



13.1 General.

Control mode specific application (CMSA) 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.

13.2 CMSA Sprinklers.

13.2.1 General.

All requirements of Section 9.5 shall apply to CMSA sprinklers except as modified in Section 13.2.

13.2.1.1

CMSA pendent sprinklers shall be installed in accordance with Section 9.5 and the manufacturer's installation instructions in lieu of the requirements in Section 13.2.

13.2.1.2

CMSA sprinklers shall be installed only in buildings where the roof or ceiling slope does not exceed 4 in 12.

13.2.1.3

CMSA sprinklers shall be permitted to be used in wet, dry, or preaction systems and shall be installed in accordance with their listing.

13.2.2 Temperature Ratings.

13.2.2.1

Unless the requirements of 13.2.2.2, 13.2.2.3, or 13.2.2.4 are met, sprinkler temperature ratings shall be the same as those indicated in Table 9.4.2.5(a) and Table 9.4.2.5(b) or those used in large-scale fire testing to determine the protection requirements for the hazard involved.

13.2.2.2

Sprinklers of intermediate- and high-temperature ratings shall be installed in specific locations as required by 9.4.2.

13.2.2.3

In storage occupancies, ordinary, intermediate, or high temperature-rated sprinklers shall be used for wet pipe systems.

13.2.2.4

In storage occupancies, high temperature-rated sprinklers shall be used for dry pipe systems.

13.2.3 Occupancy and Hazard.

13.2.3.1

Quick-response CMSA sprinklers designed to meet any applicable CMSA criteria in Chapters 20, 22, 24, 25, and 26 shall be permitted to protect light and ordinary hazard occupancies.

13.2.3.2

Standard-response CMSA sprinklers designed to meet any applicable CMSA criteria in Chapters 20, 22, 24, 25, and 26 shall be permitted to protect ordinary hazard occupancies.

13.2.4 * Protection Areas per Sprinkler (CMSA Sprinklers).

13.2.4.1 Determination of Protection Area of Coverage.

The protection area of coverage per sprinkler (A_s) shall be determined in accordance with 9.5.2.1.

13.2.4.2 Maximum Protection Area of Coverage.

13.2.4.2.1

The maximum allowable protection area of coverage for a sprinkler (A_s) shall be in accordance with the value indicated in Table 13.2.4.2.1.

Table 13.2.4.2.1 Protection Areas and Maximum Spacing for CMSA Sprinklers

Construction Type	Protection Area		Maximum Spacing	
	ft ²	m ²	ft	m
Noncombustible unobstructed	130	12	12	3.7
Noncombustible obstructed	130	12	12	3.7
Combustible unobstructed	130	12	12	3.7
Combustible obstructed	100	9	10	3.0
Rack storage combustible obstructed	100	9	10	3.0
Rack storage unobstructed and noncombustible obstructed	100	9	12	3.7

13.2.4.2.2

In any case, the maximum area of coverage of any sprinkler shall not exceed 130 ft² (12 m²).

13.2.4.3 Minimum Protection Area of Coverage.

The minimum allowable protection area of coverage for a sprinkler (A_s) shall be not less than 80 ft² (7.4 m²).

13.2.5 Sprinkler Spacing (CMSA Sprinklers).

13.2.5.1 * Maximum Distance Between Sprinklers.

13.2.5.1.1

Under unobstructed and obstructed noncombustible construction and unobstructed combustible construction, the distance between sprinklers shall be limited to not more than 12 ft (3.7 m) between sprinklers, as shown in Table 13.2.4.2.1.

13.2.5.1.2

Under obstructed combustible construction, the maximum distance shall be limited to 10 ft (3 m).

13.2.5.2 Maximum Distance from Walls.

The distance from sprinklers to walls shall not exceed one-half of the allowable distance permitted between sprinklers as indicated in Table 13.2.4.2.1.

13.2.5.3 Minimum Distance from Walls.

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

13.2.5.4 Minimum Distance Between Sprinklers.

Sprinklers shall be spaced not less than 8 ft (2.4 m) on center.

13.2.5.4.1

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 comply with the criteria in 14.2.10.2.1.
- (2) Baffles shall be 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. (50 mm) and 3 in. (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.

13.2.5.4.2 *

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, sprinklers in adjacent channels shall be permitted to be placed less than 8 ft (2.4 m) on center.

13.2.6 Deflector Position (CMSA Sprinklers).

13.2.6.1 * Distance Below Ceilings.

13.2.6.1.1 Unobstructed Construction.

Under unobstructed construction, the distance between the sprinkler deflector and the ceiling shall be a minimum of 6 in. (150 mm) and a maximum of 8 in. (200 mm).

13.2.6.1.2 Obstructed Construction.

13.2.6.1.2.1 Obstructed Construction for Ceilings with Slopes Not Exceeding 1 in 12.

Where the slope of the ceiling does not exceed 1 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

- (1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.
- (2) Where the maximum depth of the noncombustible structural members, including concrete tees, is 18 in. (450 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.
- (3) Where the maximum depth of the noncombustible structural members, including concrete tees, is greater than 18 in. (450 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the noncombustible structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft³ (11.3 m³).
- (4) Where wood joists or composite wood joists are provided with blocking to the full depth of the joists with material equivalent to or less combustible than the web construction so that individual channel volumes do not exceed 400 ft³ (11.3 m³), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

13.2.6.1.2.2 Obstructed Construction Less than or Equal to 50 Percent Open for Ceilings with Slopes Not Exceeding 2 in 12.

Where the slope of the ceiling is greater than 1 in 12, but does not exceed 2 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

- (1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.
- (2) Where the maximum depth of the noncombustible structural members, including concrete tees, is 12 in. (300 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.
- (3) Where the maximum depth of the noncombustible structural members, including concrete tees, is greater than 12 in. (300 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the noncombustible structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft³ (11.3 m³).
- (4) Where wood joists or composite wood joists are provided with blocking to the full depth of the joists with material equivalent to or less combustible than the web construction so that individual channel volumes do not exceed 400 ft³ (11.3 m³), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

13.2.6.1.2.3 Obstructed Construction Less than or Equal to 50 Percent Open for Ceilings with Slopes Not Exceeding 4 in 12.

Where the slope of the ceiling is greater than 2 in 12, but does not exceed 4 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

- (1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.
- (2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm) and are installed perpendicular to the ceiling slope, sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 300 ft³ (8.5 m³).

13.2.6.1.2.4 Obstructed Construction Greater than 50 Percent Open.

Where the slope of the ceiling is greater than 1 in 12 under obstructed construction that is greater than 50 percent open, sprinklers shall be installed in accordance with the rules for unobstructed construction.

13.2.7 * Obstructions to Sprinkler Discharge (CMSA Sprinklers).**13.2.7.1 General.****13.2.7.1.1**

In addition to the requirements of 9.5.5, CMSA sprinklers shall be arranged in accordance with 13.2.7 to minimize obstruction to their discharge pattern, or supplemental sprinklers shall be provided to ensure adequate coverage of the hazard.

13.2.7.1.2

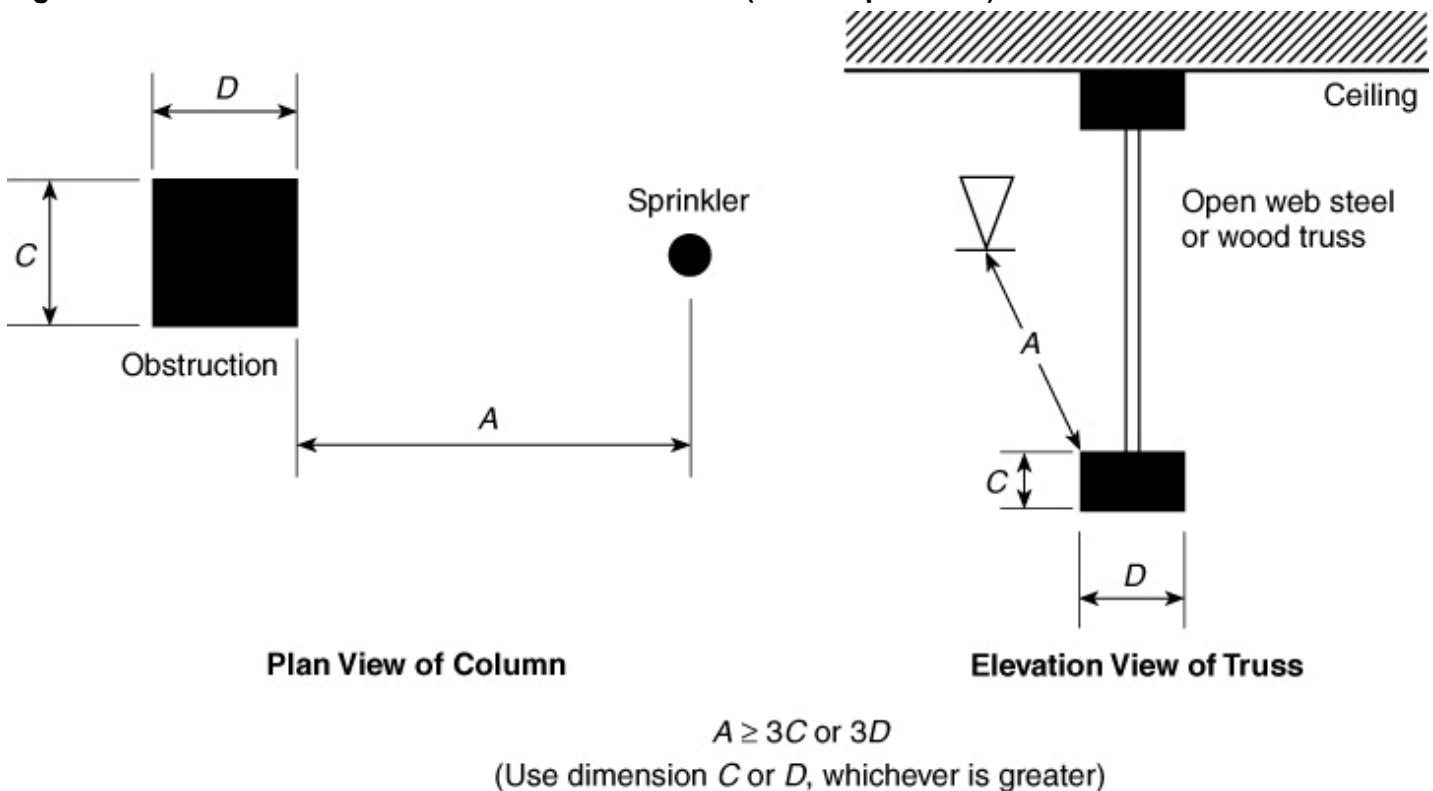
CMSA sprinklers with a special obstruction allowance shall be installed according to their listing.

13.2.7.2 Obstructions to Sprinkler Discharge Pattern Development.**13.2.7.2.1 ***

In addition to the requirements of 13.2.7.2.2, CMSA sprinklers shall be arranged in accordance with 14.2.10.2 to minimize obstruction to the development of their discharge pattern.

13.2.7.2.2 *

Unless the requirements of 14.2.10.2 are met, for obstructions 8 in. (200 mm) wide or less in width, as shown in Figure 13.2.7.2.2, sprinklers shall be positioned such that they are located at least a distance three times greater than the maximum dimension of the obstruction from the sprinkler.

Figure 13.2.7.2.2 Minimum Distance from Obstruction (CMSA Sprinklers).**13.2.7.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.**

CMSA sprinklers shall be arranged in accordance with 14.2.10.3 to minimize obstruction to sprinkler discharge reaching the hazard. (See A.9.5.5.3.1.)

13.2.8 Clearance to Storage (CMSA Sprinklers).

The clearance between the deflector and the top of storage shall be 36 in. (900 mm) or greater.