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## CHAPTER 7: COMMUNICATION ELEMENTS AND FEATURES

### 701 General

**701.1 Scope.** Communications features and *elements* required to be *accessible* by Chapter 2 shall comply with the applicable provisions of this chapter.

### 702 Fire Alarm Systems

**702.1 General.** Fire alarm systems required to be *accessible* shall have audible alarms complying with 702.2 and visual alarms complying with 702.3.

**EXCEPTION:** Fire alarm systems in medical care *facilities* shall be permitted to be modified to suit standard health care alarm practice.

**702.2 Audible Alarms.** Audible alarms shall produce a sound that exceeds the prevailing equivalent sound level in the room or *space* by 15 dBA minimum or exceeds any maximum sound level with a duration of 60 seconds by 5 dBA, whichever is louder. Sound levels for alarm signals shall not exceed 110 dBA.

**702.3 Visual Alarms.** Visual alarms shall comply with 702.3.

#### 702.3.1 Light Pulse Characteristics.

**702.3.1.1 Type.** The lamp shall be a xenon strobe type or equivalent.

**702.3.1.2 Color.** The color shall be clear or nominal white.

**702.3.1.3 Flash Rate.** The flash rate for an individual appliance shall be 1 Hz minimum and 2 Hz maximum over its rated voltage range.

Advisory 702.3.1.3
Flash rates that exceed five flashes per second may be disturbing to persons with a photosensitivity, particularly those with certain forms of epilepsy. Multiple, unsynchronized visual signals within a single <i>space</i> may produce a composite flash rate that could trigger a photoconvulsive response in such persons. Therefore, installations that may produce a composite rate in excess of 5 Hz should be avoided by decreasing the number of fixtures and raising the intensity of lamps they contain, by decreasing the flash rate of multiple lamps, or by synchronizing the flash rates of multiple fixtures.

**702.3.1.4 Pulse Duration.** The maximum pulse duration shall be two-tenths of one second with a maximum duty cycle of 40 percent. The pulse duration is defined as the time interval between initial and final points of 10 percent of maximum signal.

**702.3.2 Dispersion.** Light dispersion of wall installed appliances shall comply with Table 702.3.2.1. Light dispersion of ceiling installed appliances shall comply with Table 702.3.2.2.

**Table 702.3.2.1 Light Dispersion for Wall-Installed Visual Alarm Appliances**

Vertical Dispersion		Horizontal Dispersion	
Degrees from Horizontal	Percent of Rated	Degrees from Vertical	Percent of Rated
0	100	0	100
5 to 30	90	5 to 25	90
35	65	30 to 45	75
40	46	50	55
45	34	55	45
50	27	60	40
55	22	65	35
60	18	70	35
65	16	75	30
70	15	80	30
75	13	85	25
80	12	90	25
85	12		
90	12		

**Table 702.3.2.2 Light Dispersion for Ceiling-Installed Visual Alarm Appliances**

Degrees from Vertical	Percent of Rated
0	100
5 to 25	90
30 to 45	75

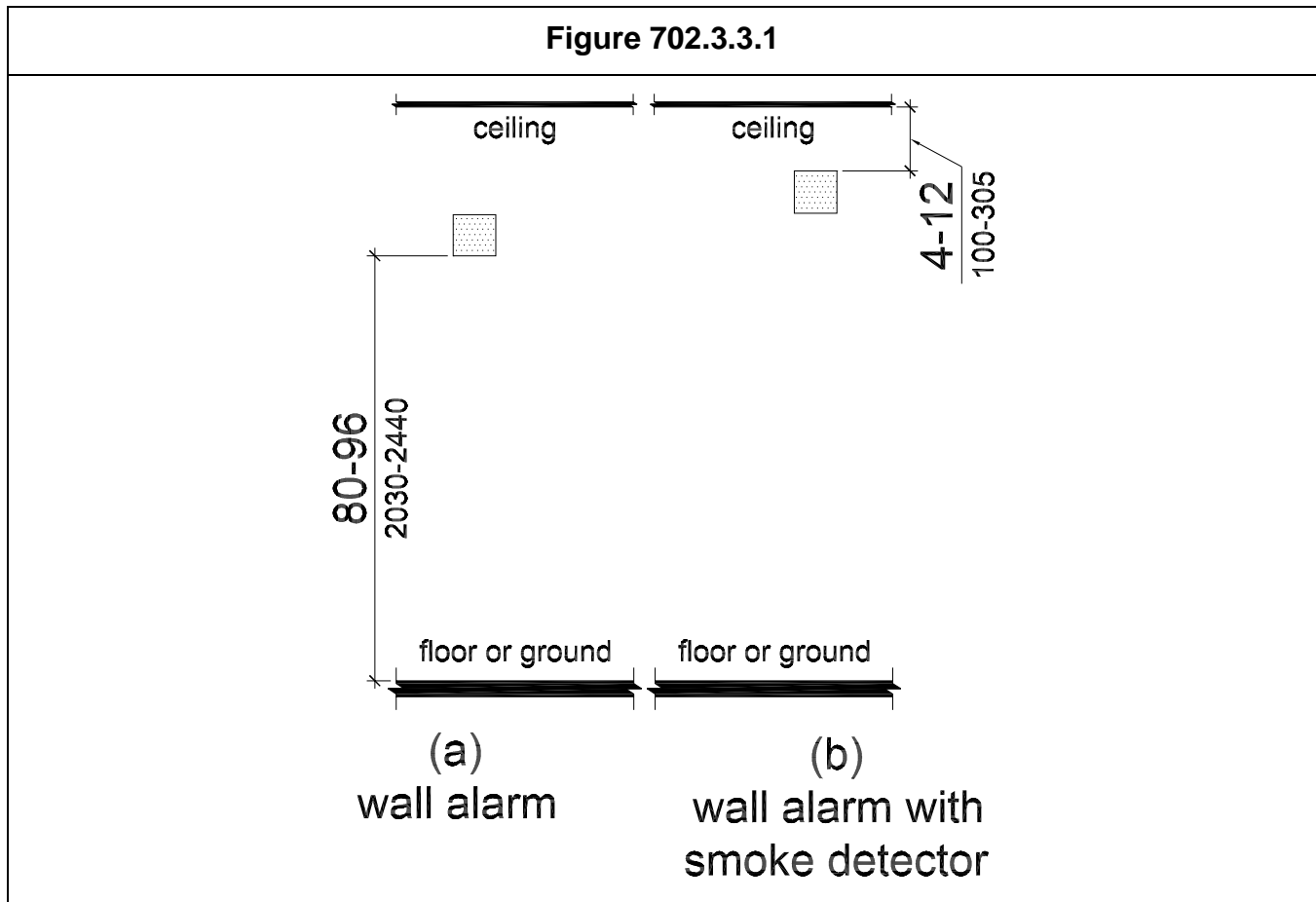
**Table 702.3.2.2 Light Dispersion for Ceiling-Installed Visual Alarm Appliances**

Degrees from Vertical	Percent of Rated
50	55
55	45
60	40
65	35
70	35
75	30
80	30
85	25
90	25

**702.3.3 Location.** Appliances shall be located in accordance with 702.3.3.1 or 702.3.3.2.

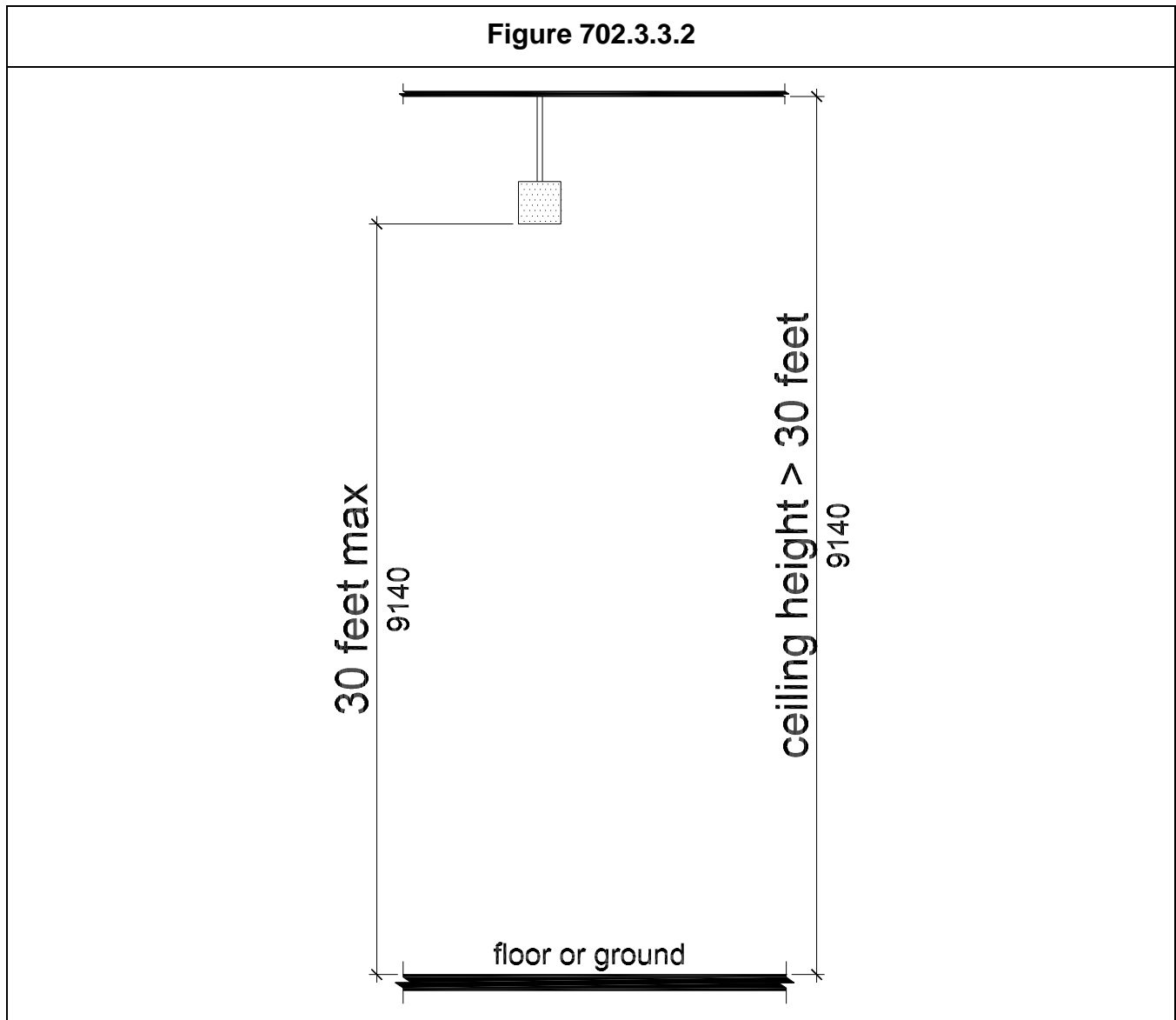
**EXCEPTION:** Appliances in guest rooms shall comply with 702.3.6.

**702.3.3.1 Wall Installed Appliances.** Appliances shall be located 80 inches (2030 mm) minimum and 96 inches (2440 mm) maximum above the finished floor or ground measured to the bottom of the appliance.



**EXCEPTION:** Wall installed appliances which are part of a smoke detector shall be located 4 inches (100 mm) minimum and 12 inches (305 mm) maximum below the ceiling measured to the top of the smoke detector.

**702.3.3.2 Ceiling-Installed Appliances.** Appliances shall be on the ceiling. Where ceiling height exceeds 30 feet (9140 mm), appliances shall be suspended from the ceiling to a height of 30 feet (9140 mm) maximum above the finished floor or ground.



**702.3.4 Spacing Allocation and Minimum Intensity.** Spacing and minimum effective intensity for appliances shall comply with 702.3.4.

- EXCEPTIONS:**
1. Appliances in corridors not more than 20 feet (6100 mm) in width shall comply with 702.3.5.
  2. Appliances in guest rooms shall comply with 702.3.6.

**702.3.4.1 General.** The signal provided by the appliance or appliances shall be visible either by direct view or by reflection from all parts of the covered area. Multiple appliances within an area are permitted only where size, shape, *building* construction or furnishings prohibit total coverage by a single appliance. Where multiple appliances are provided in a single area to provide total area coverage, the appliances shall comply with one of the following: a maximum of two appliances located on opposite walls; the appliances shall have synchronized flashes; or, in rooms 80 feet (24 m) by 80 feet (24 m) or greater in size, more than two appliances located such that all appliances in any 135-degree field of view are spaced a minimum of 55 feet (17 m) from each other.

**702.3.4.2 Wall Installed Appliances.** Spacing and minimum effective intensity for wall installed appliances shall be in accordance with Table 702.3.4.2 provided the appliance is located at the midpoint of the longest side of the area served. Where the appliance is not located at the midpoint, the minimum effective intensity shall be based on a maximum area of coverage equal to the distance to the opposite side of the area served or double the distance to the farthest adjacent side of the area served, whichever is greater.

**Table 702.3.4.2 Spacing Allocation for Wall-Installed Visual Alarm Appliances**

Maximum Area of Coverage in Feet	Minimum Required Light Output (Effective Intensity) (candela)		
	One Light per Area	Two Lights per Area	Four Lights per Area
20 X 20 (6100 X 6100 mm)	15	Not Permitted	Not Permitted
30 X 30 (9140 X 9140 mm)	30	15	Not Permitted
40 X 40 (12 X 12 m)	60	30	Not Permitted
50 X 50 (15 X 15 m)	95	60	Not Permitted
60 X 60 (18 X 18 m)	135	95	Not Permitted
70 X 70 (21 X 21 m)	185	95	Not Permitted
80 X 80 (24 X 24 m)	240	135	60
90 X 90 (27 X 27 m)	305	185	95

**Table 702.3.4.2 Spacing Allocation for Wall-Installed Visual Alarm Appliances**

Maximum Area of Coverage in Feet	Minimum Required Light Output (Effective Intensity) (candela)		
	One Light per Area	Two Lights per Area	Four Lights per Area
100 X 100 (30 X 30 m)	375	240	95
110 X 110 (34 X 34 m)	455	240	135
120 X 120 (37 X 37 m)	540	305	135
130 X 130 (40 X 40 m)	635	375	185

**702.3.4.3 Ceiling Installed Appliances.** Spacing and minimum effective intensity for ceiling installed appliances shall be in accordance with Table 702.3.4.3 provided the appliance is located at the centerpoint of the area served. Where the appliance is not located at the centerpoint, the minimum effective intensity shall be based on a maximum area of coverage equal to two times the distance from the appliance to the farthest side of the area served.

**Table 702.3.4.3 Spacing Allocation for Ceiling-Installed Visual Alarm Appliances**

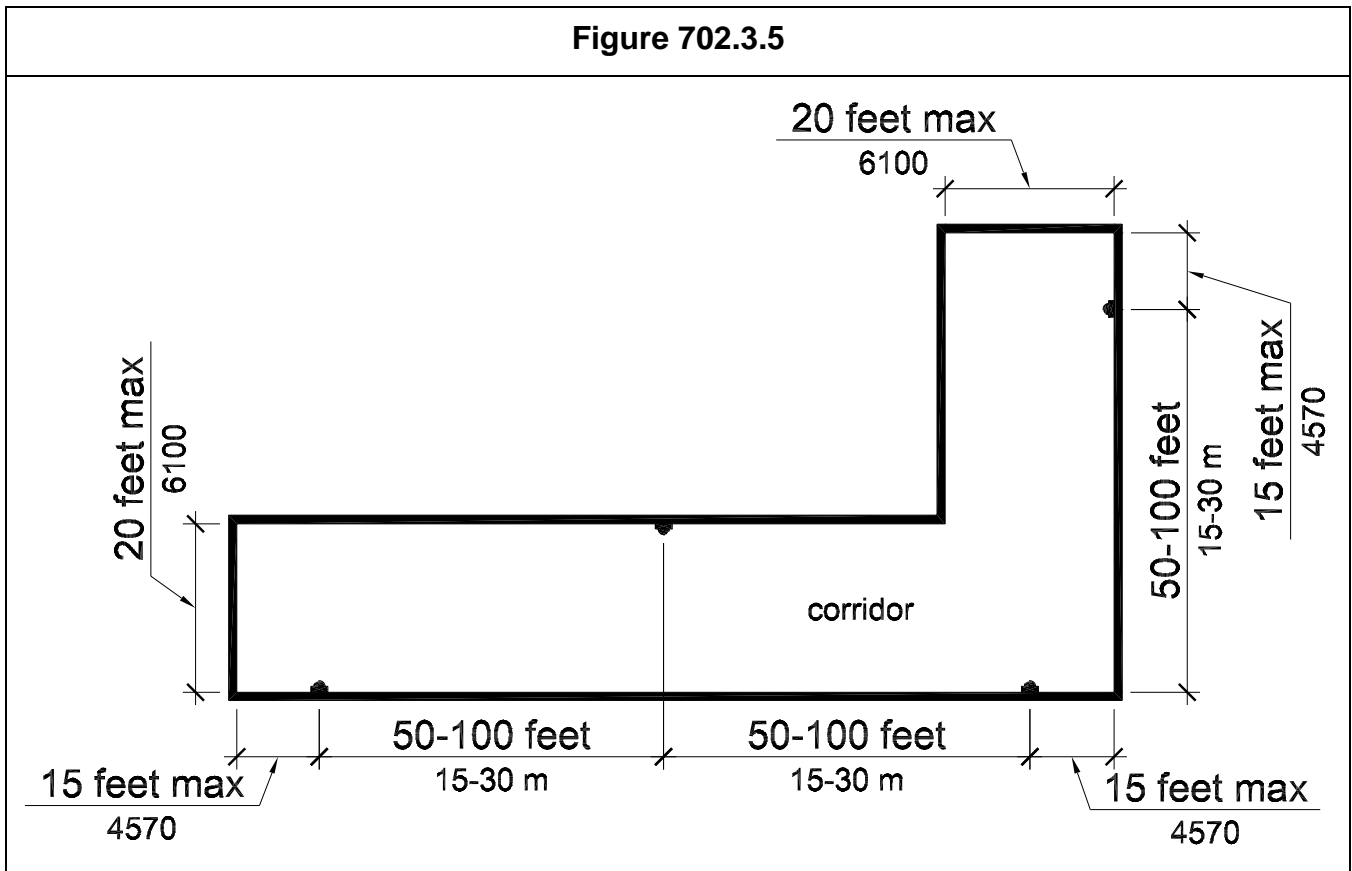
Maximum Area of Coverage in Feet	Minimum Required Light Output (Effective Intensity) (candela)	
	Maximum Ceiling Height in Feet	One Light
20 X 20 (6100 X 6100 mm)	10 (3050 mm)	15
30 X 30 (9140 X 9140 mm)	10 (3050 mm)	30
40 X 40 (12 X 12 m)	10 (3050 mm)	60
50 X 50 (15 X 15 m)	10 (3050 mm)	95
20 X 20 (6100 X 6100 mm)	20 (6100 mm)	30
30 X 30 (9140 X 9140 mm)	20 (6100 mm)	45
40 X 40 (12 X 12 m)	20 (6100 mm)	80
50 X 50 (15 X 15 m)	20 (6100 mm)	115
20 X 20 (6100 X 6100 mm)	30 (9140 mm)	55
30 X 30 (9140 X 9140 mm)	30 (9140 mm)	75

**Table 702.3.4.3 Spacing Allocation for Ceiling-Installed Visual Alarm Appliances**

Maximum Area of Coverage in Feet	Minimum Required Light Output (Effective Intensity) (candela)	
	Maximum Ceiling Height in Feet	One Light
40 X 40 (12 X 12 m)	30 (9140 mm)	115
50 X 50 (15 X 15 m)	30 (9140 mm)	150

**702.3.5 Corridor Spacing Allocation and Minimum Intensity.** Appliances in corridors that are 20 feet (6100 mm) maximum in width shall comply with 702.3.5. Corridors exceeding 20 feet (6100 mm) in width shall comply with 702.3.4.

**Figure 702.3.5**



**702.3.5.1 Appliance Spacing.** Appliances shall be located 15 feet (4570 mm) maximum from each end of the corridor and shall be located 50 feet (15 m) minimum and 100 feet (30 m) maximum apart along the corridor. Interruptions to the concentrated viewing path by doors, elevation changes or other obstructions shall constitute the end of a corridor for purposes of this section.



**702.3.5.2 Minimum Effective Intensity.** Appliances shall have a minimum effective intensity of 15 candela.

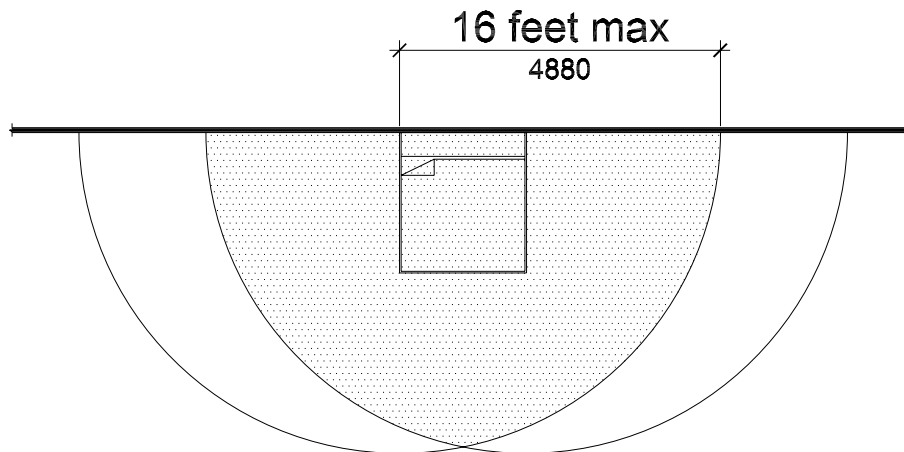
**702.3.6 Guest Rooms.** Guest rooms required to have visual alarms shall comply with 702.3.6.

**702.3.6.1 Activation.** Where single or multiple-station smoke detectors are provided in the sleeping room or suite, a visual alarm that is activated upon activation of the smoke detectors shall be provided within the room or suite. Where a *building* fire alarm system is provided, a visual alarm that is activated upon activation of the *building* fire alarm system shall be provided within the room or suite. The signaling line or channel between the activating device of the appliance and the *building* fire alarm system shall be monitored for integrity by the *building* fire alarm system. Where the same appliance is used for visual notification of smoke detector and fire alarm system activation, activation of the room or suite smoke detectors shall not activate the *building* fire alarm system.

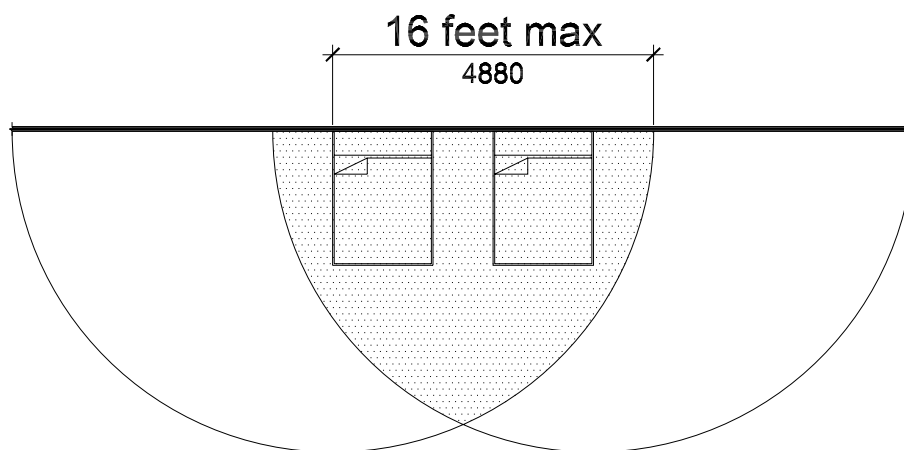
**702.3.6.2 Location.** In sleeping rooms or suites, appliances shall be permanently installed at a location where alarm signals shall be visible, directly or by reflection, in all parts of the room or suite. In sleeping rooms the appliance shall be located 16 feet (4880 mm) maximum from the

head end of the bed location, measured horizontally. Where a suite contains more than one sleeping room, an appliance shall be provided in each sleeping room.

**Figure 702.3.6.2**



(a)



(b)

**702.3.6.3 Minimum Effective Intensity and Mounting Height.** Wall installed appliances located 24 inches (610 mm) minimum below the ceiling shall have a minimum effective intensity of 110 candela. Ceiling installed appliances and wall installed appliances located less than 24 inches (610 mm) below the ceiling shall have a minimum effective intensity of 177 candela.

## 703 Signs

**703.1 General.** *Signs* required to be *accessible* shall comply with 703.

**703.2 Characters that are Both Tactile and Visual.** *Characters* required to be *tactile* shall comply with 703.2. *Tactile characters* shall be duplicated in Braille complying with 703.5.

**EXCEPTION:** *Tactile characters* shall be permitted to comply with 703.3, where separate visual *characters* complying with 703.4 provide the same information.

**703.2.1 Finish and Contrast.** *Characters* and their background shall have a non-glare finish. *Characters* shall contrast with their background with either light *characters* on a dark background or dark *characters* on a light background.

**703.2.2 Tactile Characters.** *Tactile characters* shall be raised 1/32 inch (0.8 mm) minimum above their background. Raised borders and decorative *elements* that are not required shall be separated 3/8 inch (9.5 mm) minimum from *tactile characters*.

**703.2.3 Character Forms.** Fonts shall have *characters* complying with 703.2.3.

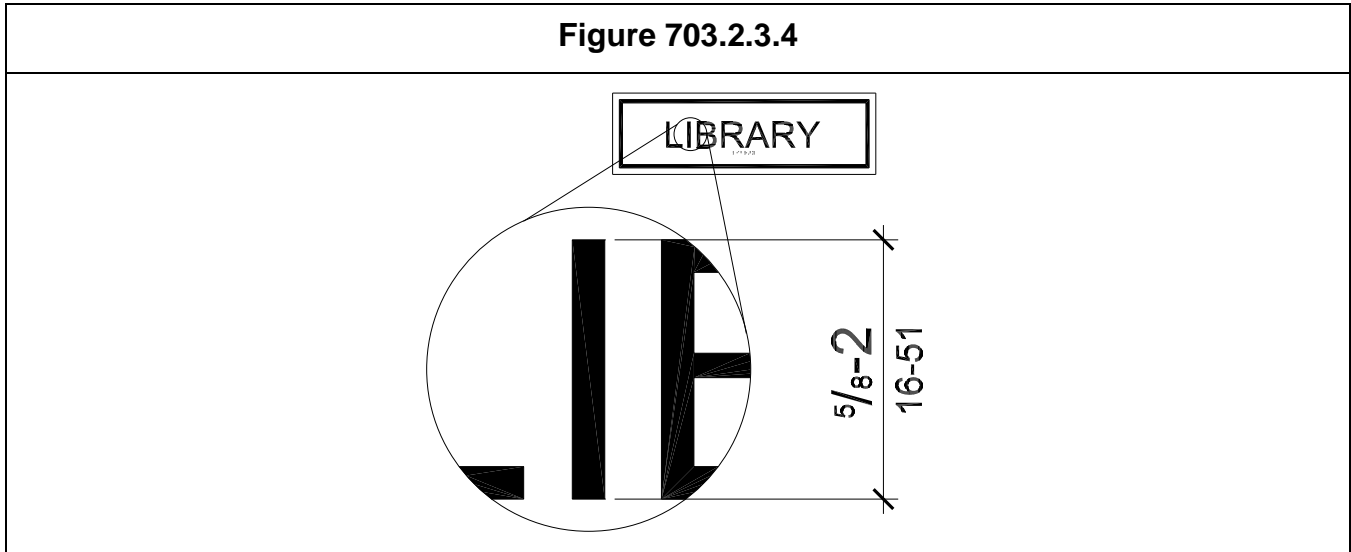
**703.2.3.1 Case.** *Characters* shall be uppercase.

**703.2.3.2 Style.** *Characters* shall be sans serif. *Characters* shall not be italic, oblique, script, highly decorative, or of other unusual forms.

**703.2.3.3 Width.** *Character* width shall be 55 percent minimum and 110 percent maximum the height of the *character* with the width based on the uppercase letter "O" and the height based on the uppercase letter "I".

**703.2.3.4 Height.** *Character* height measured vertically from the baseline of the *character* shall be 5/8 inch (16 mm) minimum and 2 inches (51 mm) maximum based on the uppercase letter "I".

**Figure 703.2.3.4**

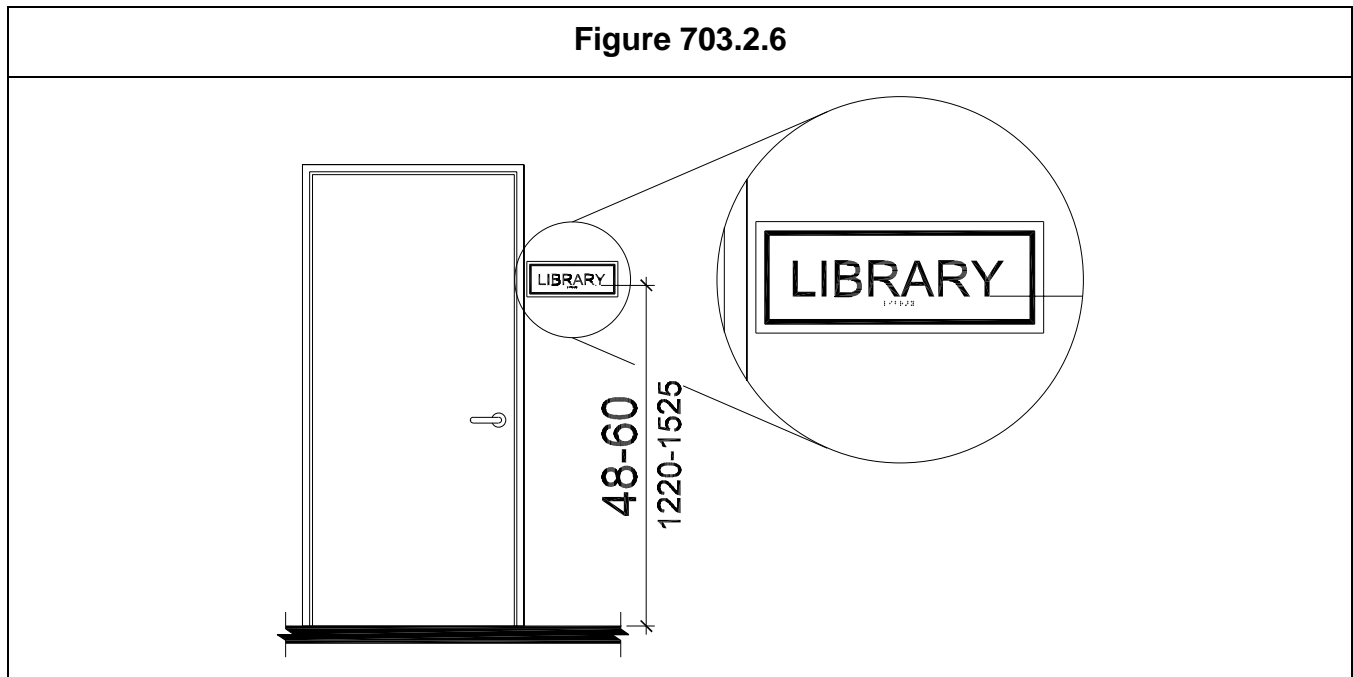


**703.2.3.5 Stroke Thickness.** For *characters* with rectangular cross sections, the stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 15 percent maximum of the height of the *character*. For *characters* with other cross sections, the stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 30 percent maximum of the height of the *character* measured at the base of the cross section. Stroke thickness at the top of the cross section shall be 15 percent maximum of the height of the *character*.

**703.2.4 Character Spacing.** *Character* spacing shall be measured between the two closest points of adjacent *characters* within a message, excluding word *spaces*. Where *characters* have rectangular cross sections, spacing between individual *characters* shall be 1/8 inch (3 mm) minimum to 3/8 inch (10 mm) maximum. Where *characters* have other cross sections, spacing between individual *characters* shall be 1/16 inch (2 mm) minimum to 3/8 inch (10 mm) maximum at the base of the cross sections and 1/8 inch (3 mm) to 3/8 inch (10 mm) maximum at the top of the cross sections.

**703.2.5 Line Spacing.** Spacing between the baselines of separate lines of *characters* in a sentence or paragraph shall be 135 percent minimum and 170 percent maximum of the *character* height.

**703.2.6 Mounting Height.** *Characters* shall be located 48 inches (1220 mm) minimum and 60 inches (1525 mm) maximum above the adjacent floor or ground surface measured from the baseline of the *characters*.

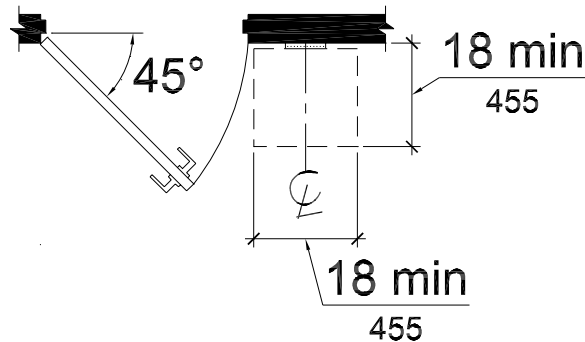


**EXCEPTION:** This requirement shall not apply to elevator car controls.

**703.2.7 Mounting Location.** Where a *sign* containing *tactile characters* is provided at a door, the *sign* shall be located alongside the door at the latch side. Where a *tactile sign* is provided at double doors, the *sign* shall be located to the right of the right hand door. Where there is no wall *space* at the latch side of a single door or to the right side of double doors, *signs* shall be located on the nearest adjacent wall. *Signs* containing *tactile characters* shall be located so that a clear floor *space*

of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the *sign*, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

**Figure 703.2.7**



**EXCEPTION:** *Signs* shall be permitted on the push side of doors with closers and without hold-open devices.

**703.3 Tactile Characters.** Where *tactile characters* are required and separate *tactile* and visual *characters* with the same information are provided, *tactile characters* shall comply with 703.3 and visual *characters* shall comply with 703.4. *Tactile characters* shall be duplicated in Braille complying with 703.5.

**703.3.1 Tactile Characters.** *Tactile characters* shall be raised 1/32 inch (0.8 mm) minimum above their background. Raised borders and decorative *elements* that are not required shall be separated 3/8 inch (9.5 mm) minimum from *tactile characters*.

**703.3.2 Character Forms.** Fonts shall have *characters* complying with 703.3.2.

**703.3.2.1 Case.** *Characters* shall be uppercase.

**703.3.2.2 Style.** *Characters* shall be sans serif. *Characters* shall not be italic, oblique, script, highly decorative, or of other unusual forms.

**703.3.2.3 Width.** *Character* width shall be 55 percent minimum and 110 percent maximum the height of the *character* with the width based on the uppercase letter "O" and the height based on the uppercase letter "I".

**703.3.2.4 Height.** *Character* height measured vertically from the baseline of the *character* shall be 1/2 inch (13 mm) minimum and 3/4 inch (19 mm) maximum based on the height of the uppercase letter "I".

**703.3.2.5 Stroke Thickness.** Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the *character*.

**703.3.3 Character Spacing.** *Character* spacing shall be measured between the two closest points of adjacent *character* within a message, excluding word *spaces*. Spacing between individual *characters* shall be 1/8 inch (3 mm) minimum to 1/4 inch (6 mm) maximum.

**703.3.4 Line Spacing.** Spacing between the baselines of separate lines of *characters* within a message shall be 135 percent minimum and 170 percent maximum of the *character* height.

**703.3.5 Mounting Height.** *Characters* shall be located 48 inches (1220 mm) minimum and 60 inches (1525 mm) maximum above the adjacent floor or ground surface, measured from the baseline of the *characters*.

**EXCEPTION:** This requirement shall not apply to elevator car controls.

**703.3.6 Mounting Location.** Where a *tactile sign* is provided at a door, the *sign* shall be located alongside the door at the latch side. Where a *tactile sign* is provided at double doors, the *sign* shall be located to the right of the right hand door. Where there is no wall *space* at the latch side of a single door or to the right side of double doors, *signs* shall be located on the nearest adjacent wall. *Signs* containing *tactile characters* shall be located so that a clear floor *space* of 18 inches (455 mm) by 18 inches (455 mm) minimum, centered on the *sign*, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

**EXCEPTION:** *Signs* shall be permitted on the push side of doors with closers and without hold-open devices.

**703.4 Visual Characters.** Visual *characters* required to be *accessible* shall comply with 703.4.

**703.4.1 Finish and Contrast.** *Characters* and their background shall have a non-glare finish. *Characters* shall contrast with their background with either light *characters* on a dark background or dark *characters* on a light background.

#### Advisory 703.4.1

*Signs* are more legible for persons with low vision when *characters* contrast with their background by approximately 70 percent.

Contrast in percent can be determined by:  $\text{contrast} = [(B1-B2)/B1] \times 100$  where B1=light reflectance value (LRV) of the lighter area and B2=light reflectance value (LRV) of the darker area.

Note: in any application both white and black are never absolute; thus B1 never equals 100 and B2 is always greater than zero.

**703.4.2 Character Forms.** Fonts shall have *characters* complying with 703.4.2.

**703.4.2.1 Case.** *Characters* shall be uppercase or lowercase or a combination of both.

**703.4.2.2 Style.** *Characters* shall be conventional in form. *Characters* shall not be italic, oblique, script, highly decorative, or of other unusual forms.

**703.4.2.3 Width.** *Character* width shall be 55 percent minimum and 110 percent maximum the height of the *character* with the width based on the uppercase letter "O" and the height based on the uppercase letter "I".

**703.4.2.4 Height.** Minimum *character* height measured from the baseline of the *character* shall comply with Table 703.4.2.4 based on the height of the *characters* above the finished floor of the viewing location and the minimum viewing distance. *Character* height shall be based on the uppercase letter "I". Minimum viewing distance shall be measured as the horizontal distance where an obstruction prevents further approach towards the *sign*.

**Table 703.4.2.4 Visual Character Dimensions**

Height of Floor to Baseline of Character	Minimum Viewing Distance	Minimum Character Height
less than 40 inches (100 mm) <sup>1</sup>		
40 inches (100 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)
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 (75 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

1. not permitted except in elevators

**703.4.2.5 Stroke Thickness.** Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 30 percent maximum of the height of the *character*.

**703.4.3 Character Spacing.** *Character* spacing shall be measured between the two closest points of adjacent *characters*, excluding word spaces. Spacing between individual *characters* shall be 10 percent minimum and 35 percent maximum of *character* height.



**703.4.4 Line Spacing.** Spacing between the baselines of separate lines of *characters* shall be 135 percent minimum and 170 percent maximum of the *character* height.

**703.4.5 Mounting Height.** Visual *characters* shall be located 40 inches (1015 mm) minimum above the floor of the viewing position. Mounting heights shall comply with Table 703.4.2.4 based on the size of the *characters* on the *sign*.

**703.5 Braille.** *Tactile characters* shall be accompanied by Grade II Braille complying with Table 703.5 and 703.5. Braille dots shall have a domed or rounded shape.

**Table 703.5 Braille Dimensions**

Measurement Range	Minimum in Inches	Maximum in Inches
Dot base diameter	0.059 (1.5 mm)	0.063 (1.6 mm)
Distance between two dots in the same cell <sup>1</sup>	0.090 (2.3 mm)	0.100 (2.5 mm)
Distance between corresponding dots in adjacent cells <sup>1</sup>	0.241 (6.1 mm)	0.300 (7.6 mm)
Dot height	0.025 (0.6 mm)	0.037 (0.9 mm)
Distance between corresponding dots from one cell directly below <sup>1</sup>	0.395 (10 mm)	0.400 (10.2 mm)

1. measured center to center

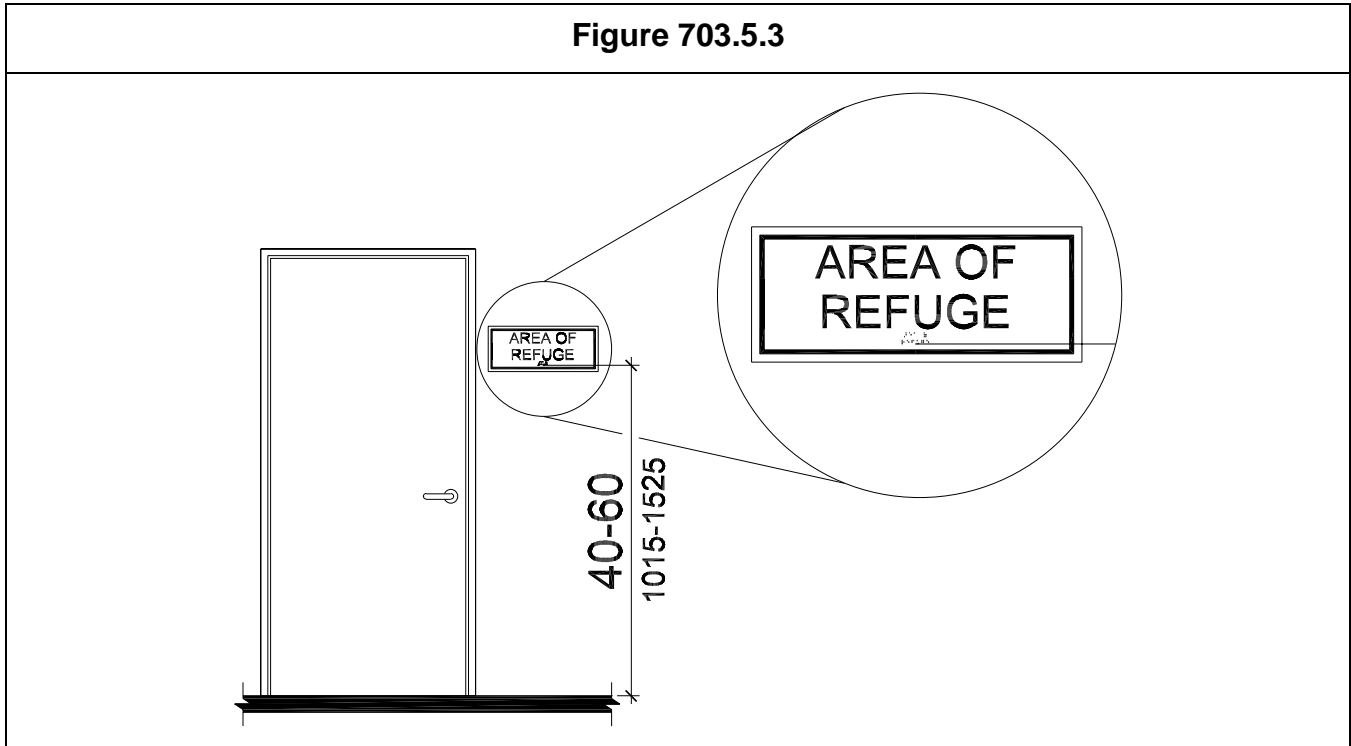
**703.5.1 Location.** Braille shall be located below the corresponding text. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 1/4 inch (6.4 mm) minimum from any other *tactile characters*.

**EXCEPTION:** Braille provided on elevator car controls shall be separated 3/16 inch (4.8 mm) minimum and shall be located either directly below or adjacent to the corresponding *tactile characters* or symbols.

**703.5.2 Raised Borders and Decorative Elements.** Raised borders and decorative *elements* that are not required, shall be separated 3/8 inch (9.5 mm) minimum from Braille.

**703.5.3 Height.** Braille shall be located 40 inches (1015 mm) minimum and 60 inches (1525 mm) maximum above the floor measured from the baseline of the Braille cells.

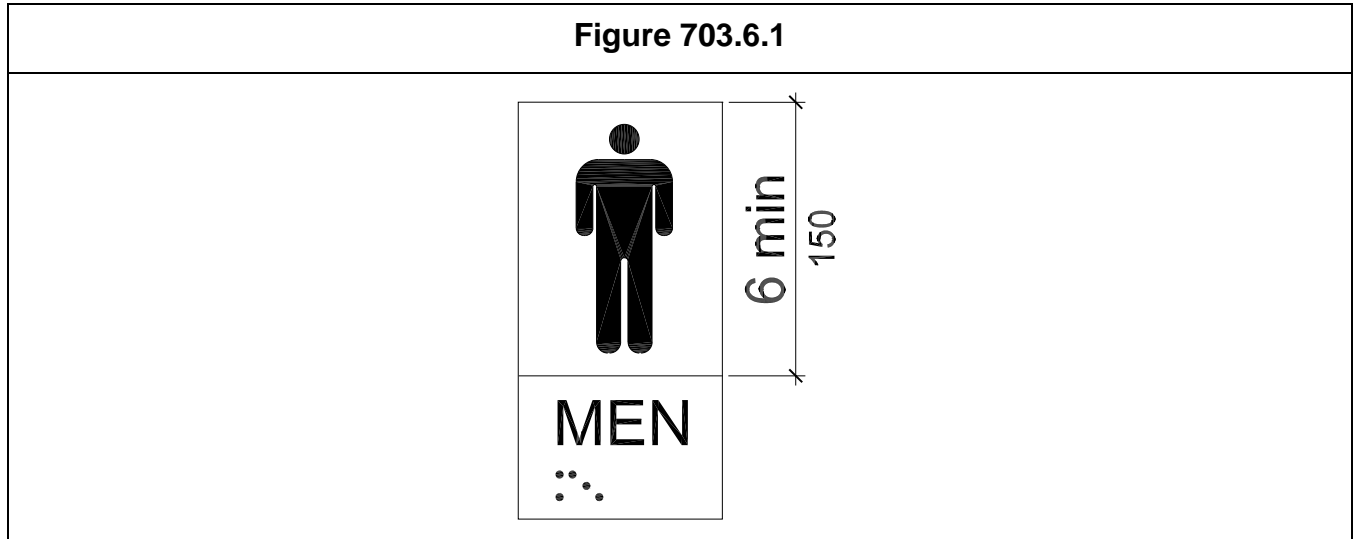
**Figure 703.5.3**



**EXCEPTION:** This requirement shall not apply to elevator car controls.

**703.6 Pictograms.** Where *pictograms* are required to be *accessible*, they shall comply with 703.6.

**703.6.1 Pictogram Field.** *Pictograms* shall have a field height of 6 inches (150 mm) minimum. *Characters* or Braille shall not be located in the *pictogram* field.



**703.6.2 Finish and Contrast.** *Pictograms* and their field shall have a non-glare finish. *Pictograms* shall contrast with their field with either a light *pictogram* on a dark field or a dark *pictogram* on a light field.

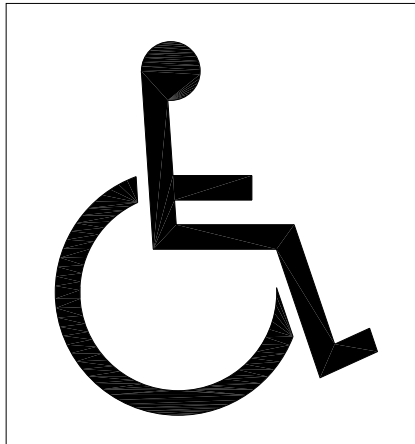
**703.6.3 Text Descriptors.** Where text descriptors for *pictograms* are required, they shall be located directly below or adjacent to the *pictogram* and shall comply with 703.2.

**703.7 Symbols of Accessibility.** Where symbols of accessibility are required, they shall comply with 703.7.

**703.7.1 Finish and Contrast.** Symbols of accessibility and their background shall have a non-glare finish. Symbols of accessibility shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.

**703.7.2 Symbols.**

**703.7.2.1 International Symbol of Accessibility.** Where the International Symbol of Accessibility is required, it shall comply with Figure 703.7.2.1.

**Figure 703.7.2.1**

**703.7.2.2 International Symbol of TTY.** Where the International Symbol of TTY is required, it shall comply with Figure 703.7.2.2.

**Figure 703.7.2.2**

**703.7.2.3 Volume Controlled Telephones.** Telephones required to have a volume control shall be identified by a *sign* containing a *pictogram* of a telephone handset with radiating sound waves on a square field such as shown in Figure 703.7.2.3.

**Figure 703.7.2.3**



**703.7.2.4 Assistive Listening Systems.** Where assistive listening systems are required to be identified by the International Symbol of Access for Hearing Loss, it shall comply with Figure 703.7.2.4.

**Figure 703.7.2.4**

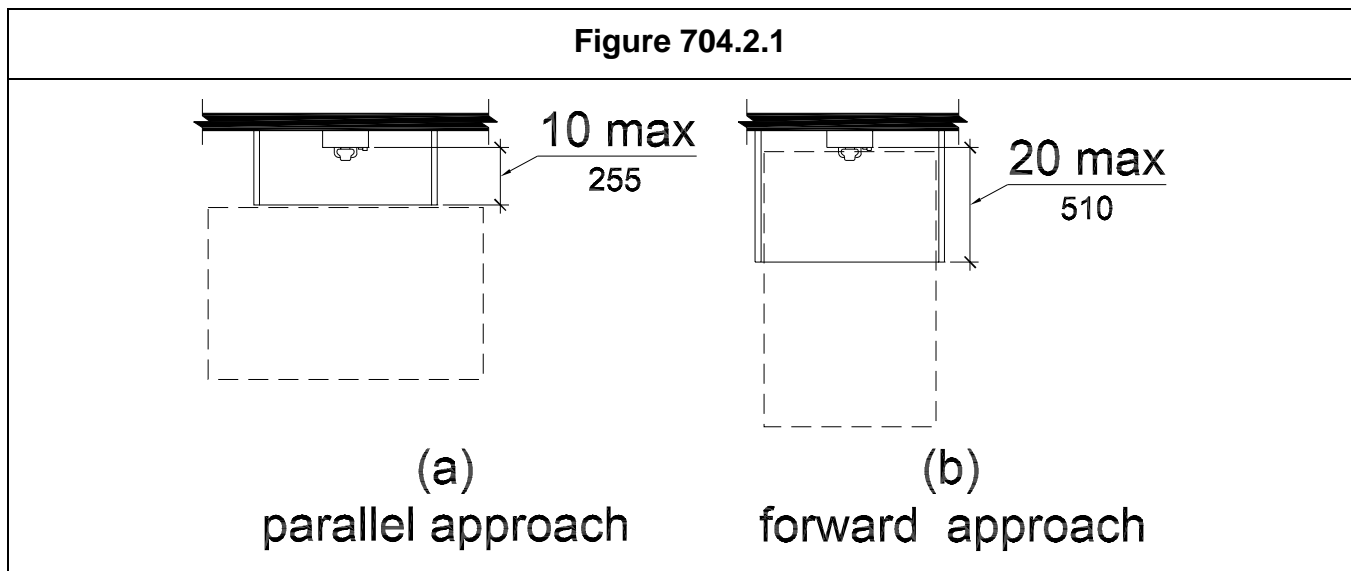


## 704 Telephones

**704.1 General.** Public telephones required to be *accessible* shall comply with 704.

**704.2 Wheelchair Accessible Telephones.** Public telephones required to be *wheelchair accessible* shall comply with 704.2.

**704.2.1 Clear Floor or Ground Space.** A clear floor or ground *space* complying with 305 shall be provided. The clear floor or ground *space* shall not be restricted 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 unit shall be 10 inches (255 mm) maximum.

**704.2.1.2 Forward Approach.** Where a forward approach is provided, the distance from the front edge of a counter within the telephone enclosure to the face of the telephone unit shall be 20 inches (510 mm) maximum.

**704.2.2 Operable Parts.** *Operable parts* shall comply with 309. Telephones shall have push-button controls where service for such equipment is available.

**704.2.3 Protruding Objects.** Telephones, enclosures and related equipment shall comply with 307.

**704.2.4 Telephone Directories.** Telephone directories, where provided, shall be located in accordance with 309.

**704.2.5 Cord Length.** The cord from the telephone to the handset shall be 29 inches (735 mm) long minimum.

**704.3 Volume Control Telephones.** Public telephones required to have volume controls shall be equipped with a receive volume control that provides a gain adjustable up to a minimum of 20 dB. For incremental volume control, provide at least one intermediate step of 12 dB of gain. An automatic reset shall be provided.

#### **Advisory 704.3**

Amplifiers on pay phones are located in either the base or the handset and are built into the telephone. Most are located in the base and are operated by pressing a button or key. If the microphone in the handset is not being used, a mute button that temporarily turns it off also reduces the amount of background noise which the person hears in the earpiece. If a volume adjustment is provided that allows the user to set the level anywhere from zero to the upper requirement of 20 dB, there is no need to specify a lower limit. If a stepped volume control is provided, one of the intermediate levels must provide 12 dB of gain. Consider compatibility issues when matching an amplified handset with a phone or phone system. Amplified handsets that can be switched with pay telephone handsets are available. Portable and in-line amplifiers can be used with some phones but are not practical at most public phones covered by this document.

**704.4 TTYs.** *TTYs* required at a public pay telephone shall be permanently affixed within or adjacent to the telephone enclosure. Where an acoustic coupler is used, the telephone cord shall be sufficiently long to allow connection of the *TTY* and the telephone receiver. *Operable parts* of *TTYs* and the telephones they serve shall comply with 309.

#### **Advisory 704.4**

Designers are encouraged to ensure that sufficient electrical service is available where *TTYs* are to be installed.

**704.4.1 Clearances.** Clear floor *space* positioned for a forward approach shall be provided. Knee and toe clearance complying with 306 shall be provided below the *TTY*. When in use, the touch surface of *TTY* keypads shall be 30 inches (760 mm) minimum and 34 inches (865 mm) maximum above the finish floor.

**EXCEPTION:** In assembly occupancies, 50 percent plus or minus one *TTY*, shall not be required to comply with 704.4.1 provided that the *TTY* has a seat.

#### **Advisory 704.1.1 Exception**

*Facilities* covered by this section may include, but are not limited to, airports and other passenger terminals or stations, courts, art galleries and convention centers.

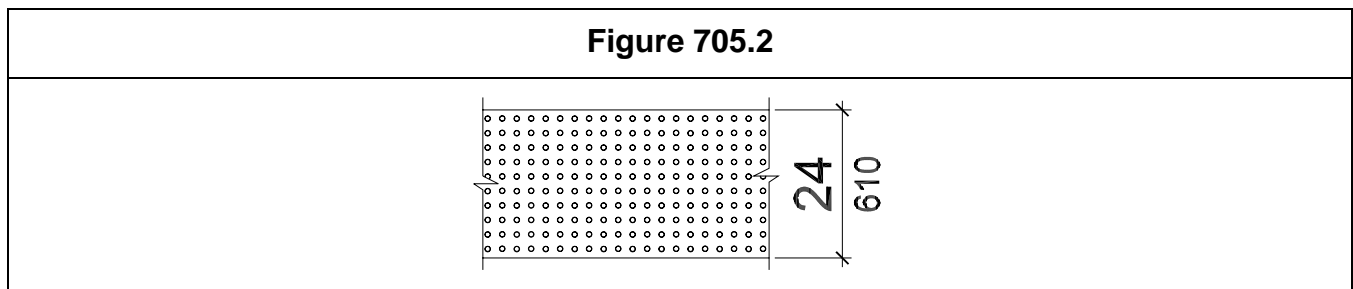
**704.5 TTY Shelf.** Public pay telephones required to accommodate portable *TTYs* shall be equipped with a shelf and an electrical outlet within or adjacent to the telephone enclosure. The telephone handset shall be capable of being placed flush on the surface of the shelf. The shelf shall be capable of

accommodating a TTY and shall have 6-inch (150 mm) minimum vertical clearance in the area where the TTY is to be placed.

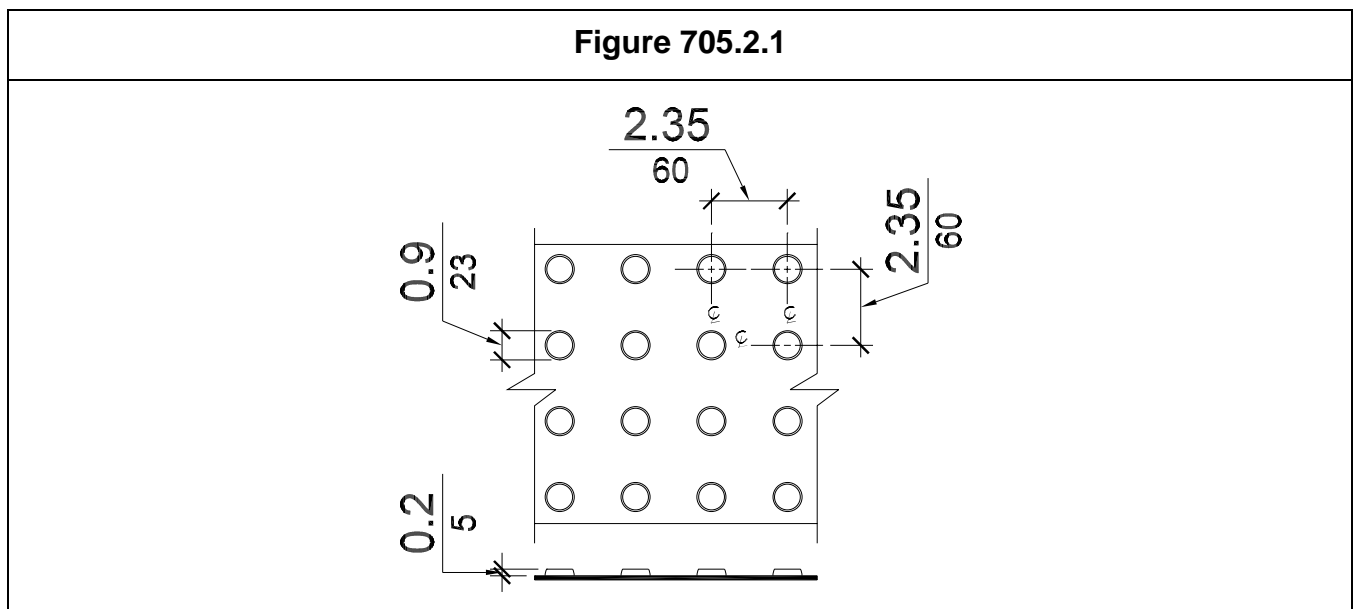
**705 Detectable Warnings**

**705.1 General.** *Detectable warnings* required on platform edges shall comply with 705.2, 705.3 or 705.4.

**705.2 Truncated Domes.** A 24-inch (610 mm) wide truncated dome surface complying with 705.2 shall be provided on the walking surface at the platform edge.



**705.2.1 Dome Size.** Domes shall have a diameter of 0.9 inch (23 mm), a height of 0.2 inch (5 mm) and a center-to-center spacing of 2.35 inches (60 mm).



**705.2.2 Contrast.** The truncated dome surface shall contrast visually with adjoining walking surfaces either light-on-dark, or dark-on-light. The material used to provide contrast shall be an integral part of the truncated dome surface.



**705.2.3 Interior Locations.** *Detectable warnings* in interior locations shall differ from adjoining walking surfaces in resiliency or sound-on-cane contact.

**705.3 Equivalent Tactile Surface.** A 24 inch (610 mm) wide *tactile* surface shall be provided on the walking surface at the platform edge. The *tactile* surface shall provide equivalent detectability underfoot to that provided by 705.2.1 and shall provide contrast in accordance with 705.2.2.

**705.4 Equivalent Detectability.** Equivalent detectability of the platform edge by other construction, technology, or means that will ensure equivalent or superior and reliable communication of the impending change to pedestrians who are blind or visually impaired shall be permitted. The information to be communicated must include 24 inches (610 mm) of advance warning of the platform edge and the precise orientation of the platform edge in relation to the pedestrian.

## 706 Assistive Listening Systems

**706.1 General.** Assistive listening systems required in *assembly areas* shall comply with 706.

**706.2 Types of Listening Systems.** Induction loops, infrared systems, FM and AM radio frequency systems, hard-wired earphones, and other equivalent devices shall be permitted as acceptable assistive listening systems.

### Advisory 706.2

Assistive listening systems are generally categorized by their mode of transmission. There are hard-wired systems and three types of wireless systems: induction loop, infrared, and FM radio transmission. Each has different advantages and disadvantages that can help determine which system is best for a given application. For example, an FM system, which is broadcast to an entire area, may be better than an infrared system, which is directional in transmission, in some open-air assemblies since infrared signals can be overpowered by the sun or by movement of people. On the other hand, an infrared system is typically a better choice than an FM system where confidential transmission is important because it is directional.

**706.3 Receiver Jacks.** Receivers required for use with an assistive listening system shall include a 1/8-inch (3 mm) standard mono jack. Where other jack types are used, adapters shall be provided to comply with this provision.

### Advisory 706.3

Earphone jacks with variable volume controls benefit only people who have slight hearing loss and do not help people who use hearing aids.

**706.4 Receiver Hearing-Aid Compatibility.** Receivers required to be hearing-aid compatible shall interface with T-coils in hearing aids through the provision of neck loops.

#### **Advisory 706.4**

Neckloops and headsets that can be worn as neckloops are compatible with hearing aids. Receivers that are not compatible include earbuds, which may require removal of hearing aids, silhouette transducers, earphones, and headsets that must be worn over the ear, which can create disruptive interference in the transmission and can be uncomfortable for people wearing hearing aids.

### **707 Automatic Teller Machines and Fare Machines**

**707.1 General.** Automatic teller machines and fare machines required to be *accessible* shall comply with 707.

#### **Advisory 707.1**

If farecards have one tactually distinctive corner they may be inserted with greater ease. Token collection devices that are designed to accommodate tokens which are perforated can allow a person to distinguish more readily between tokens and common coins. Place *accessible* gates and fare vending machines in close proximity to other *accessible elements* when feasible so the *facility* is easier to use.

**707.2 Clear Floor or Ground Space.** A clear floor or ground *space* complying with 305 shall be provided.

**EXCEPTION:** Clear floor or ground *space* is not required at drive-up only automatic teller machines.

**707.3 Operable Parts.** *Operable parts* shall comply with 309. Each *operable part* shall be able to be differentiated by sound or touch without activation.

**EXCEPTION:** Drive-up only automatic teller machines shall not be required to comply with 309.2 and 309.3.

**707.4 Input.** Input devices shall comply with 707.4.

**707.4.1 Privacy.** The opportunity for the same degree of privacy of input shall be available to all individuals utilizing the equipment.

**707.4.2 Key Surfaces.** All keys used to operate a machine shall be tactually discernible. Key surfaces shall be raised above the surrounding surface by 1/25 inch (1 mm) minimum. The outer edge of key surfaces shall have a radius of 1/50 inch (0.5 mm) maximum.

**EXCEPTION:** The touch areas of video display screens shall not be required to be tactually discernible.

**707.4.3 Separation Between Keys.** Any key surface shall be separated from other key surfaces by 1/8 inch (3.2 mm) minimum. Function keys shall be separated from numeric keys by a distance that is not less than three times greater the distance between the numeric keys.

**707.4.4 Numeric Keys.** Where provided, numeric keys shall comply with 707.4.4.1 and 707.4.4.2.

**707.4.4.1 Arrangement.** Numeric keys shall be arranged in a 12-key telephone keypad layout with the number one key in the upper left hand corner.

**707.4.4.2 Marking.** The number five key shall have a single raised dot.

**707.4.5 Function Keys.** Where provided, function keys shall comply with 707.4.5.

**707.4.5.1 Arrangement.** Function keys shall be arranged in the order of enter, clear, cancel, add value and decrease value horizontally from left to right or vertically from top to bottom. Where provided, add value and decrease value function keys shall be grouped with other function keys.

**707.4.5.2 Marking.** Function keys shall be marked with *tactile characters* as follows: Enter or proceed key: raised circle; Clear or correct key: raised vertical line or bar; Cancel key: raised ex; Add value key: raised plus *sign*; Decrease value key: raised minus *sign*.

**707.4.5.3 Color Coding.** Where function keys are color coded, they shall be colored as follows: Enter or proceed key: green; Clear or correct key: black; Cancel key: red; Add value key: blue; Decrease value key: yellow.

**707.5 Output.** Output devices shall comply with 707.5.

#### **Advisory 707.5**

Speech output should be supplied for all displayed text and labels. For information which is presented in non-text form (e.g., a picture or graphic), consider using a verbal description unless the graphic is just decorative. When speech output is utilized, allow for the spoken message to be repeated if the message is very long.

**707.5.1 Privacy.** The opportunity for the same degree of privacy of output shall be available to all individuals utilizing the equipment.

**707.5.2 Transaction Prompts.** All transaction prompts within each operation shall be provided.

**707.5.3 Input Verification.** Verification of all user inputs shall be provided.

#### **Advisory 707.5.3**

An audible beep may be used to indicate that personal identification numbers have been entered.

**707.5.4 Operating Instructions.** Machines shall provide visual and audible instructions for operation. Visual and audible instructions shall include all information required by 707.5.4.

**707.5.4.1 Initiation.** Instructions shall be able to be initiated by the user of the machine.

**707.5.4.2 Expedited Process.** After initiation, instructions shall be available for the experienced user to expedite the transaction.

**707.5.4.3 Orientation.** Orientation and assistance for unfamiliar users to the physical features of the machine, operational options, and details for each function shall be provided.

**707.5.5 Audible Instruction.** Audible instructions shall be provided through a standard audio mini jack, a telephone handset, a wireless transmission system or another mechanism that is readily available to all customers.

**707.5.6 Video Display Screen.** The video display screen shall comply with 707.5.6.

<b>Advisory 707.5.6</b>
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For video display screens required to be <i>accessible</i> , the screen should be visible and usable by persons standing and sitting.
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**707.5.6.1 Visibility.** The screen shall be visible from a point located 40 inches (1015 mm) above the center of the clear floor *space* in front of the machine.

**EXCEPTION:** This requirement shall not apply to drive-up only automatic teller machines.

**707.5.6.2 Characters.** *Characters* displayed on the screen shall be in a sans serif font. *Characters* shall be 3/16 inch (4.8 mm) minimum in height based on the uppercase letter "I". *Characters* shall contrast with their background with either light *characters* on a dark background or dark *characters* on a light background.

**707.5.7 Dispensing of Bills.** Machines that dispense paper currency shall dispense the currency in descending order with the lowest denomination on top.

**707.5.8 Receipts and Verification.** Where a receipt is available and is requested, the following options shall be provided: a printed receipt, audible presentation of the transaction information provided on the receipt, or both.

## 708 Two-Way Communication Systems

**708.1 General.** Two-way communication systems required to be *accessible* shall comply with 708.

<b>Advisory 708.1</b>
Devices that do not require handsets are easier to use by people who have a limited reach.

**708.2 Audible and Visual Indicators.** The system shall provide both visual and audible signals.

<b>Advisory 708.2</b>
It is recommended that a device with a light be used to indicate visually that assistance is on the way. Consideration should be given to providing <i>signs</i> to indicate the meaning of visual signals.

**708.3 Handsets.** Handset cords, if provided, shall be 29 inches (735 mm) long minimum.

**EXCEPTION:** This requirement shall not apply to two-way communication systems provided at inaccessible *entrances*.

