



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:

- (1) 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)
- (2) In unobstructed or noncombustible obstructed construction, where specifically listed for such use
- (3) Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 7½ 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)
- (4) 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
- (5) Extended coverage sidewall sprinklers installed in accordance with 11.3.5.2.1 in slopes exceeding a ceiling pitch of 2 in 12
- (6) Extended coverage upright and pendent sprinklers installed in obstructed construction, in accordance with 11.2.4.1
- (7) Extended coverage sprinklers installed to protect areas below a single overhead door(s)

11.2.1.1

Extended-coverage pendent sprinklers having a nominal K-factor of K-22.4 (K-320) or less shall not be permitted for use in Ordinary Hazard Group 2 and higher occupancy hazards where the ceiling height is greater than 30 ft (9.1 m).

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 (A_s) 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 [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	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)

Construction Type	Light Hazard		Ordinary Hazard		Extra Hazard		High-Piled Storage	
	Protection Area [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	Spacing [ft (m)]	Protection Area [ft ² (m ²)]	Spacing [ft (m)]
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 (A_s) 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:

- (1) Baffles shall be arranged to protect the actuating elements.
- (2) Baffles shall be of solid and rigid material that will stay in place before and during sprinkler operation.
- (3) Baffles shall be not less than 8 in. (200 mm) long and 6 in. (150 mm) high.
- (4) The tops of baffles shall extend between 2 in. and 3 in. (50 mm and 75 mm) above the deflectors of upright sprinklers.
- (5) The bottoms of baffles shall extend downward to a level at least even with the deflectors of pendent sprinklers.

11.2.3.4.3

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, the structural members shall be considered baffles in accordance with 11.2.3.4.2.

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:

- (1) 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
- (2) Installed with the deflectors at or above the bottom of noncombustible structural members 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
- (3) 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
- (4) 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 10.2.7.1.3.1(a) and Figure 10.2.7.1.3.1(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 installed under horizontal ceilings shall be permitted to be installed with deflectors parallel to the floor.

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:

- (1) Sprinklers shall be in accordance with 9.5.5.2, Table 11.2.5.1.2(a) or Table 11.2.5.1.2(b), and Figure 11.2.5.1.2(a).
- (2) 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.
- (3) 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).
- (4) 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.
- (5) Obstructions up to 12 in. (300 mm) in width in hallways up to 6 ft (1.8 m) in width shall be permitted in accordance with Figure 11.2.5.1.2(d) when the sprinkler is located in the allowable obstruction zone and the closest edge of the obstruction is a minimum of 12 in. (300 mm) away from the centerline of the sprinkler.

Table 11.2.5.1.2(a) Positioning of Sprinklers to Avoid Obstructions to Discharge (Extended Coverage Upright and Pendent Sprinklers)

Distance from Sprinkler to Side of Obstruction (A) (ft)	Allowable Distance of Deflector Above Bottom of Obstruction (B)(in.)
Less than 1½	0
1½ or more	1 or less
3 or more	3 or less
4 or more	5 or less
4½ or more	7 or less
6 or more	9 or less
6½ or more	11 or less
7 or more	14 or less
8 or more	15 or less
8½ or more	17 or less
9 or more	19 or less
9½ or more	21 or less

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

Table 11.2.5.1.2(b) Positioning of Sprinklers to Avoid Obstructions to Discharge (Extended Coverage Upright and Pendent Sprinklers)

Distance from Sprinkler to Side of Obstruction (<i>A</i>) (mm)	Allowable Distance of Deflector Above Bottom of Obstruction (<i>B</i>) (mm)
Less than 450	0
450 or more	25 or less
900 or more	75 or less
1200 or more	125 or less
1400 or more	175 or less
1800 or more	225 or less
2000 or more	275 or less
2100 or more	350 or less
2400 or more	375 or less
2600 or more	425 or less
2700 or more	475 or less
2900 or more	525 or less

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).

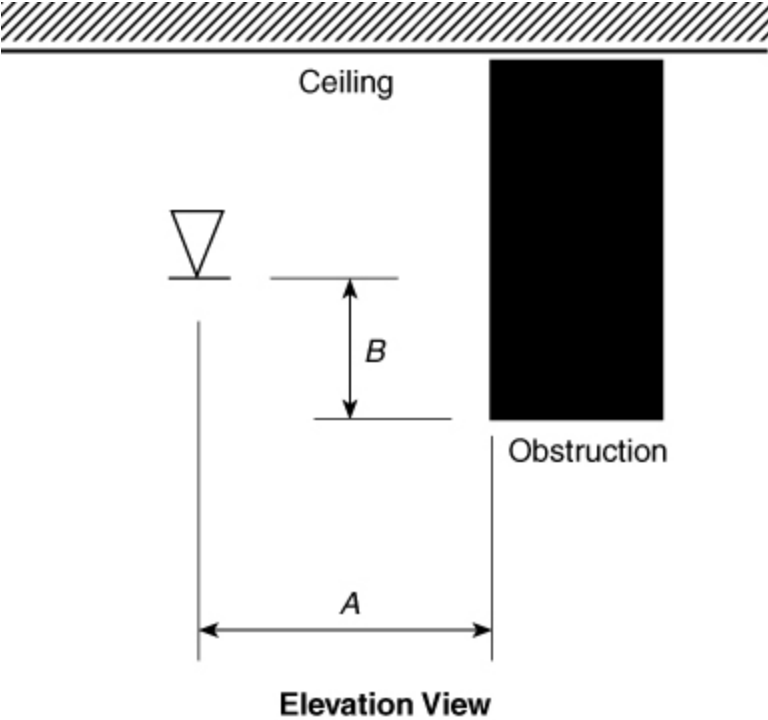


Figure 11.2.5.1.2(b) Obstructions Against Walls (Extended Coverage Upright and Pendent Spray Sprinklers).

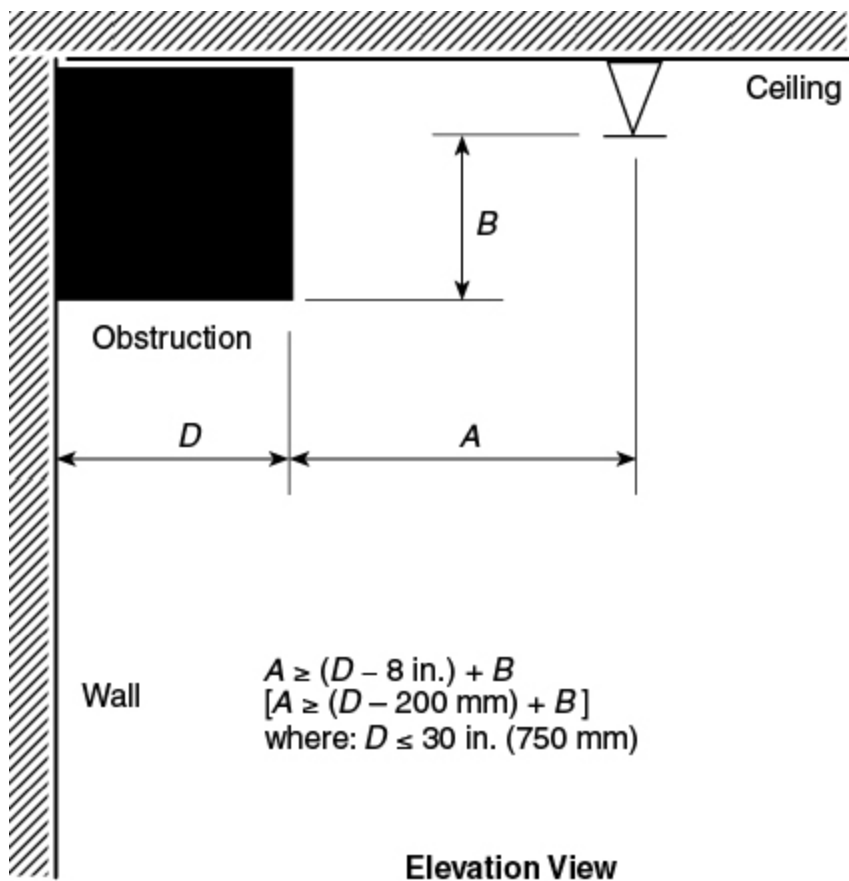


Figure 11.2.5.1.2(c) Obstructions Against Walls (Extended Coverage Upright and Pendent Spray Sprinklers).

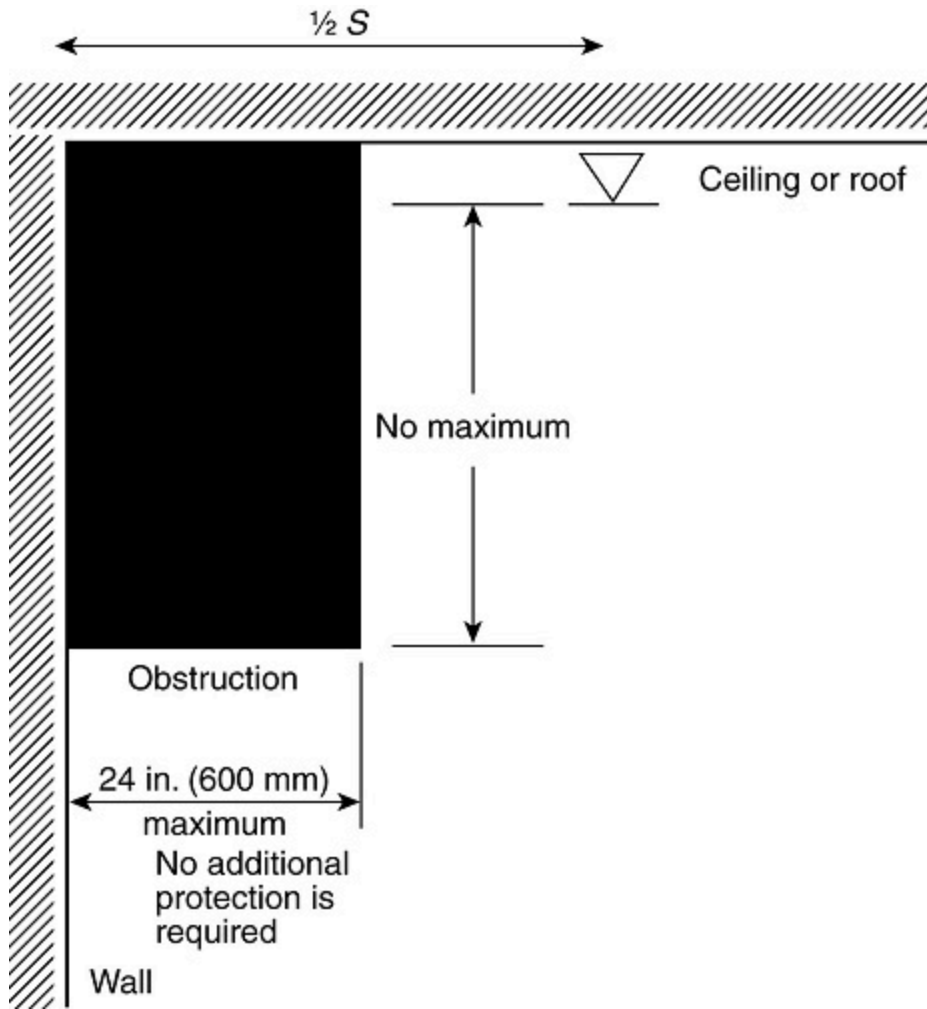
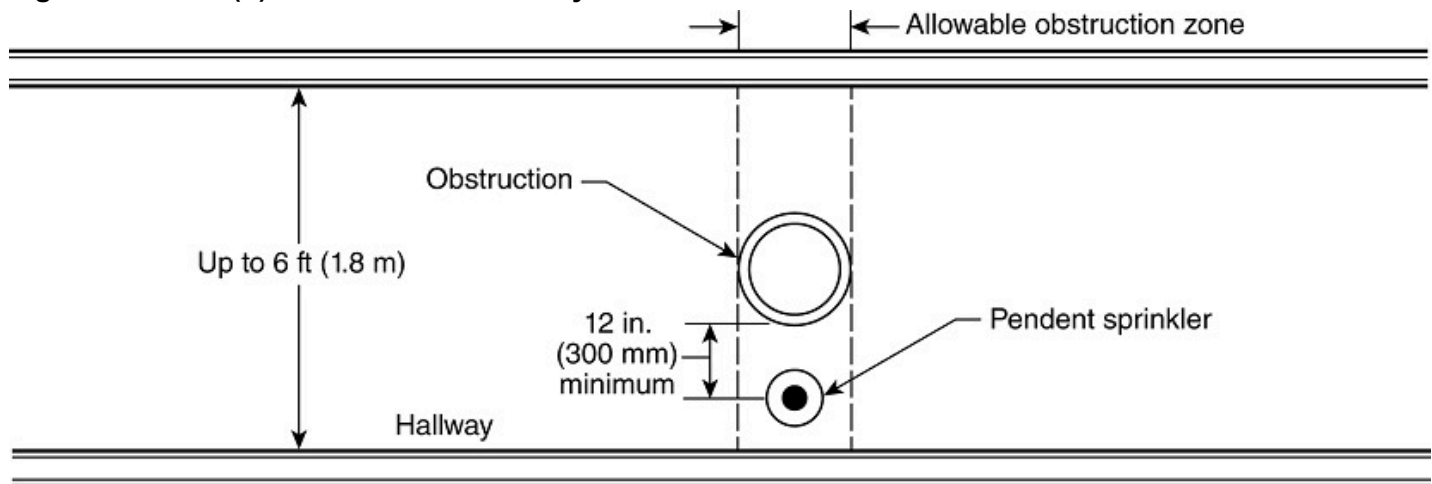


Figure 11.2.5.1.2(d) Obstruction in Hallway.



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.

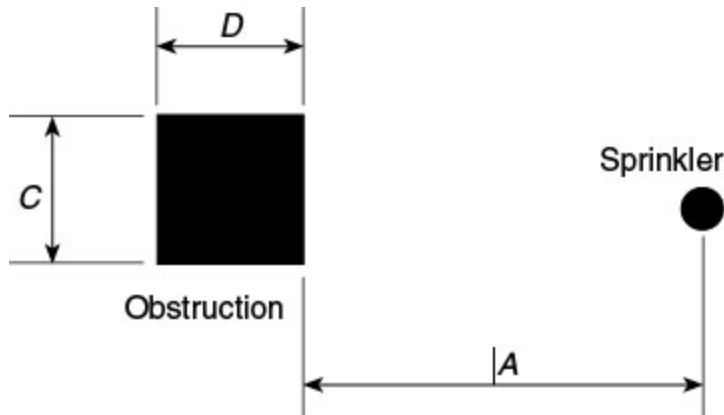
11.2.5.2.1.2

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).

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

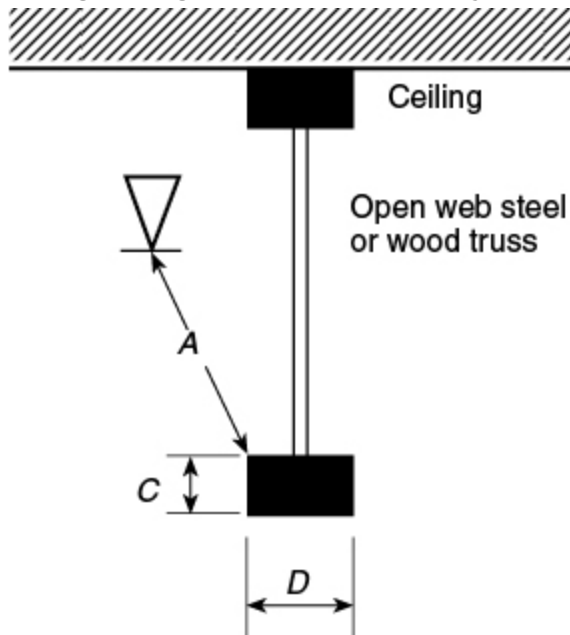


Plan View of Column
(Obstruction in vertical orientation)

$$A \geq 4C \text{ or } 4D$$

(Use dimension C or D , whichever is greater)

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



Elevation View of Truss
(Obstruction in horizontal orientation)

$$A \geq 4C \text{ or } 4D$$

$$A \leq 36 \text{ in. (900 mm)}$$

(Use dimension C or D , whichever is greater)

(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).

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(a) or Table 11.2.5.2.2(b) and Figure 11.2.5.2.2.

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

Horizontal Distance (A) (in.) Minimum Vertical Distance Below Deflector (B) (in.)	
6 or less	3 or more
9 or less	4 or more
12 or less	6 or more
15 or less	8 or more
18 or less	9½ or more
24 or less	12½ or more
30 or less	15½ or more
More than 30	18 or more

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

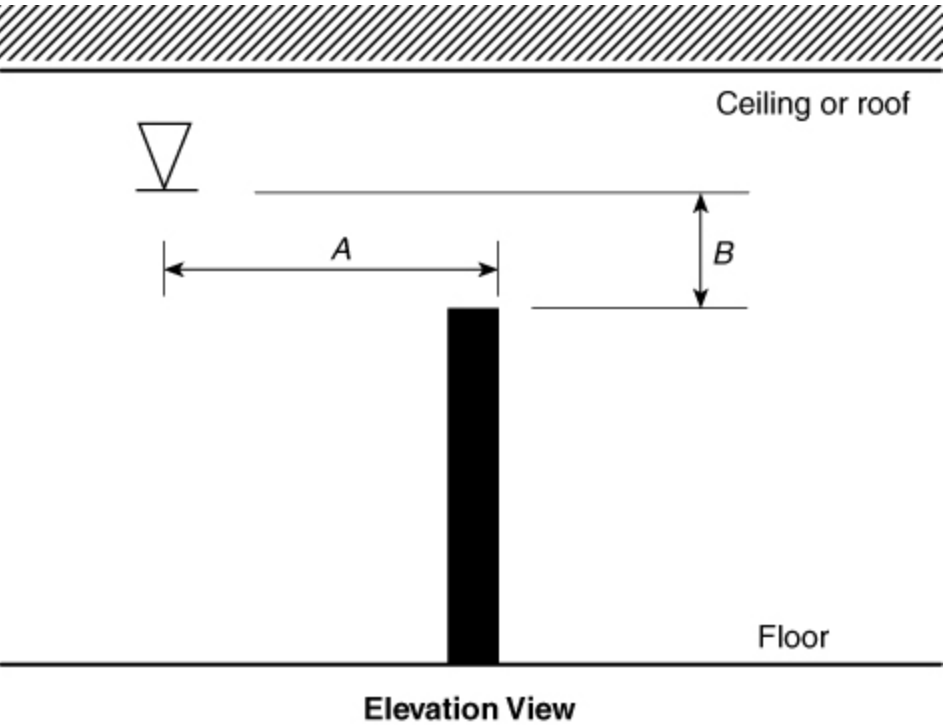
Table 11.2.5.2.2(b) Suspended or Floor-Mounted Obstructions in Light Hazard Occupancies Only (Extended Coverage Upright and Pendent Sprinklers)

Horizontal Distance (A) (mm) Minimum Vertical Distance Below Deflector (B) (mm)	
150 or less	75 or more
225 or less	100 or more
300 or less	150 or more
375 or less	200 or more

Horizontal Distance (A) (mm)	Minimum Vertical Distance Below Deflector (B) (mm)
450 or less	240 or more
600 or less	315 or more
750 or less	390 or more
More than 750	450 or more

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 *

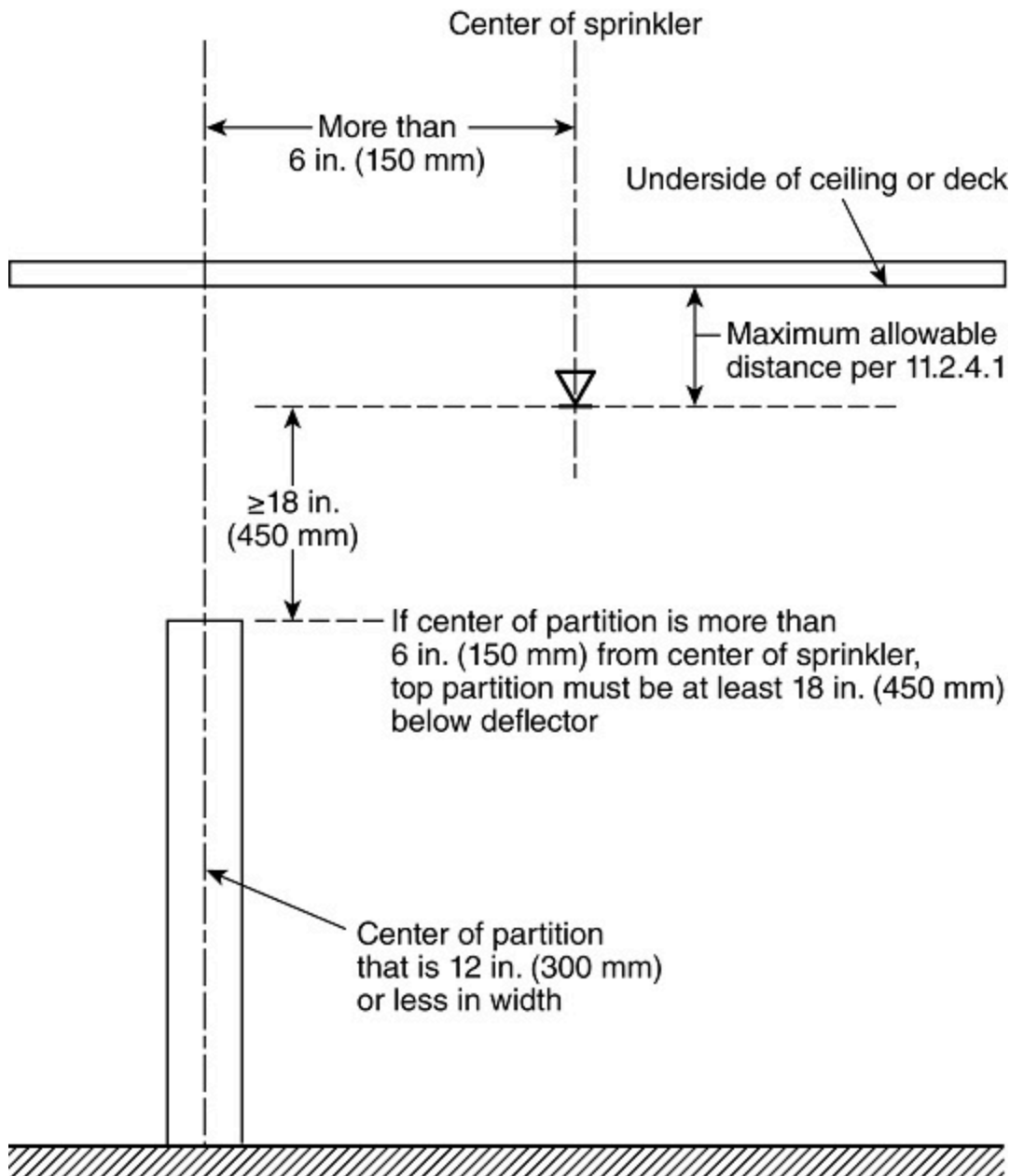
In light hazard occupancies, privacy curtains, as shown in Figure 11.2.5.2.2, shall not be considered obstructions where all of the following are met:

- (1) The curtains are supported by fabric mesh on ceiling track.
- (2) Openings in the mesh are equal to 70 percent or greater.
- (3) The mesh extends a minimum of 22 in. (550 mm) down from ceiling.

11.2.5.2.2.2

In ordinary hazard occupancies, where sprinklers are installed above freestanding partitions, room dividers, and similar obstructions, the distance from the sprinkler deflector to the top of the obstruction shall be 18 in. (450 mm) or greater per Figure 11.2.5.2.2.2.

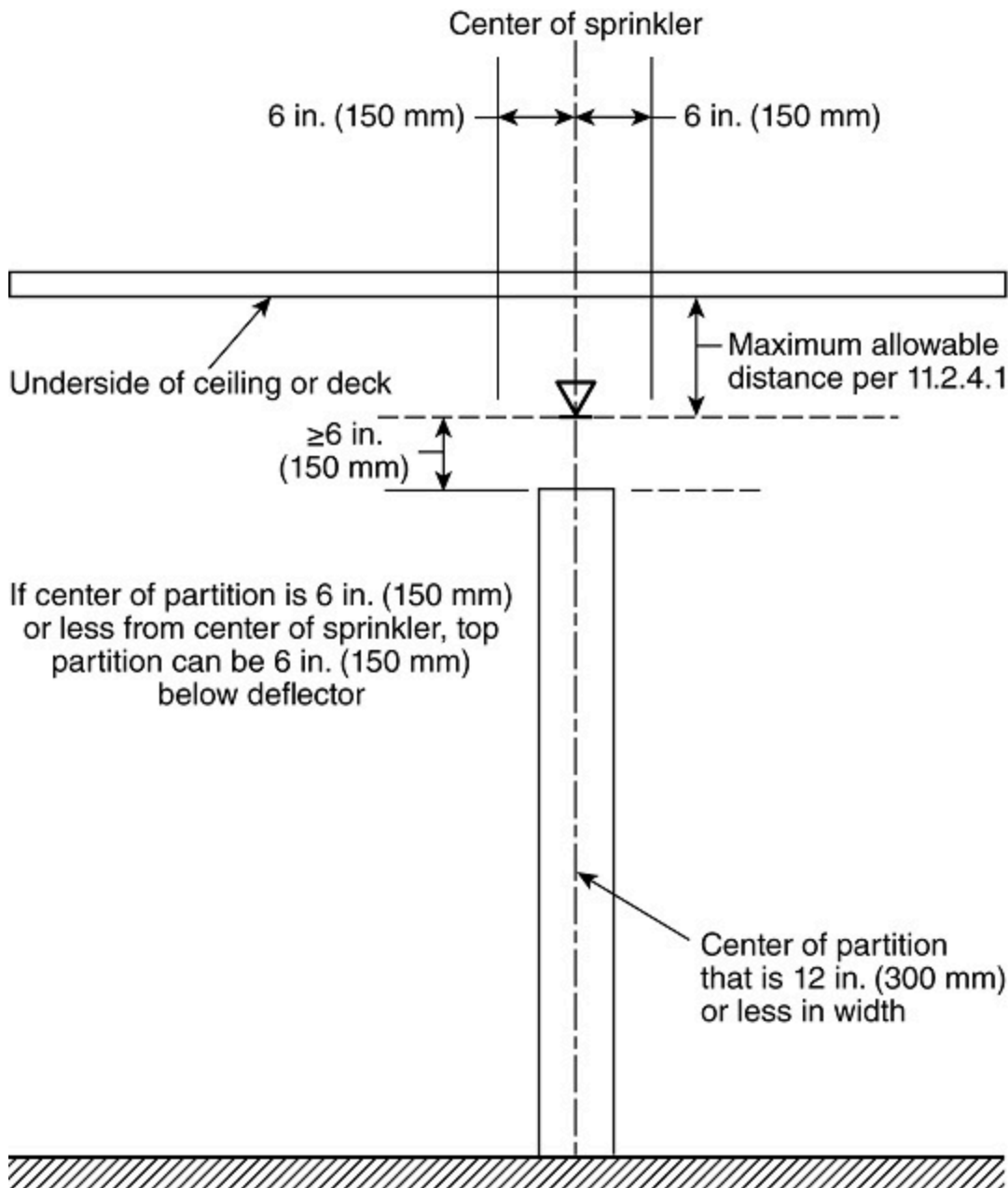
Figure 11.2.5.2.2.2 Location of Suspended or Floor-Mounted Obstruction in Ordinary Hazard Occupancies (Sprinkler Located to the Side) (ECU/ECP).



11.2.5.2.2.3

In ordinary hazard occupancies, where sprinklers are installed within 6 in. (150 mm) horizontally of the centerline of freestanding partitions, room dividers, and similar obstructions no greater than 12 in. (300 mm) in width, the distance from the sprinkler deflector to the top of the obstruction shall be permitted to be installed 6 in. (150 mm) or greater vertically per Figure 11.2.5.2.2.3.

Figure 11.2.5.2.2.3 Location of Suspended or Floor-Mounted Obstruction in Ordinary Hazard Occupancies (Sprinkler Located Directly Above) (ECU/ECP).



11.2.5.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

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 9.5.3.3. (See A.9.5.5.3.1.)

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

11.2.6.1 *

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

11.2.6.2

The 18 in. (450 mm) dimension shall not limit the height of shelving on a wall or shelving against a wall in accordance with 11.2.6.

11.2.6.2.1

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. (450 mm) below ceiling sprinkler deflectors.

11.2.6.2.2

Shelving, and any storage thereon, directly below the sprinklers shall not extend above a plane located 18 in. (450 mm) below the ceiling sprinkler deflectors.

11.2.6.3

The clearance from the top of storage to sprinkler deflectors shall not be less than 36 in. (900 mm) where rubber tires are stored.

11.2.6.4

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

11.2.7 Ceiling Pockets (Extended Coverage Upright and Pendent Spay Sprinklers).**11.2.7.1 ***

Except as allowed in 11.2.7.2 and 11.2.7.3, sprinklers shall be required in all ceiling pockets.

11.2.7.2

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

- (1) The total volume of the unprotected ceiling pocket does not exceed 1000 ft³ (28 m³).
- (2) The depth of the unprotected ceiling pocket does not exceed 36 in. (900 mm).
- (3) The entire floor under the unprotected ceiling pocket is protected by sprinklers at the lower ceiling elevation.
- (4)* 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).
- (5) The unprotected ceiling pocket has noncombustible or limited-combustible finishes.
- (6) Quick-response sprinklers are utilized throughout the compartment.

11.2.7.3

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

11.3 Extended Coverage Sidewall Spray Sprinklers. (See 10.2.9.2.)**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:

- (1) Light hazard occupancies with smooth, horizontal or sloped, flat ceilings
- (2) Ordinary hazard occupancies with smooth, flat ceilings where specifically listed for such use
- (3) 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)
- (4) In unobstructed or noncombustible obstructed construction, where specifically listed for such use
- (5) Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 7½ 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)
- (6) Extended coverage sidewall sprinklers installed in accordance with 11.3.6.2.2 in slopes exceeding a ceiling pitch of 2 in 12
- (7) In each bay of obstructed construction consisting of solid structural members that extend below the deflector of the sprinkler
- (8) Extended coverage sprinklers installed to protect areas below a single overhead door(s)
- (9) For the protection of exterior projections and similar structures
- (10) Under cars in car stackers and car lift systems with cars stacked vertically placed under each level of cars [see A.10.3.2(9)]

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 (A_s) 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 (A_s) 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	
	ft ²	m ²	ft	m	ft ²	m ²	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

Where sidewall extended spray sprinklers are installed to protect areas below overhead doors within ordinary hazard occupancy spaces or rooms, listed light hazard sidewall extended coverage spray sprinklers shall be permitted and the protection area and maximum sprinkler spacing for light hazard as specified in Table 11.3.3.2.1 shall be permitted.

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.

11.3.4.4.1

Sidewall sprinklers shall be permitted to be installed on opposing or adjacent walls, provided no sprinkler is located within 12 ft (3.7 m) of the opposing sprinkler.

11.3.4.4.2

Sprinklers installed on the same wall shall be not located within 8 ft (2.4 m) of any other sprinkler unless the listing of the sprinkler requires a greater distance, or unless required by 11.3.5.1.4.1, or separated by baffles that comply with the following:

- (1) Baffles shall be arranged to protect the actuating elements.
- (2) Baffles shall be of solid and rigid material that will stay in place before and during sprinkler operation.
- (3) Baffles shall be not less than 8 in. (200 mm) long and 6 in. (150 mm) high.
- (4) The tops of baffles shall extend between 2 in. and 3 in. (50 mm and 75 mm) above the deflectors.
- (5) 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. (See A.10.3.5.1.2.1.)

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(a) or Table 11.3.6.1.3(b) and Figure 11.3.6.1.3.

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

Distance from Sprinkler to Side of Obstruction (A) (ft)	Allowable Distance of Deflector Above Bottom of Obstruction (B) (in.)
Less than 8	0
8 or more	1 or less
10 or more	2 or less
11 or more	3 or less
12 or more	4 or less
13 or more	6 or less
14 or more	7 or less
15 or more	9 or less
16 or more	11 or less
17 or more	14 or less

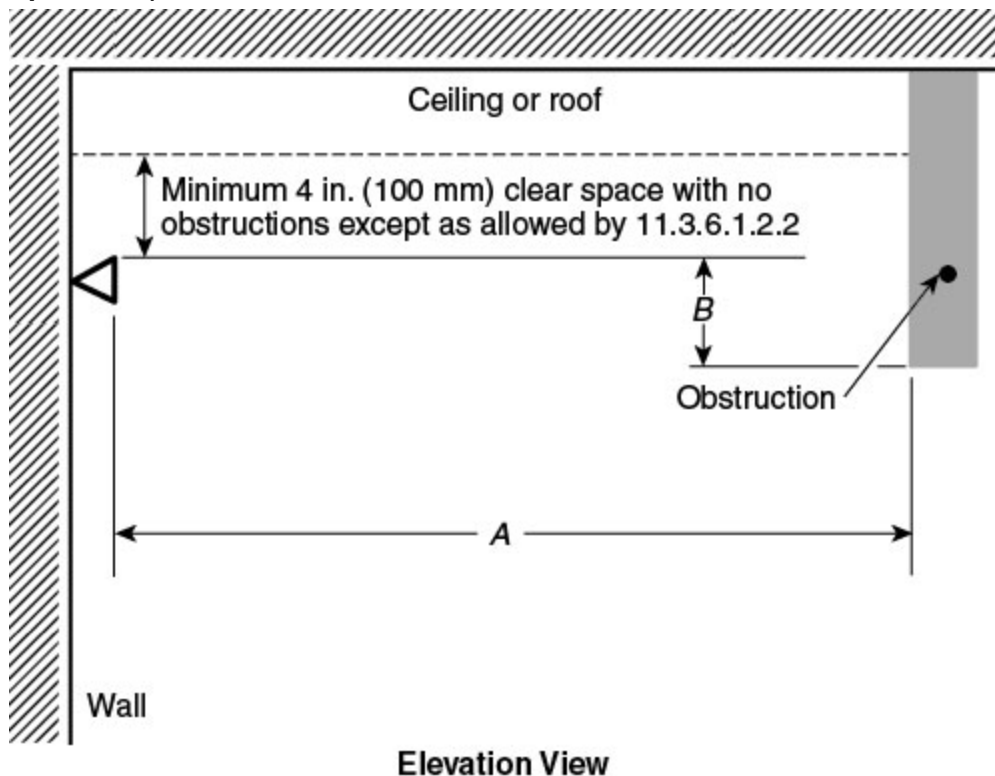
Note: For A and B, refer to Figure 11.3.6.1.3.

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

Distance from Sprinkler to Side of Obstruction (A) (mm)	Allowable Distance of Deflector Above Bottom of Obstruction (B) (mm)
Less than 2400	0
2400 or more	25 or less
3000 or more	50 or less
3400 or more	75 or less
3700 or more	100 or less
4000 or more	150 or less
4300 or more	175 or less
4600 or more	225 or less
4900 or more	275 or less
5200 or more	350 or less

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:

- (1) Sprinklers shall be installed in accordance with Table 11.3.6.1.4(a) or Table 11.3.6.1.4(b) and Figure 11.3.6.1.4(a).
- (2) 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.
- (3) 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).
- (4) 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.

- (5) Obstructions with a maximum width of 12 in. (300 mm) in hallways up to 6 ft (1.8 m) in width shall be permitted in accordance with Figure 11.3.6.1.4(d) when the sprinkler is located in the allowable obstruction zone and the closest edge of the obstruction is a minimum of 12 in. (300 mm) away from the deflector.

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

Distance from Sprinkler to Side of Obstruction (A) (ft)	Allowable Distance of Deflector Above Bottom of Obstruction (B) (in.)
Less than 1½	0
1½ or more	1 or less
3 ft or more	3 or less
4 ft or more	5 or less
4½ or more	7 or less
6 ft or more	9 or less
6½ or more	11 or less
7 or more	14 or less

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

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

Distance from Sprinkler to Side of Obstruction (A) (mm)	Allowable Distance of Deflector Above Bottom of Obstruction (B) (mm)
Less than 450	0
450 or more	25 or less
900 or more	75 or less
1200 or more	125 or less
1400 or more	175 or less
1800 or more	225 or less
2000 or more	275 or less
2100 or more	350 or less

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).

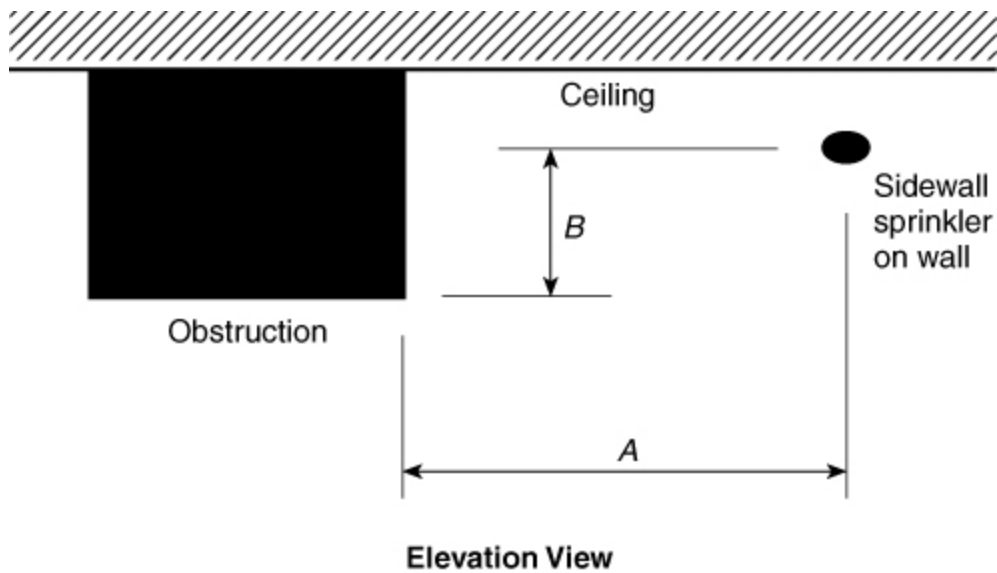


Figure 11.3.6.1.4(b) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinklers).

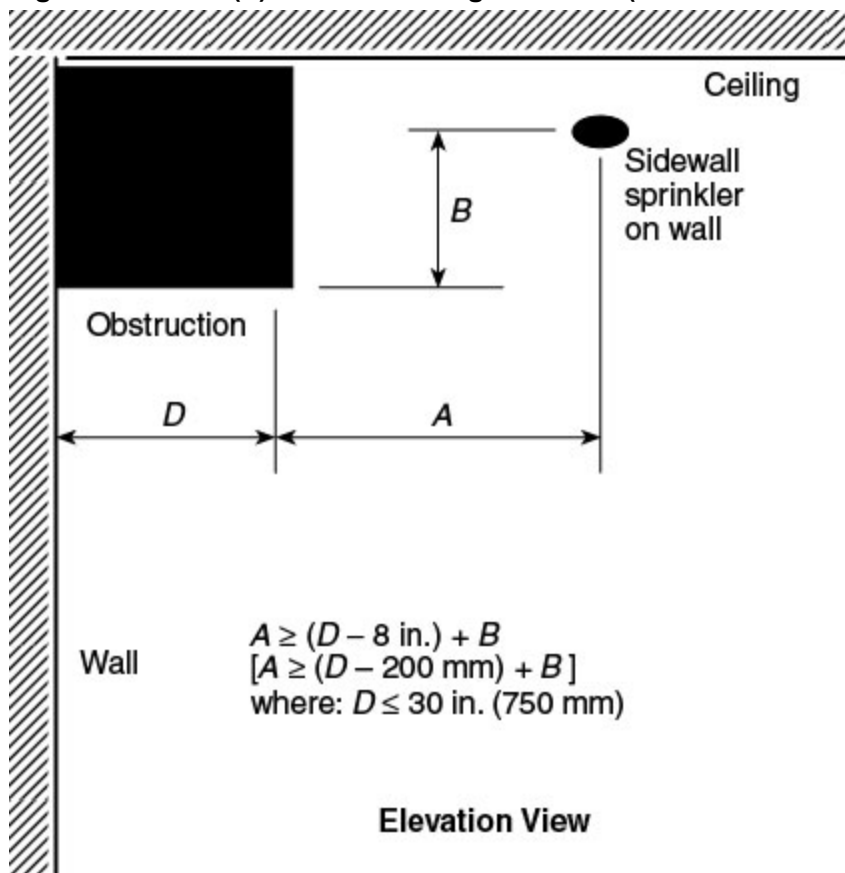


Figure 11.3.6.1.4(c) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinklers).

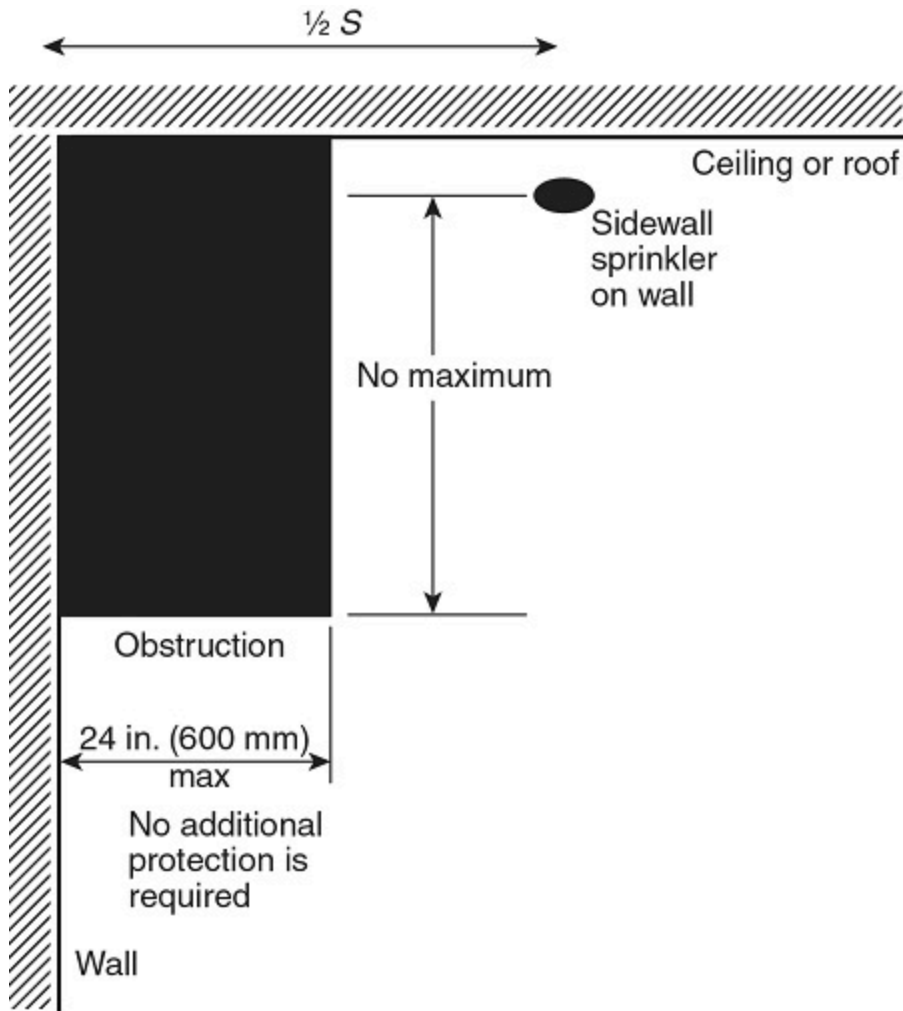
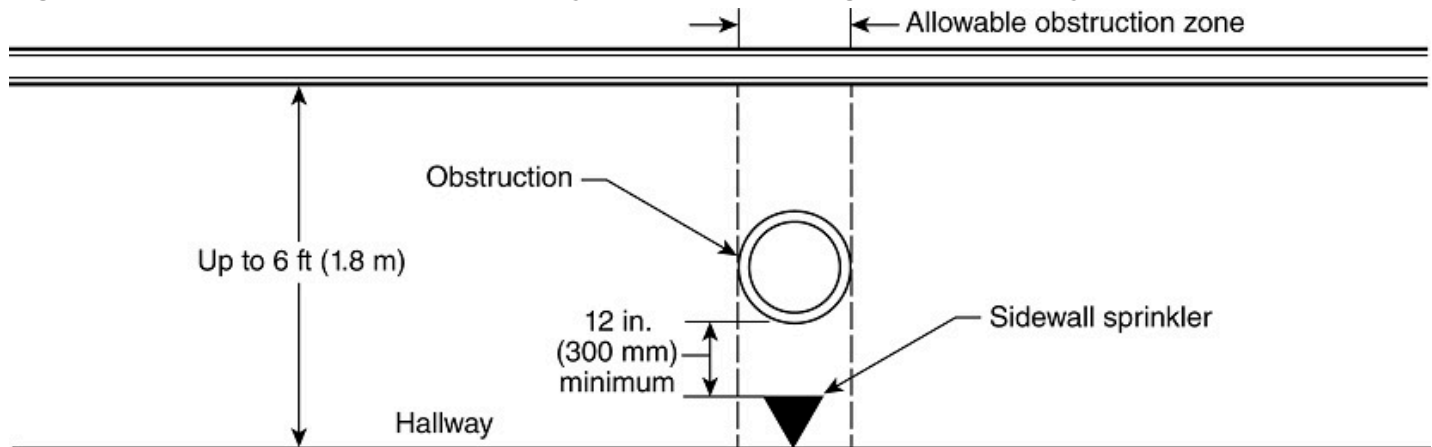


Figure 11.3.6.1.4(d) Obstruction in Hallway (Extended Coverage Sidewall Spray Sprinklers).



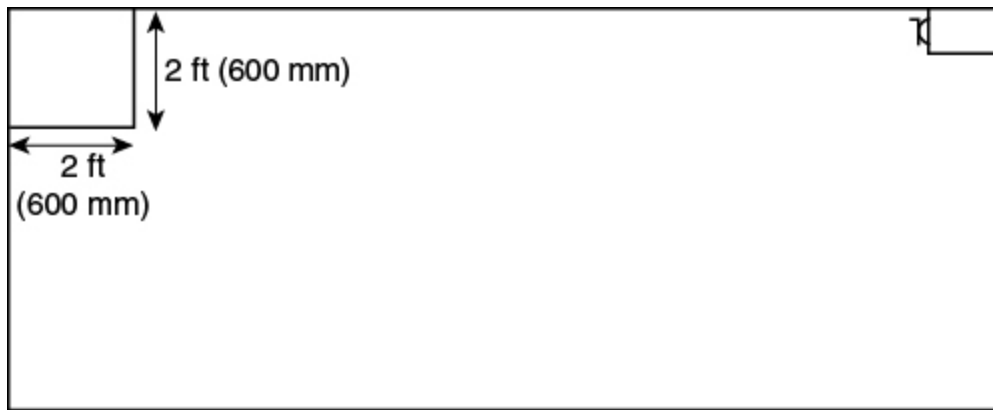
11.3.6.1.5 Isolated Obstructions.

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 in accordance with Figure 11.3.6.1.6.

Figure 11.3.6.1.6 Permitted Obstruction on Wall Opposite EC Sidewall Sprinkler.



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.

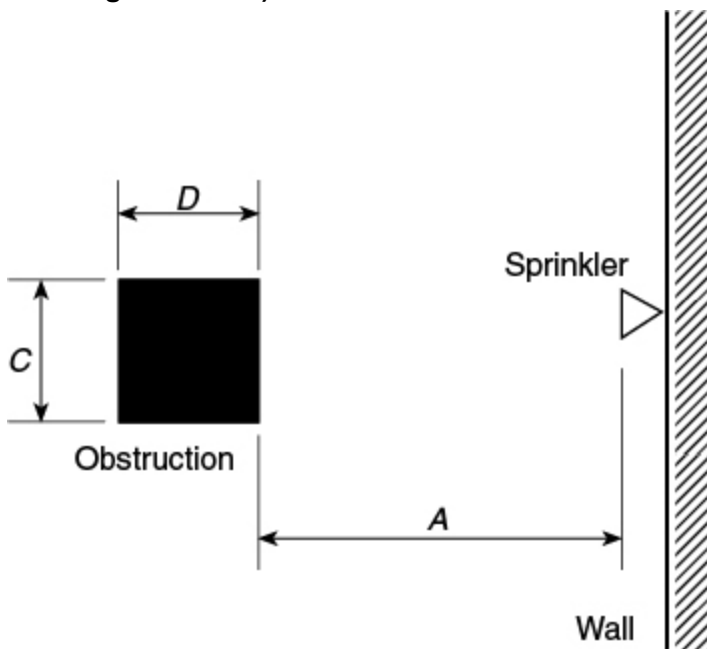
11.3.6.2.1.2

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).

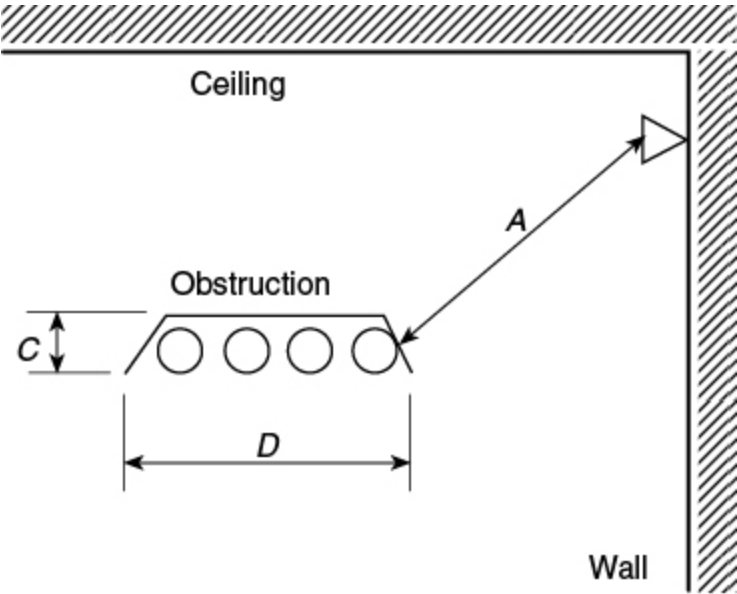
Figure 11.3.6.2.1.3(a) Minimum Distance from an Obstruction in the Vertical Orientation (Extended Coverage Sidewall).



Plan View of Column
(Obstruction in vertical orientation)

$A \geq 4C \text{ or } 4D$
(Use dimension C or D , whichever is greater)

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



Elevation View of Pipe Conduit or Light Fixture
(Obstruction in horizontal orientation)

$A \geq 4C \text{ or } 4D$
 $A \leq 36 \text{ in. (900 mm)}$

(Use dimension C or D, whichever is greater)

- (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).

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(a) or Table 11.3.6.2.2(b) and Figure 11.3.6.2.2.

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

Horizontal Distance (A) (in.)	Minimum Vertical Distance Below Deflector (B) (in.)
6 or less	3 or more
9 or less	4 or more
12 or less	6 or more
15 or less	8 or more
18 or less	9½ or more

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

24 or less	12½ or more
30 or less	15½ or more
More than 30	18 or more

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

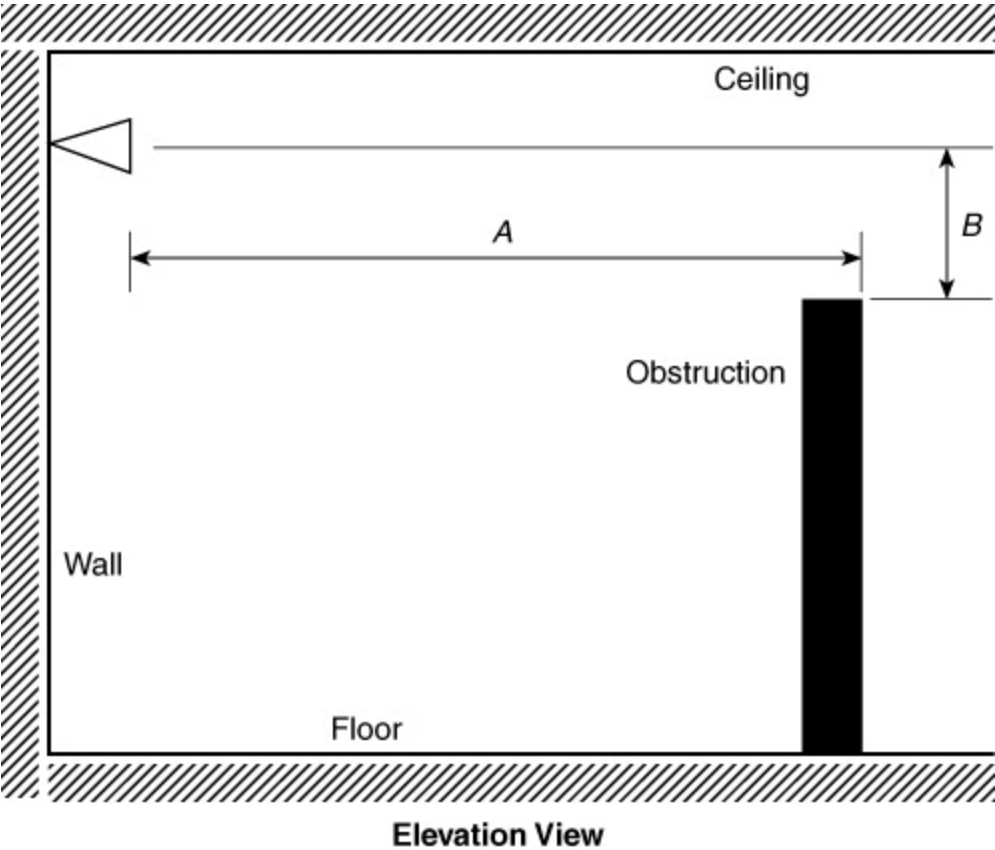
Table 11.3.6.2.2(b) Suspended or Floor-Mounted Obstructions in Light Hazard Occupancies Only (Extended Coverage Sidewall Sprinklers)

Horizontal Distance (A) (mm) Minimum Vertical Distance Below Deflector (B) (mm)

150 or less	75 or more
225 or less	100 or more
300 or less	150 or more
375 or less	200 or more
450 or less	240 or more
600 or less	315 or more
750 or less	390 or more
More than 750	450 or more

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:

- (1) The curtains are supported by fabric mesh on ceiling track.
- (2) Openings in the mesh are equal to 70 percent or greater.
- (3) 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.

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 9.5.5.3.

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.

11.3.7.1

The 18 in. (450 mm) dimension shall not limit the height of shelving on a wall in accordance with 11.3.7.1.1.

11.3.7.1.1

Where shelving is installed on a wall and is not directly below the sprinklers, the shelves, including storage thereon, shall be permitted to extend above the level of a plane located 18 in. (450 mm) below the sprinkler deflectors.

11.3.7.1.2

Shelving, and any storage thereon, directly below the sprinklers shall not extend above a plane located 18 in. (450 mm) below the ceiling sprinkler deflectors.

11.3.7.2

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