12.5 Water Supply. Provided, hose bibs complying with Section 308 and 309. Provide lever control. Properly slope supply lines and provide drain valve. Provide automatic watering with rain sensor.

1022.12.6 Cooking. Cooking area should comply with Section 1012.

1022.12.7 Storage. Provide storage complying with Section 1012.5 and 1024.

1022.12.8 Operable Parts. Operable parts should comply with Section 1009.

1022.12.9 Drainage. Provide proper slope and drainage to prevent the accumulation of water, snow and ice.

1022.12.10 Lighting. Lighting increases usability, safety and security. Provide automatic general and task lighting.

1022.12.11 Fencing. Provide childproof climb proof fencing that eliminates any footholds.

1023 Windows. Where operable windows are provided they should comply with Section 506 and have operable parts complying with Section 309. Operable windows that cannot comply with reach ranges complying with Section 308 should be automatic. Provide childproofing that includes guards, finger stops, proper balance setting, as well as other features complying with Section 309.5 Emergency escape and rescue openings in Group R and Group I-1 occupancies as per the *2014 NYCBC* Section 1029. shall have the bottom of the clear opening not greater than 36 inches (914 mm) measured from the floor.

EXCEPTION: Fixed windows such as a transom sash above an operable window are not required to be operable.

1024 General Storage and Closets. Where general storage is provided it should comply with Section 1024 and Section 1005.1. This includes bedroom and hall closets. Kitchen storage should comply with Section 1012.5; Bathroom storage should comply with Section 1011.12. Laundry storage should comply with Section 1010. Garden storage should comply with Section 1022. Storage should be a variable composition of general, compartmentalized and dedicated spaces that accommodate user needs and preferences. Clear or translucent cabinet faces can help to locate items.

1024.1 Clear Floor Space. A clear floor space complying with Section 305, positioned for parallel or forward approach, should be provided at each storage location.

1024.1.1 Walk-in Closets Clear Floor Space. Walk-in closets should be provided with a clear floor space complying with Section 305 Walk-in closets should be adaptable and provided with a clear floor space complying with Section 305.3. The lower portion of the closet should contain removable storage, to provide if needed, a turning space complying with Section 304 with knee and toe clearances complying with Section 306. Storage may overlap the turning circle but not the clear floor space.

1024.2 Height. A portion of the storage area of each facility should comply with the reach ranges specified in Section 308.

1024.3 Operable Parts. Operable parts for storage facilities should comply with Section 309. Hardware should comply with Section 309.4. Consider motorized garment racks, carousels and bins to increase access and ease of use, especially in large and deep closets. Provide full extension locking glides on drawers. Usability may be increased with spring loaded or electronic motor driven automatic operation for self-opening doors, drawers, movable shelves, pull-out cabinets with adjustable height shelves, and work surfaces. Manual and automatic 360 degree rotating shelves or offset hinged pull-out shelves to increase access and efficiency. Consider top-hinged doors for upper cabinetry, roll-down shutters, sliding doors and other types of enclosures to eliminate door swing arc obstruction.

1025 Communication Features.

1025.1 General. Communication features should comply with Section 1025.5.

1025.1 Advisory. Pre-wiring a dwelling unit during the construction phase is recommended. This will reduce or eliminate potential damage to the unit later and make it much easier to install a wide range of devices (e.g., controls, two-way communications, detectors, security and remote home monitoring). Identify access ports on the construction documents and provide some other physical indicator. Provide two or more controls locations (e.g., hall and living room). Wires should be bundled and distribution patterns simplified. Standardized placement should make runs easy to locate. Empty rigid conduit could be used instead of pre-wiring. Adequate and easily accessed pull locations should be provided for all areas of the dwelling unit including the exterior. In some ways, empty conduit may be preferred since this allows installation of new wire products as they become available. Wire degradation may require replacement that conduit allows. Of course, wireless devices could make some percentage of the pre-wiring obsolete.

1025.2 Unit Detection. Unit should be provided with fire, smoke, carbon monoxide, gas, power outage, appliance overheating, water leakage, water temperature, personal emergency, entrapment, security, appliance timers, open appliance, continuous water flow, low water cutoff, HVAC equipment failure, and other types of alarms that are visual and audible and if possible, tactile. Consider a house monitoring system with a wide range of detectors, control capabilities and two-way communications for both on and off site, occupied and unoccupied applications. Monitoring may be a variety of communication means including phone, computer, PDA, etc. Audible notification should comply with NFPA 72 listed in Section 105.2.2. Unit should be hard-wired with a back-up power source. Remote visual (camera) and sound (microphones) are an option for occupants that need this level of monitoring.

1025.3 Building Fire Alarm System. A building fire alarm system should be provided. The system wiring should be extended to a point within the unit in the vicinity of the detection system.

1025.4 Multisensory Alarms. Multisensory alarms should be provided within the unit as part of the unit detection system or the building fire alarm system and comply with Sections 309.9, 1025.4 and 1026.

1025.4.1 Appliance. Notification appliances, should be visual, audible and if possible, tactile.

1025.4.2 Activation. All notification appliances provided within the unit for smoke, carbon monoxide and gas detection should be activate upon detection. All visible notification appliances provided within the unit for building fire alarm notification should be activated upon activation of the building fire alarm in the portion of the building containing the unit.

1025.4.3 Interconnection. The same notification appliances should be permitted to provide notification of unit smoke and carbon monoxide detection and activate the building fire alarm system.

1025.4.4 Prohibited Use. Notification appliances used to indicate unit smoke, carbon monoxide or gas detection or building fire alarm activation should not be used for any other purpose within the unit.

1025.5 Unit Primary Entrance. Communication features should be provided at the unit primary entrance complying with Section 1025.5.

1025.5.1 Notification. A hard-wired electric doorbell should be provided. A button or switch should be provided on the public side of the unit primary entrance. Activation of the button or switch should initiate a audible tone within the unit. Unit should be provided with an optional visible notification device if required by the occupant. Consider a remote notification unit similar to the activator in Section 708.7.1.2 that utilizes tactile/vibration indicator.

1025.5.2 Visual Identification. A means for visually identifying a visitor without opening the unit entry door should be provided.

1025.5.2.1 Vision Lites. Vision lites, if provided should comply with Section 404.2.10.

1025.5.2.2 CCTV. Provide wiring and identify location of a CCTV system for future use if required by occupant. CCTV should comply with Section 1025.7.

1025.5.2.3 Voice Communication. Provide two-way voice communication complying with Section 1025.6.

1025.5.2.4 Peepholes. Peepholes should be placed at dual heights with a 200 degree direct view optical lense with a minimum 1-inch (25.4 mm) viewing area with privacy cover. The upper peephole for a standing position should be located 56.6 inches (1438 mm) to 70.3 inches (1786 mm) above the floor. The lower peephole for a seated position for people in wheelchairs and children, should be located 43.5 inches (1105 mm) to 51 inches (1295 mm) above the floor. A suggested average upper height is 60 inches (1524 mm) and an average lower height is 43 inches (1092 mm) above the floor. It is generally easier for a taller person to bend down slightly than a shorter person to raise themselves. See Section 310 Eye Levels.

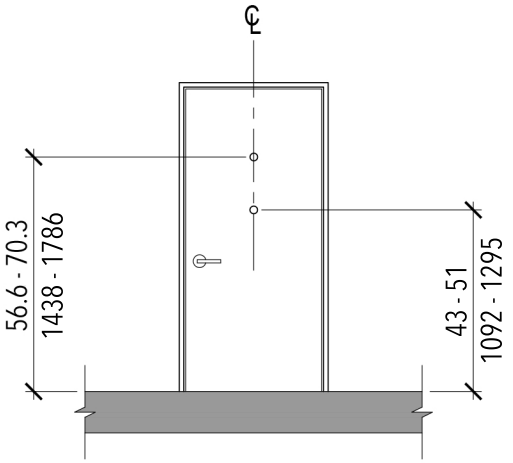

Fig. 1025.5.2.4
Peephole Heights

1025.6 Voice and Visual Communications. A system permitting voice and visual communication between a visitor and the occupant of the unit should be provided at locations throughout the unit and at the entry door and should comply with Section 1025.6.

1025.6.1 Public or Common-Use Interface. The public or common-use system interface should include the capability of supporting voice and visual communication with the unit interface.

1025.6.2 Unit Interface. The unit interface should include a telephone jack capable of supporting voice and TTY communication with the public or common-use system interface.

1025.7 Closed-Circuit Communication System. A closed-circuit communication system is recommended. The public or common-use system interface should comply with Section 1025.6.1, and the unit system interface in units that have communication features complying with Section 1025.6.2. See Section 1030 Remote Monitoring.

1025.8 Additional Communication Features. Provide wiring for adaptable emergency assistance alarm complying with Section 702.2, emergency signage if desired complying with Section 703.9, 703.10, 703.11, 703.12. Provide telephone, computer, television cable connections to all rooms. Consider a two-way communication system throughout dwelling complying with Section 708.

1025.8.1 Detectable Warnings and Surfaces. Provide detectable warning and surfaces as required by occupant complying with Section 705.

1025.8.1 Advisory. The occupant may desire warnings if they have limited sight or are blind, (e.g. glass slider leading to an exterior deck).

1025.8.2 Intercom. Provide voice communication with CCTV for identification of visitors at entry door complying with Section 708.4.

1025.8.3 Phone Lines. Volume control receivers, TTY's, hearing aid compatible phones, computers, and other equipment that uses a phone line should be capable of being connected in any room as required by occupant. Unit should be pre-wired throughout all rooms and spaces.

1025.8.4 Emergency Alarms. Provide emergency assistance alarms as required by occupant complying with Section 702.2. Unit should be pre-wired throughout including bathrooms, kitchens, garages, attics, basements and yards. Multisensory alarms should be provided, complying with Section 309.9, Section 1026.1, Section 1026.2, Section 1026.3 for fire, electrical and water emergencies. Other alarms are identified throughout the dwelling unit (e.g. laundry, bathroom, kitchen and utility rooms).

1026 Safety Systems. Safety systems should be multisensory, exceed code minimums and should comply with Section 1026.

1026.1 Fire Safety. In addition to complying with all fire safety code requirements, comply with Section 713. Childproofing should comply with Section 309.5. Provide an evacuation plan complying with Section 713.5 Provide in addition to code requirements, fire extinguishers in at least the kitchen, outside of bedroom area, garage, basement, attic and any other location where fire is a potential serious threat. Extinguishers should comply with Section 307, 308 and Section 309. Where knee and toe space is provided, the underside of a range or cooktop should be insulated or otherwise configured to protect from burns, abrasions, or electrical shock. Provide access to gas shutoffs complying with Section 308 and Section 309. Provide local shutoff and location of the main gas shutoff at critical locations throughout unit to increase safety (e.g. kitchen, laundry and utility rooms). Provide multisensory alarms complying with Section 309.9.

1026.2 Electrical Safety. Provide childproofing as necessary at all receptacles and GFI's anywhere near water or the potential of flooding or path of water overflow. Childproofing should comply with Section 309.5 (e.g. outlet covers and plates). Consider locating the electrical panel at the upper reach range height and include a child defeat lock on the panel complying with the NYC Electrical Code. Where knee and toe space is provided, wires or other electrical equipment should be insulated or otherwise configured to protect from electrical shock. Provide access to electrical panel boards and complying with Section 308 and Section 309. Provide a clear floor space centered on the electrical panel for a front approach complying with Section 305.3.1 Tier I. Provide local breakers and location of main breaker at critical locations throughout unit to increase safety (e.g. kitchen, bathroom, laundry and utility rooms). Provide multisensory alarms complying with 309.9.

1026.3 Water Safety. Provide GFI for all outlets in a kitchen and bathroom and any area in the house that may have a potential water hazard including basements, laundry areas, as well as any landscaping applications. Childproofing should comply with Section 309.5 (e.g. anti-scald devices). Provide water overflow, water temperature, continuous flow, alarms in bathrooms, laundry rooms, utility (e.g., low water cut-off alarm for hydronic heating and hot water heater) and other relevant areas. Provide access to local plumbing shutoffs and main shutoffs with location signage of the shutoff locations complying with Section 308 and Section 309.

1026.4 Personal Safety. Personal safety includes a variety of physical and cognitive concerns and the most effective means to identify, actuate alert and summon help. Devices and systems should be multisensory and comply with Section 309, accommodating user needs and preferences. Personal safety includes fire electrical and water safety as well as slipping, tripping, falling, bodily injury, disorientation, dexterity balance, sight, hearing, touch, entrapment, known and unknown medical conditions, and a wide variety of other types of emergencies. There are many devices available that are worn, carried, temporary and permanent unit installations.

1027 Lighting. Lighting is beyond the technical scope of the book, but rudimentary recommendations are included. It is a science and an art, accommodating individual changing needs and preferences, safety, health, functionality, aesthetics, physics, engineering, efficiency, building and landscape design, etc. Lighting is much more than luminance, it includes: intensity; color; pattern; focus; contrast; balance; ambient/spot/task lighting; direct/indirect lighting; direction; interior/exterior applications; maximizing natural light; full spectrum bulbs; quality; source type; fixtures/equipment; shade; glare reduction; surface reflectivity; wayfinding; security; warning/alarms; obstruction and edge detection; boundary/space/shape definition; shadow reduction; source shielding; manual operation (e.g., actuation switches and dimmers); automatic operation (e.g., hands free actuation, timers, motion and ambient light sensors, and adjustments for time of day, weather conditions and seasons) and much more. See Section 311 for additional information .

1028 HVAC. Provide controls complying with Section 309. Consider controls with visual, tactile and auditory characteristics. Provide the highest quality filters to reduce allergens and other pollution. Provide filter change indicators. Consider placing controls in at least two locations (e.g., hall and master bedroom or living room and master bedroom).

1029 Soundproofing. Consider soundproofing as a means to address noise pollution and for occupants that for various reasons may require low noise levels. Consider the use of sound cancelling technology.

1030 Automatic Remote Monitoring. An automatic remote monitoring system may operate via an internal remote or other devices such as a PDA, laptop, smartphone, web or cloud based, and other means through sight, sound and touch. It provides a practical means for many people to comfortably stay in their homes and safely age-in-place.

1030 Advisory. Safety and security are addressed through detection and operation. Indoor and outdoor temperature not only indicates freezing and excessive heat but raises questions concerning the cause. Heat and moisture will result in the formation of mold. Water leaks may be caused by rain penetrating the building's roof, broken windows, sheathing or from defective plumbing. A single water sensor may not alone provide enough information to determine the cause and the severity of the problem. Multiple sensors and a variety of types provide more information and accuracy while adding only minor additional costs to a whole dwelling unit/home system. Interfacing with automatic valve shut-offs and automatic appliance shut-offs takes the system from passive monitoring to a dynamic controllable system that can address an emergency remotely. Window sensors may indicate an intruder but a motion detector and camera will be able to provide verification. Appliance sensors will indicate activation. Remotely controlled locks are useful to make sure that the unit is secure and can be used to allow visitors to enter. Remotely controlling the lighting, outlets and HVAC system is very important and can reduce energy usage. Remote pool monitoring is recommended since it will add a much higher level of safety. Exterior ground sensors may be useful to alert those in flood prone areas of potential water damage.

1030.1 Detection. Detection utilizes cameras, microphones, a variety of sensors and automatic devices. Sensors may include: indoor/outdoor temperature, humidity, water leakage, smoke detection, carbon monoxide detection, ice, rain, frozen plumbing lines, window and door intrusion, plumbing fixture leaks, appliances, motion, even exterior flooding.

1030.2 Features. Features may include operation, detection, safety items, and security devices. Operation includes activation and deactivation of lights, HVAC, alarms, appliances, cameras, recording devices, locks, etc. Essentially all operable parts of the home can potentially be automated, even windows.

1030.2 Advisory. The system can go beyond just monitoring the physical unit and can be designed to monitor the occupant(s). This includes: vital signs, medication and dietary needs, even checking on pets. Notification should use a stepped alarm system that is visual, tactile and audible. See Section 309.9 Multisensory Alarms. It may utilize pre-recorded messages. The alarms may be tied into a central system, 911, 311 and other entities such as private home security companies and health care providers.

1031 Visitability. Visitability should comply with Section 1031.

1031 Advisory. Visitability requirements have been contained in previous bills before the House of Representatives, but most recently in HR 3260, the Eleanor Smith Inclusive Home Design Act 2015. HR 3260 requires newly constructed, federally assisted single family houses and townhouses to include at least one level that complies with the standard for Type C (Visitable) units found in *ICC/ANSI A117.1-2009*, Section 1005 and any future revisions. "Type C" units are covered in Section 1031. HR 3260 defines a "covered dwelling unit" as:

(A) a detached single family house, a townhouse or multi-level dwelling unit (whether detached or attached to other units or structures), or a ground-floor unit in a building of three or fewer dwelling units;

(B) designed as, or intended for occupancy as, a residence;

(C) designed, constructed, or commissioned, contracted or otherwise arranged for construction, by any person or entity who, at any time before the design or construction, received or was guaranteed Federal financial assistance for any program or activity; and

(D) available for first occupancy after the expiration of the one-year period beginning on the date of the enactment of this Act.
For other definitions, enforcement, and additional details of the bill see https://www.govtrack.us/congress/bills/114/hr3260/text.

1031.1 Primary Functions. Primary functions should be located on the entrance level of the unit. These include entry, habitable space, bathroom, kitchen area (optional) and storage (optional).

1031.1.1 Multi-Level Unit. Multilevel units should contain an interior stair complying with Section 1030.3.1. Type B+NYC multistory units in R-2 occupancy are required to comply with the *2014 NYCBC* Section 1107.2.5.

1031.2 Entrance. Entrance requirements should be met and inclusive by complying with Section 1002 and Section 1005. This includes a threshold level with the landing that is sloped to drain, notification device that is both visual, audible and tactile (e.g., activator with vibration complying with Section 708.7.1.2). Entry should not contain steps and should be located on an inclusive route from a public street or sidewalk, a dwelling unit driveway, or a garage. All rooms on the entrance level should be connected by a route complying with Section 1031.3.

1031.3 Routes

1031.3.1 Exterior Route. Route requirements should be met and inclusive by complying with Section 1003, 1004, 1005, 1006, 1007 and 1008. Consider visual, auditory and tactile characteristics complying with Section 302.6, 302.10 and 302.11. Routes include curb cuts, parking access aisles, walks and ramps.

1031.3.2 Interior Circulation Path. The interior circulation path should consist of one or more of the following elements: walking surfaces with a slope not steeper than 1:20; doors, doorways and gates; ramps; elevators; and platform lifts.

1031.3.2.1 Walking Surfaces. Walking surfaces with slopes not steeper than 1:20 should comply with Section 1004.

1031.3.2.2 Clear Width. The clear width of the circulation path should comply with Section 1003.4.

1031.3.2.3 Interior Stair. Interior stair, if provided, should comply with Section 1003.4.2.

1031.4 Interior Doors. Interior door requirement should be met and inclusive by complying with Section 1005. Consider visual and tactile contrasting doors, with the surrounding wall surfaces.

1031.5 Operable Parts. Operable parts including environmental controls, lighting controls, and outlets should be met and inclusive by complying with Section 309. Consider visual, tactile and auditory characteristics. Environmental controls should not be located directly above a counter, sink or appliance. Provide childproofing complying with Sect. 309.5. Provide multisensory alarms complying with Section 309.9. Consider automatic lighting.

1031.6 Habitable Space. Provide at least one indoor room that has an area of not less than 80 square feet (7.2 m^2) and contains no side or dimension narrower than 8 feet (2438 mm) and a minimum height of 8 feet (2438 mm). This may be a multi-purpose space where the ordinary functions of domestic life are carried on and which includes sleeping, living, study, recreation, food preparation, eating and other similar functions. Provide both adjustable general and task lighting.

1031.6 Advisory. The recommended habitable space is influenced by the *2014 NYC Building Code, Section BC 1208*. In particular, Section 1208.3, Habitable Rooms and Spaces: "Every habitable room or space shall have not less than 80 square feet (7.4 m^2) in net floor area." And section 1208.1 Minimum Room Widths: "Habitable spaces, other than a kitchen, shall not be less than 8 feet (2134 mm) in any plan dimension." The code contains exceptions. The federal visitability minimum requirements are less stringent with an area not less than 70 square feet and contains no side or dimension narrower than 7 feet, with a minimum height of 8 feet.

1031.7 Bathroom. Provide at least one bathroom that is inclusive that includes a clear floor space, lavatory, water closet and reinforcement that complies with Section 1030.7. Provide alarms complying with Section 309.9 (e.g., water leakage). Provide both adjustable general and task lighting.

1031.7.1 Clear Floor Space. Clear floor space requirements should be met and inclusive by complying with Section 1011.2.1 and 1011.3.

1031.7.2 Lavatory and Water Closet. Lavatory and water closet requirements should be met and inclusive by complying with Section 1011.5 and Section 1011.7 Provide automatic or single lever open side mounted controls.

1031.7.4 Bathtub. If a bathtub is provided, it should comply with Section 607.

1031.7.3 Shower. If a shower is provided it should comply with Section 608.1.

1031.7.5 Multipurpose bathing. If a multipurpose bathing compartment is provided it should comply with Section 608.2.

1031.8 Kitchen Area. A kitchen area should include a sink complying with Section 1012.4, a work surface complying with Section 1012.3, a range, cooktop, or microwave complying with Section 1012.6.4 or 1012.6.6, a refrigerator complying with Section 1012.6.7. Provide alarms complying with Section 309.9 (e.g., smoke, water and appliance). Provide both adjustable general and task lighting.

1031.9 Sleeping Area. Provide a sleeping area with a turning circle within the room, and a bed complying with Section 1013.1. A fixed frame bed should comply with Section 1013.1.2.1. An adjustable height frame bed should comply with Section 1013.1.2.2.

1031.10 Lighting Controls and Receptacle Outlets. Receptacle outlets and operable parts of lighting and HVAC controls should be locate 24 inches (610 mm) minimum and 48 inches (1220 mm) maximum above the floor.

1031.10 Storage. Storage should be provided and should comply with 1024. Storage may be multipurpose. Provide adjustable reconfigurable shelves. Provide automatic lighting.

1031.11 Windows. Operable windows should comply with Section 1023. Consider visual, tactile and auditory characteristics of the operable parts.

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