**Chapter 11 Installation Requirements for Extended Coverage Upright, Pendent, Sidewall Spray Sprinkler**

11.1 General

Extended coverage pendent, upright, and sidewall sprinklers shall be selected for use and installation as indicated in this chapter and shall be positioned and spaced in accordance with Section 9.5.

11.2 Extended Coverage Upright and Pendent Spray Sprinklers

11.2.1 Extended Coverage Sprinklers

Extended coverage sprinklers shall only be installed as follows:

In unobstructed construction consisting of flat, smooth ceilings with a slope not exceeding a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

In unobstructed or noncombustible obstructed construction, where specifically listed for such use

Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 71/2 ft (2.3 m) on center and where the ceiling slope does not exceed a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

Extended coverage upright and pendent sprinklers installed under smooth, flat ceilings that have slopes not exceeding a pitch of 1 in 3 (a rise of 4 units in a run of 12 units, a roof slope of 33.3 percent), where specifically listed for such use

Extended coverage sidewall sprinklers installed in accordance with 11.3.5.2.1 in slopes exceeding a ceiling pitch of 2 in 12

In each bay of obstructed construction consisting of solid structural members that extend below the deflector of the sprinkler

Extended coverage sprinklers installed to protect areas below a single overhead door(s)

11.2.2 Protection Areas Per Sprinkler (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.2.1\* Determination of Protection Area of Coverage

11.2.2.1.1

The protection area of coverage (As) for extended coverage sprinklers shall be not less than that prescribed by the listing.

11.2.2.1.2

Listing dimensions shall be even-numbered square protection areas as shown in Table 11.2.2.1.2.

Table 11.2.2.1.2 Protection Areas and Maximum Spacing (Extended Coverage Upright and Pendent Spray Sprinklers)

Construction Type Light Hazard Ordinary Hazard Extra Hazard High-Piled Storage

Protection Area

[ft2 (m2)] Spacing

[ft (m)] Protection Area

[ft2 (m2)] Spacing

[ft (m)] Protection Area

[ft2 (m2)] Spacing

[ft (m)] Protection Area

[ft2 (m2)] Spacing

[ft (m)]

Unobstructed 400 (37) 20 (6.1) 400 (37) 20 (6.1) — — — —

324 (30) 18 (5.5) 324 (30) 18 (5.5) — — — —

256 (24) 16 (4.9) 256 (24) 16 (4.9) — — — —

— — 196 (18) 14 (4.3) 196 (18) 14 (4.3) 196 (18) 14 (4.3)

— — 144 (13) 12 (3.7) 144 (13) 15 (4.6) 144 (13) 15 (4.6)

Obstructed noncombustible (when specifically listed for such use) 400 (37) 20 (6.1) 400 (37) 20 (6.1) — — — —

324 (30) 18 (5.5) 324 (30) 18 (5.5) — — — —

256 (24) 16 (4.9) 256 (24) 16 (4.9) — — — —

— — 196 (18) 14 (4.3) 196 (18) 14 (4.3) 196 (18) 14 (4.3)

— — 144 (13) 12 (3.7) 144 (13) 15 (4.6) 144 (13) 15 (4.6)

Obstructed combustible N/A N/A N/A N/A N/A N/A N/A N/A

11.2.2.1.3

Determination of the protection area of coverage and sprinkler spacing for sprinklers listed for extended coverage extra hazard or high-piled storage shall be permitted to be spaced in accordance with the requirements of 9.5.2 and 9.5.3 and shall not exceed 14 ft (4.3 m) maximum spacing and 196 ft2 (18 m2) maximum area per sprinkler or 15 ft (4.6 m) maximum spacing and 144 ft2 (13 m2) maximum area per sprinkler.

11.2.2.2 Maximum Protection Area of Coverage

11.2.2.2.1\*

The maximum allowable area of coverage for a sprinkler (As) shall be in accordance with the value indicated in Table 11.2.2.1.2.

11.2.2.2.2

In any case, the maximum area of coverage of a sprinkler shall not exceed 400 ft2 (37 m2).

11.2.3 Sprinkler Spacing (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.3.1 Maximum Distance Between Sprinklers

11.2.3.1.1

The maximum distance permitted between sprinklers shall be based on the centerline distance between sprinklers on the branch line or on adjacent branch lines.

11.2.3.1.2

The maximum distance shall be measured along the slope of the ceiling.

11.2.3.1.3

The maximum distance permitted between sprinklers shall comply with Table 11.2.2.1.2.

11.2.3.2 Maximum Distance From Walls

11.2.3.2.1

The distance from sprinklers to walls shall not exceed one-half of the allowable distance permitted between sprinklers as indicated in Table 11.2.2.1.2.

11.2.3.2.2

The distance from the wall to the sprinkler shall be measured perpendicular to the wall.

11.2.3.2.3

Where walls are angled or irregular, the maximum horizontal distance between a sprinkler and any point of floor area protected by that sprinkler shall not exceed 0.75 times the allowable distance permitted between sprinklers.

11.2.3.3 Minimum Distance From Walls

Sprinklers shall be located a minimum of 4 in. (100 mm) from a wall unless listed for distances less than 4 in. (100 mm).

11.2.3.4 Minimum Distance Between Sprinklers

11.2.3.4.1

Unless the requirements of 11.2.3.4.2 are met, sprinklers shall be spaced not less than 8 ft (2.4 m) on center.

11.2.3.4.2

Sprinklers shall be permitted to be placed less than 8 ft (2.4 m) on center where the following conditions are satisfied:

Baffles shall be arranged to protect the actuating elements.

Baffles shall be of solid and rigid material that will stay in place before and during sprinkler operation.

Baffles shall be not less than 8 in. (200 mm) long and 6 in. (150 mm) high.

The tops of baffles shall extend between 2 in. and 3 in. (50 mm and 75 mm) above the deflectors of upright sprinklers.

The bottoms of baffles shall extend downward to a level at least even with the deflectors of pendent sprinklers.

11.2.4 Deflector Position (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.4.1 Distance Below Ceilings

11.2.4.1.1 Unobstructed Construction

11.2.4.1.1.1

Under unobstructed construction, the distance between the sprinkler deflector and the ceiling shall be a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) throughout the area of coverage of the sprinkler.

11.2.4.1.1.2

The requirements of 11.2.4.1.1.1 shall not apply where ceiling-type sprinklers (concealed, recessed, and flush types) have the operating element above the ceiling and the deflector located nearer to the ceiling where installed in accordance with their listing.

11.2.4.1.1.3

The requirements of 11.2.4.1.1.1 shall not apply where sprinklers are listed for use under other ceiling construction features or for different distances where they shall be permitted to be installed in accordance with their listing.

11.2.4.1.1.4

The requirements of 11.2.4.1.1.1 shall not apply for light and ordinary hazard occupancies with ceilings of noncombustible or limited-combustible construction.

(A) \*

Where a vertical change in ceiling elevation within the area of coverage of the sprinkler creates a distance of more than 36 in. (900 mm) between the upper ceiling and the sprinkler deflector, a vertical plane extending down from the ceiling at the change in elevation shall be considered a wall for the purpose of sprinkler spacing.

(B)\*

Where the distance between the upper ceiling and the sprinkler deflector is less than or equal to 36 in. (900 mm), the sprinklers shall be permitted to be spaced as though the ceiling were flat, provided the obstruction rules are observed.

11.2.4.1.2 Obstructed Construction

Under obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:

Installed with the deflectors within the horizontal planes of 1 in. to 6 in. (25 mm to 150 mm) below noncombustible structural members and a maximum distance of 22 in. (550 mm) below the ceiling/roof deck

Installed with the deflectors at or above the bottom of noncombustible structural member to a maximum of 22 in. (550 mm) below the noncombustible ceiling/roof deck where the sprinkler is installed in conformance with 11.2.5.1.2

Installed in each bay of combustible or noncombustible obstructed construction, with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling

Installed in accordance with their listing where sprinklers are listed for use under other ceiling construction features or for different distances

11.2.4.1.3\* Peaked Roofs and Ceilings

Sprinklers under or near the peak of a roof or ceiling shall have deflectors located not more than 3 ft (900 mm) vertically down from the peak in accordance with Figure 10.2.6.1.3.1(a) and Figure 10.2.6.1.3.1(b).

11.2.4.2 Deflector Orientation

Deflectors of sprinklers shall be aligned parallel to ceilings or roofs.

11.2.4.2.1

Roofs and ceilings having a pitch not exceeding 2 in 12 (16.7 percent) are considered horizontal in the application of 11.2.4.2, and sprinklers shall be permitted to be installed with deflectors horizontal.

11.2.5 Obstructions to Sprinkler Discharge (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.5.1 Performance Objective

11.2.5.1.1

Sprinklers shall be located so as to minimize obstructions to discharge as defined in 11.2.5.2 and 11.2.5.3, or additional sprinklers shall be provided to ensure adequate coverage of the hazard.

11.2.5.1.2\*

Sprinklers shall be arranged to comply with one of the following arrangements:

Sprinklers shall be in accordance with 9.5.5.2, Table 11.2.5.1.2, and Figure 11.2.5.1.2(a).

Sprinklers shall be permitted to be spaced on opposite sides of obstructions not exceeding 4 ft (1.2 m) in width provided the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance permitted between sprinklers.

Obstructions located against the wall and that are not over 30 in. (750 mm) in width shall be permitted to be protected in accordance with Figure 11.2.5.1.2(b).

Obstructions located against the wall and that are not over 24 in. (600 mm) in width shall be permitted to be protected in accordance with Figure 11.2.5.1.2(c). The maximum distance between the sprinkler and the wall shall be measured from the sprinkler to the wall behind the obstruction and not to the face of the obstruction.

Table 11.2.5.1.2 Position of Sprinklers to Avoid Obstructions to Discharge (Extended Coverage Upright and Pendent Spray Sprinklers)

Distance from Sprinklers to Side of Obstruction (A) Maximum Allowable Distance of Deflector Above Bottom of Obstruction (B) [in. (mm)]

Less than 1 ft (300 m) 0 (0)

1 ft (300 m) to less than 1 ft 6 in. (450 m) 0 (0)

1 ft 6 in. (450 m) to less than 2 ft (600 m) 1 (25)

2 ft (600 m) to less than 2 ft 6 in. (750 m) 1 (25)

2 ft 6 in. (750 m) to less than 3 ft (900 m) 1 (25)

3 ft (900 m) to less than 3 ft 6 in. (1.1 m) 3 (75)

3 ft 6 in. (1.1 m) to less than 4 ft (1.2 m) 3 (75)

4 ft (1.2 m) to less than 4 ft 6 in. (1.4 m) 5 (125)

4 ft 6 in. (1.4 m) to less than 5 ft (1.5 m) 7 (175)

5 ft (1.5 m) to less than 5 ft 6 in. (1.7 m) 7 (175)

5 ft 6 in. (1.7 m) to less than 6 ft (1.8 m) 7 (175)

6 ft (1.8 m) to less than 6 ft 6 in. (2 m) 9 (225)

6 ft 6 in. (2 m) to less than 7 ft (2.1 m) 11 (275)

7 ft (2.1 m) to less than 7 ft 6 in. (2.3 m) 14 (350)

7 ft 6 in. (2.3 m) to less than 8 ft (2.4 m) 14 (350)

8 ft (2.4 m) to less than 8 ft 6 in. (2.6 m) 15 (375)

8 ft 6 in. (2.6 m) to less than 9 ft (2.7 m) 17 (425)

9 ft (2.7 m) to less than 9 ft 6 in. (2.9 m) 19 (475)

9 ft 6 in. (2.9 m) to less than 10 ft (3.0 m) 21 (525)

Note: For A and B, refer to Figure 11.2.5.1.2(a).

FIGURE 11.2.5.1.2(a) Position of Sprinkler to Avoid Obstruction to Discharge (Extended Coverage Upright and Pendent Spray Sprinklers).

FIGURE 11.2.5.1.2(b) Obstructions Against Walls (Extended Coverage Upright and Pendent Spray Sprinklers).

FIGURE 11.2.5.1.2(c) Obstructions Against Walls (Extended Coverage Upright and Pendent Spray Sprinklers).

11.2.5.2 Obstructions to Sprinkler Discharge Pattern Development

11.2.5.2.1 General

11.2.5.2.1.1

Continuous or noncontinuous obstructions less than or equal to 18 in. (450 mm) below the sprinkler deflector that prevent the pattern from fully developing shall comply with 11.2.5.2.

11.2.5.2.1.2

Regardless of the rules of this section, solid continuous obstructions shall meet the applicable requirements of 11.2.5.1.2.

11.2.5.2.1.3\*

Unless the requirements of 11.2.5.2.1.4 through 11.2.5.2.1.8 are met, sprinklers shall be positioned away from obstructions a minimum distance of four times the maximum dimension of the obstruction (e.g., truss webs and chords, pipe, columns, and fixtures) in accordance with Figure 11.2.5.2.1.3(a) and Figure 11.2.5.2.1.3(b).

(A)

The maximum clear distance required to obstructions in the horizontal orientation (e.g., light fixtures and truss chords) shall be 36 in. (900 mm).

(B)

The maximum clear distance shall not be applied to obstructions in the vertical orientation (e.g., columns).

FIGURE 11.2.5.2.1.3(a) Minimum Distance from an Obstruction in the Vertical Orientation (Extended Coverage Upright and Pendent Spray Sprinkler).

FIGURE 11.2.5.2.1.3(b) Minimum Distance from an Obstruction in the Horizontal Orientation (Extended Coverage Upright and Pendent Spray Sprinkler).

11.2.5.2.1.4

Sprinklers shall be permitted to be spaced on opposite sides of the obstruction where the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance between sprinklers.

11.2.5.2.1.5

Sprinklers shall be permitted to be located one-half the distance between the obstructions where the obstruction consists of wood bar joists 20 in. (500 mm) or greater apart, provided that the top and bottom chords of the wood bar joist are not greater than 4 in. (100 mm) (nominal) in width and bar members do not exceed 1 in. (25 mm) in width.

11.2.5.2.1.6

Sprinklers shall be permitted to be installed on the centerline of a truss or bar joist or directly above a beam, provided that the truss chord or beam, dimension is not more than 8 in. (200 mm) and the sprinkler deflector is located at least 6 in. (150 mm) above the structural member and where the sprinkler is positioned at a distance four times greater than the maximum dimension of the web members away from the web members.

11.2.5.2.1.7

The requirements of 11.2.5.2.1.3 shall not apply to sprinkler system piping less than 3 in. (80 mm) in diameter.

11.2.5.2.1.8

The requirements of 11.2.5.2.1.3 shall not apply to sprinklers positioned with respect to obstructions in accordance with 11.2.5.1.2.

11.2.5.2.1.9\*

Sprinklers shall be permitted to be placed without regard to the blades of ceiling fans less than 60 in. (1.5 m) in diameter, provided the plan view of the fan is at least 50 percent open.

11.2.5.2.2 Suspended or Floor-Mounted Vertical Obstructions

The distance from sprinklers to privacy curtains, freestanding partitions, room dividers, and similar obstructions in light hazard occupancies shall be in accordance with Table 11.2.5.2.2 and Figure 11.2.5.2.2.

Table 11.2.5.2.2 Suspended or Floor-Mounted Obstructions (Extended Coverage Upright and Pendent Spray Sprinklers) in Light Hazard Occupancies Only

Horizontal Distance (A) Minimum Vertical Distance Below Deflector (B) [in. (mm)]

6 in. (150 mm) or less 3 (75)

More than 6 in. (150 mm) to 9 in. (225 mm) 4 (100)

More than 9 in. (225 mm) to 12 in. (300 mm) 6 (150)

More than 12 in. (300 mm) to 15 in. (375 mm) 8 (200)

More than 15 in. (375 mm) to 18 in. (450 mm) 91/2 (240)

More than 18 in. (450 mm) to 24 in. (600 mm) 121/2 (315)

More than 24 in. (600 mm) to 30 in. (750 mm) 151/2 (390)

More than 30 in. (750 mm) 18 (450)

Note: For A and B, refer to Figure 11.2.5.2.2.

FIGURE 11.2.5.2.2 Suspended or Floor-Mounted Obstruction (Extended Coverage Upright and Pendent Spray Sprinklers) in Light Hazard Occupancy Only.

11.2.5.2.2.1

In light hazard occupancies, privacy curtains, as shown in Figure 11.2.5.2.2, shall not be considered obstructions where all of the following are met:

The curtains are supported by fabric mesh on ceiling track.

Openings in the mesh are equal to 70 percent or greater.

The mesh extends a minimum of 22 in. (550 mm) down from ceiling.

11.2.5.3\* Obstructions That Prevent Sprinkler Discharge From Reaching Hazard

11.2.5.3.1

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 11.2.5.3.

11.2.5.3.2\*

Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.

11.2.5.3.3

Sprinklers shall not be required under obstructions that are not fixed in place such as conference tables.

11.2.5.3.4

Sprinklers installed under open gratings shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.

11.2.5.3.5

Sprinklers installed under round ducts shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.

11.2.6\* Clearance to Storage (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.6.1

The clearance between the deflector and the top of storage shall be 18 in. (450 mm) or greater.

11.2.6.2

Where other standards specify greater clearance to storage minimums, they shall be followed.

11.2.7 Clearance to Storage (Extended Coverage Upright and Pendent Spray Sprinklers)

11.2.7.1\*

The clearance between the deflector and top of storage shall be 18 in. (460 mm) or greater.

11.2.7.2

The 18 in. (460 mm) dimension shall not limit the height of shelving on a wall or shelving against a wall in accordance with 11.2.7.

11.2.7.2.1

Where shelving is installed on a wall and is not directly below sprinklers, the shelves, including storage thereon, shall be permitted to extend above the level of a plane located 18 in. (460 mm) below ceiling sprinkler deflectors.

11.2.7.2.2

Shelving, and any storage thereon, directly below the sprinklers shall not extend above a plane located 18 in. (460 mm) below the ceiling sprinkler deflectors.

11.2.8 Ceiling Pockets (Extended Coverage Upright and Pendent Spay Sprinklers)

11.2.8.1

Except as allowed in 11.2.8.2 and 11.2.8.3, sprinklers shall be required in all ceiling pockets.

11.2.8.2

Sprinklers shall not be required in ceiling pockets where all of the following are met:

The total volume of the unprotected ceiling pocket does not exceed 1000 ft3 (28 m3).

The depth of the unprotected ceiling pocket does not exceed 36 in. (900 mm).

The entire floor under the unprotected ceiling pocket is protected by sprinklers at the lower ceiling elevation.

\* The total size of all unprotected ceiling pockets in the same compartment within 10 ft (3 m) of each other does not exceed 1000 ft3 (28 m3).

The unprotected ceiling pocket has noncombustible or limited-combustible finishes.

Quick-response sprinklers are utilized throughout the compartment.

11.2.8.3

Sprinklers shall not be required in skylights and similar pockets in accordance with 9.3.16.

11.3\* Extended Coverage Sidewall Spray Sprinklers

11.3.1

General. All requirements of Section 9.5 shall apply to extended coverage sidewall spray sprinklers except as modified in Section 11.3.

11.3.2

Extended coverage sidewall spray sprinklers shall only be installed as follows:

Light hazard occupancies with smooth, horizontal or sloped, flat ceilings

Ordinary hazard occupancies with smooth, flat ceilings where specifically listed for such use

In unobstructed construction consisting of flat, smooth ceilings with a slope not exceeding a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

In unobstructed or noncombustible obstructed construction, where specifically listed for such use

Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 71/2 ft (2.3 m) on center and where the ceiling slope does not exceed a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

Extended coverage sidewall sprinklers installed in accordance with 11.3.6.2.2 in slopes exceeding a ceiling pitch of 2 in 12

In each bay of obstructed construction consisting of solid structural members that extend below the deflector of the sprinkler

Extended coverage sprinklers installed to protect areas below a single overhead door(s)

11.3.3 Protection Areas Per Sprinkler (Extended Coverage Sidewall Spray Sprinklers)

11.3.3.1 \* Determination of Protection Area of Coverage

11.3.3.1.1

The protection area of coverage per sprinkler (As) for extended coverage sidewall sprinklers shall be not less than that prescribed by the listing.

11.3.3.1.2

Listing dimensions shall be in 2 ft (600 mm) increments up to 28 ft (8.5 m).

11.3.3.2 Maximum Protection Area of Coverage

11.3.3.2.1

The maximum allowable protection area of coverage for a sprinkler (As) shall be in accordance with the value indicated in Table 11.3.3.2.1.

Table 11.3.3.2.1 Protection Area and Maximum Spacing for Extended Coverage Sidewall Spray Sprinklers

Construction Type Light Hazard Ordinary Hazard

Protection Area Spacing Protection Area Spacing

ft2 m2 ft m ft2 m2 ft m

Unobstructed, smooth, flat 400 37 28 8.5 400 37 24 7.3

11.3.3.2.2

In any case, the maximum area of coverage of a sprinkler shall not exceed 400 ft2 (37 m2).

11.3.4 Sprinkler Spacing (Extended Coverage Sidewall Spray Sprinklers)

11.3.4.1 Maximum Distance Between Sprinklers

11.3.4.1.1

The maximum distance permitted between sprinklers shall be based on the centerline distance between sprinklers on the branch line along the wall.

11.3.4.1.2

Where sprinklers are installed along the length of a single wall of rooms or bays, they shall be spaced in accordance with the maximum spacing provisions of Table 11.3.3.2.1.

11.3.4.1.3

Sidewall sprinklers shall not be installed back-to-back without being separated by a continuous lintel, soffit, or baffle.

11.3.4.1.4

Sidewall sprinklers shall be permitted to be installed on opposing or adjacent walls, provided no sprinkler is located within the maximum protection area of another sprinkler.

11.3.4.2 Maximum Distance From Walls

The distance from sprinklers to the end walls shall not exceed one-half of the allowable distance permitted between sprinklers as indicated in Table 11.3.3.2.1.

11.3.4.3 Minimum Distance From Walls

11.3.4.3.1

Sprinklers shall be located a minimum of 4 in. (100 mm) from an end wall.

11.3.4.3.2

The distance from the wall to the sprinkler shall be measured perpendicular to the wall.

11.3.4.4 Minimum Distance Between Sprinklers

Sprinklers shall be not located within the maximum protection area of any other sprinkler unless required by 11.3.5.1.4.1 or separated by baffles that comply with the following:

Baffles shall be arranged to protect the actuating elements.

Baffles shall be of solid and rigid material that will stay in place before and during sprinkler operation.

Baffles shall be not less than 8 in. (200 mm) long and 6 in. (150 mm) high.

The tops of baffles shall extend between 2 in. and 3 in. (50 mm and 75 mm) above the deflectors.

The bottoms of baffles shall extend downward to a level at least even with the deflectors.

11.3.5 Deflector Position From Ceilings and Walls (Extended Coverage Sidewall Spray Sprinklers)

11.3.5.1 Distance Below Ceilings and From Walls to Which Sprinklers Are Mounted

11.3.5.1.1 Ceilings

11.3.5.1.1.1

Unless the requirements of 11.3.5.1.1.2 are met, sidewall sprinkler deflectors shall be located not more than 6 in. (150 mm) nor less than 4 in. (100 mm) from ceilings.

11.3.5.1.1.2

Horizontal sidewall sprinklers shall be permitted to be located in a zone 6 in. to 12 in. (150 mm to 300 mm) or 12 in. to 18 in. (300 mm to 450 mm) below noncombustible or limited-combustible ceilings where listed for such use.

11.3.5.1.2 Walls

11.3.5.1.2.1\*

Sidewall sprinkler deflectors shall be located not more than 6 in. (150 mm) or less than 4 in. (100 mm) from walls on which they are mounted.

11.3.5.1.2.2

Horizontal sidewall sprinklers shall be permitted to be located with their deflectors less than 4 in. (100 mm) from the wall on which they are mounted.

11.3.5.1.3 Lintels and Soffits

11.3.5.1.3.1\*

Where soffits used for the installation of sidewall sprinklers are less than or equal to 8 in. (200 mm) in width or projection from the wall, additional sprinklers shall not be required below the soffit.

11.3.5.1.3.2\*

A sidewall sprinkler shall be permitted to be installed under a soffit when both the minimum distance from the sprinkler deflector to the bottom of the soffit and the maximum distance from the sprinkler deflector to the high ceiling are maintained.

11.3.5.1.4\* Soffits and Cabinets in Residential Areas/Occupancies

Where soffits are used for the installation of sidewall sprinklers, the sprinklers and soffits shall be installed in accordance with 11.3.5.1.4.1, 11.3.5.1.4.2, or 11.3.5.1.4.3.

11.3.5.1.4.1

Where soffits exceed more than 8 in. (200 mm) in width or projection from the wall, pendent sprinklers shall be installed under the soffit.

11.3.5.1.4.2

Sidewall sprinklers shall be permitted to be installed in the face of a soffit located directly over cabinets, without requiring additional sprinklers below the soffit or cabinets, where the soffit does not project horizontally more than 12 in. (300 mm) from the wall.

11.3.5.1.4.3

Where sidewall sprinklers are more than 3 ft (900 mm) above the top of cabinets, the sprinkler shall be permitted to be installed on the wall above the cabinets where the cabinets are no greater than 12 in. (300 mm) from the wall.

11.3.5.2 Deflector Orientation

11.3.5.2.1

Sidewall sprinklers, where installed under a sloped ceiling with a slope exceeding 2 in 12, shall be located at the high point of the slope and positioned to discharge downward along the slope.

11.3.5.2.2

Sidewall sprinklers specifically listed for other ceiling configurations shall be permitted to be installed in accordance with the listing requirements.

11.3.6 Obstructions to Sprinkler Discharge (Extended Coverage Sidewall Spray Sprinklers)

11.3.6.1 Performance Objective

11.3.6.1.1

Sprinklers shall be located so as to minimize obstructions to discharge as defined in 9.5.5.2 and 9.5.5.3, or additional sprinklers shall be provided to ensure adequate coverage of the hazard.

11.3.6.1.2

Sidewall sprinklers shall not be installed less than 8 ft (2.4 m) from light fixtures or similar obstructions unless the requirements of 11.3.6.1.2.1 or 11.3.6.1.2.2 are met.

11.3.6.1.2.1

For obstructions such as light fixtures, where the greatest dimension of the obstruction is less than 2 ft (0.6 m), sidewall sprinklers shall be permitted to be installed at a minimum distance of four times the greatest dimension.

11.3.6.1.2.2

For obstructions located 4 in. or greater above the plane of the sprinkler deflector the sprinkler shall be permitted to be located less than 8 ft (2.4 m) from the obstruction.

11.3.6.1.3

The distance between light fixtures or similar obstructions located 8 ft (2.4 m) or greater from the sprinkler shall be in conformance with Table 11.3.6.1.3 and Figure 11.3.6.1.3.

Table 11.3.6.1.3 Positioning of Sprinklers to Avoid Obstructions (Extended Coverage Sidewall Spray Sprinklers)

Distance from Sidewall Sprinkler to Side of Obstruction (A) Maximum Allowable Distance of Deflector Above Bottom of Obstruction (B) [in. (mm)]

8 ft (2.4 m) to less than 10 ft (3.0 m) 1 (25)

10 ft (3.0 m) to less than 11 ft (3.4 m) 2 (50)

11 ft (3.4 m) to less than 12 ft (3.7 m) 3 (75)

12 ft (3.7 m) to less than 13 ft (4.0 m) 4 (100)

13 ft (4.0 m) to less than 14 ft (4.3 m) 6 (150)

14 ft (4.3 m) to less than 15 ft (4.6 m) 7 (175)

15 ft (4.6 m) to less than 16 ft (4.9 m) 9 (225)

16 ft (4.9 m) to less than 17 ft (5.2 m) 11 (275)

17 ft (5.2 m) or greater 14 (350)

Note: For A and B, refer to Figure 11.3.6.1.3.

FIGURE 11.3.6.1.3 Positioning of Sprinkler to Avoid Obstruction (Extended Coverage Sidewall Spray Sprinklers).

11.3.6.1.4

Continuous obstructions projecting from the same wall as the one on which the sidewall sprinkler is mounted shall be in accordance with one of the following arrangements:

Sprinklers shall be installed in accordance with Table 11.3.6.1.4 and Figure 11.3.6.1.4(a).

Sprinklers shall be permitted to be spaced on opposite sides of obstructions less than 4 ft (1.2 m) in width where the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance between sprinklers.

Obstructions located against the wall and that are not over 30 in. (750 mm) in width shall be permitted to be protected in accordance with Figure 11.3.6.1.4(b).

Obstructions located against the wall and that are not over 24 in. (600 mm) in width shall be permitted to be protected in accordance with Figure 11.3.6.1.4(c). The maximum distance between the sprinkler and the wall shall be measured from the sprinkler to the wall behind the obstruction and not to the face of the obstruction.

Table 11.3.6.1.4 Positioning of Sprinklers to Avoid Obstructions Along Wall (Extended Coverage Sidewall Spray Sprinklers)

Distance from Sidewall Sprinkler to Side of Obstruction (A) Maximum Allowable Distance of Deflector Above Bottom of Obstruction (B) [in. (mm)]

Less than 1 ft 6 in. (450 mm) 0 (0)

1 ft 6 in. (450 mm) to less than 3 ft (900 mm) 1 (25)

3 ft (900 mm) to less than 4 ft (1.2 m) 3 (75)

4 ft (1.2 m) to less than 4 ft 6 in. (1.4 m) 5 (125)

4 ft 6 in. (1.4 m) to less than 6 ft (1.5 m) 7 (175)

6 ft (1.5 m) to less than 6 ft 6 in. (2.0 m) 9 (225)

6 ft 6 in. (2.0 m) to less than 7 ft (2.1 m) 11 (275)

7 ft (2.1 m) to less than 7 ft 6 in. (2.3 m) 14 (350)

Note: For A and B, refer to Figure 11.3.6.1.4(a).

FIGURE 11.3.6.1.4(a) Positioning of Sprinkler to Avoid Obstruction Along Wall (Extended Coverage Sidewall Spray Sprinklers).

FIGURE 11.3.6.1.4(b) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinklers).

FIGURE 11.3.6.1.4(c) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinkler).

11.3.6.1.5 Isolated Obstructions

Isolated obstructions projecting from the same wall as the one on which the extended coverage sidewall sprinkler is mounted shall be located a minimum of 6 in. (150 mm) from the sidewall sprinkler.

11.3.6.1.6\*

Obstructions on the wall opposite from the sidewall sprinkler shall be permitted where the obstruction is up to 2 ft (600 mm) deep and 2 ft (600 mm) wide.

11.3.6.2 Obstructions to Sprinkler Discharge Pattern Development

11.3.6.2.1 General

11.3.6.2.1.1

Continuous or noncontinuous obstructions less than or equal to 18 in. (450 mm) below the sprinkler deflector that prevent the pattern from fully developing shall comply with this section.

11.3.6.2.1.2

Regardless of the rules of this section, solid continuous obstructions shall meet the requirements of 11.3.6.1.2 and 11.3.6.1.3.

11.3.6.2.1.3\*

Unless the requirements of 11.3.6.2.1.4 and 11.3.6.2.1.5 are met, sprinklers shall be positioned away from obstructions a minimum distance of four times the maximum dimension of the obstruction (e.g., truss webs and chords, pipe, columns, and fixtures) in accordance with Figure 11.3.6.2.1.3(a) and Figure 11.3.6.2.1.3(b).

(A)

The maximum clear distance required to obstructions in the horizontal orientation (e.g., light fixtures and truss chords) shall be 36 in. (900 mm).

(B)

The maximum clear distance shall not be applied to obstructions in the vertical orientation (e.g., columns).

FIGURE 11.3.6.2.1.3(a) Minimum Distance from an Obstruction in the Vertical Orientation (Extended Coverage Sidewall).

FIGURE 11.3.6.2.1.3(b) Minimum Distance from an Obstruction in the Horizontal Orientation (Extended Coverage Sidewall).

11.3.6.2.1.4

The requirements of 11.3.6.2.1.3 and 11.3.6.2.1.4 shall not apply where sprinklers are positioned with respect to obstructions in accordance with 11.3.6.1.2 and 11.3.6.1.3.

11.3.6.2.1.5

The requirements of 11.3.6.2.1.3 shall not apply to sprinkler system piping less than 3 in. (80 mm) in diameter.

11.3.6.2.1.6\*

Sprinklers shall be permitted to be placed without regard to the blades of ceiling fans less than 60 in. (1.5 m) in diameter, provided the plan view of the fan is at least 50 percent open.

11.3.6.2.2 Suspended or Floor-Mounted Vertical Obstructions

The distance from sprinklers to privacy curtains, freestanding partitions, room dividers, and similar obstructions in light hazard occupancies shall be in accordance with Table 11.3.6.2.2 and Figure 11.3.6.2.2.

Table 11.3.6.2.2 Suspended or Floor-Mounted Obstructions (Extended Coverage Sidewall Sprinklers) in Light Hazard Occupancies Only

Horizontal Distance (A) Minimum Allowable Distance Below Deflector (B) [in. (mm)]

6 in. (150 mm) or less 3 (75)

More than 6 in. (150 mm) to 9 in. (225 mm) 4 (100)

More than 9 in. (225 mm) to 12 in. (300 mm) 6 (150)

More than 12 in. (300 mm) to 15 in. (375 mm) 8 (200)

More than 15 in. (375 mm) to 18 in. (450 mm) 91/2 (240)

More than 18 in. (450 mm) to 24 in. (600 mm) 121/2 (315)

More than 24 in. (600 mm) to 30 in. (750 mm) 151/2 (390)

More than 30 in. (750 mm) 18 (450)

Note: For A and B, refer to Figure 11.3.6.2.2.

FIGURE 11.3.6.2.2 Suspended or Floor-Mounted Obstruction (Extended Coverage Sidewall Sprinklers) in Light Hazard Occupancy Only.

11.3.6.2.2.1\*

In light hazard occupancies, privacy curtains, as shown in Figure 11.3.6.2.2, shall not be considered obstructions where all of the following are met:

The curtains are supported by fabric mesh on ceiling track.

Openings in the mesh are equal to 70 percent or greater.

The mesh extends a minimum of 22 in. (550 mm) down from ceiling.

11.3.6.3\* Obstructions That Prevent Sprinkler Discharge From Reaching Hazard

11.3.6.3.1

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with this section.

Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.

11.3.6.3.3

Sprinklers shall not be required under obstructions that are not fixed in place, such as conference tables.

11.3.7 Clearance to Storage (Extended Coverage Sidewall Spray Sprinklers)

The clearance between the deflector and the top of storage shall be 18 in. (450 mm) or greater.