

## Model CC3—4.2 and 5.6 K-factor Combustible Concealed Space Sprinklers Specific Application, Upright

### IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

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[docs.jci.com/tycofire/TFP633](http://docs.jci.com/tycofire/TFP633)

## General Description

The Model CC3 Combustible Concealed Sprinklers are quick response, upright, specific application sprinklers designed to provide protection of specific light hazard combustible, as well as non-combustible, concealed spaces requiring sprinkler protection. The Model CC3 Sprinklers comply with the criteria for the protection of combustible concealed spaces as described in NFPA 13.

The Model CC3 Sprinklers are designed for installation on BLAZE-MASTER CPVC wet pipe systems, other UL Listed CPVC pipe products,

and steel wet pipe or dry pipe sprinkler systems (see the respective Design Criteria sections). The Model CC3 Sprinklers are designed to be installed in the following arrangements for both wet CPVC and steel:

- 4.2K  
14 ft (4,3 m) maximum between sprinklers  
196 ft<sup>2</sup> (18,2 m<sup>2</sup>) maximum coverage area
- 5.6K  
16 ft (4,9 m) maximum between sprinklers  
256 ft<sup>2</sup> (23,8 m<sup>2</sup>) maximum coverage area
- 6 in. (152,4 mm) minimum height for joist with steel pipe or CPVC when insulation filled. 12 in. (305 mm) minimum height for all other arrangements and sizes
- 60 in. (1524 mm) maximum height from joist to joist and 84 in. (2134 mm) from floor to ceiling
- 60 in. (1524 mm) maximum height for truss and bar joist

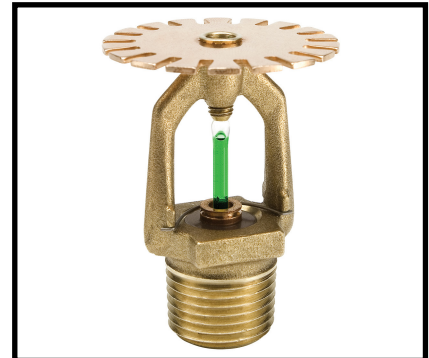
### NOTICE

The Model CC3 Combustible Concealed Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

## Sprinkler Identification Number

TY2199 – Upright, 4.2K  
TY3199 – Upright, 5.6K



## Technical Data

### Approvals

UL Listed

(Listings and approvals only apply to the service conditions indicated in the Design Criteria sections.)

### Antifreeze Compatibility

Model CC3 TY2199 4.2K and TY3199 5.6K Sprinklers can be used with:

- LFP® Antifreeze in accordance with Technical Data Sheet TFP1680, LFP® Antifreeze Agency Listed Solution for Fire Sprinkler Systems
- LFP® Antifreeze+ in accordance with Technical Data Sheet TFP1682, LFP® Antifreeze+ Agency Listed Solution for Fire Sprinkler Systems

### Maximum Working Pressure

175 psi (12,1 bar)

### Pipe Thread Connection

½ in. NPT

### Discharge Coefficient

K = 4.2 GPM/psi<sup>1/2</sup> (60,5 LPM/bar<sup>1/2</sup>)  
K = 5.6 GPM/psi<sup>1/2</sup> (80,6 LPM/bar<sup>1/2</sup>)

### Temperature Rating

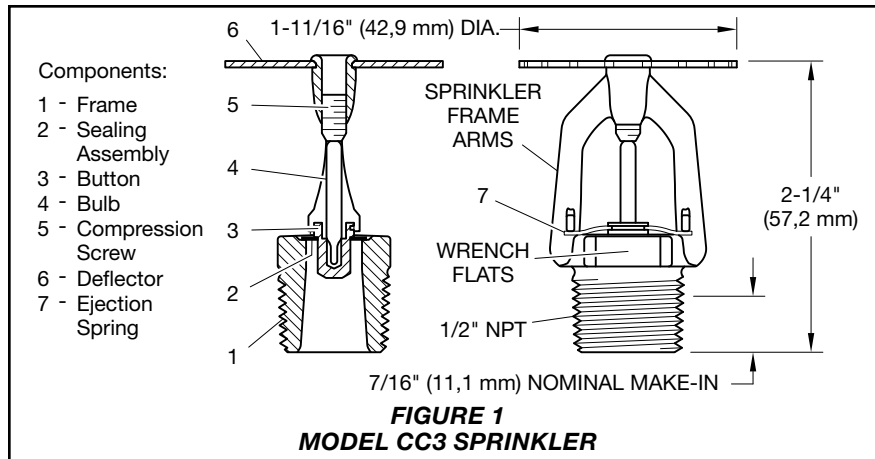
200°F (93°C)

### Finish

Natural Brass

### Physical Characteristics

Frame	.....	Brass
Button	.....	Bronze
Sealing Assembly	.....	Beryllium Nickel w/TEFLON
Bulb	.....	Glass (3 mm)
Compression Screw	.....	Brass
Deflector	.....	Bronze



## Operation

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb allowing the sprinkler to activate and flow water.

## Design Criteria

Design criteria is provided as follows:

- 200°F (93°C), Model CC3 Combustible Concealed Sprinklers with CPVC pipe and horizontal slope above sprinklers not exceeding 2:12, see Area of Use (CPVC Pipe)
- 200°F (93°C), Model CC3 Combustible Concealed Sprinklers with steel pipe and horizontal slope above sprinklers not exceeding 2:12, see Area of Use (Steel Pipe)
- For the installation of Model CC3 Combustible Concealed Sprinklers installed with baffles at 2000 ft<sup>2</sup> (186 m<sup>2</sup>), the design of the system should be 6 sprinklers or 1000 ft<sup>2</sup> (93 m<sup>2</sup>), whichever is greater.
- For the installation of 5.6K Model CC3 Combustible Concealed Sprinklers installed without the use of draft curtains for unobstructed solid wood truss construction on edge or on face or unobstructed bar joist construction, the design of the system should be 9 sprinklers or 1000 ft<sup>2</sup> (93 m<sup>2</sup>), whichever is greater.

## Design Criteria, CPVC Pipe

### Area of Use (CPVC Pipe)

Horizontal (slope not exceeding 2:12) combustible concealed spaces of:

- Unobstructed wood truss construction or unobstructed bar joist construction, see Figure 2

- Non-combustible, insulation-filled solid wood or composite wood joist construction, see Figure 3

**NOTE:** *In order to be considered "non-combustible insulation-filled solid wood or composite wood joist construction," the insulation (including insulation provided with a combustible vapor barrier), must completely fill the pockets between the joists to the bottom of the joists, and the insulation must be secured in place with metal wire netting. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the Model CC3 Sprinklers in the event of a fire.*

### Concealed Space Area (CPVC Pipe)

The area of the concealed space is not limited.

The 4.2K sprinkler is UL listed for a 1000 ft<sup>2</sup> (93 m<sup>2</sup>) draft curtain area as shown in Figures 2 and 3.

The 5.6K sprinkler is UL Listed for a 2000 ft<sup>2</sup> (186 m<sup>2</sup>) draft curtain area as shown in Figure 3. In addition, it may be used without draft curtains as shown in Figure 2 for unobstructed wood truss construction, on edge or on face, or for unobstructed bar joist construction.

This draft curtain shall be at least 1/3 the depth of the concealed space or 8 in. (200 mm), whichever is greater, and be constructed using a material that will not allow heat to escape through or above the draft curtain.

For information about the use of anti-freeze see the Technical Data section.

### Concealed Space Size (CPVC Pipe)

The depth of the concealed space is 60 in. (1524 mm) maximum to 6 in. (152 mm) minimum.

### System Type (CPVC Pipe)

Light hazard, wet pipe system

**Maximum Distance Between Model CC3 Sprinklers (CPVC Pipe)**  
 TY2199 4.2K. . . . . 14 ft (4,3 m)  
 TY3199 5.6K. . . . . 16 ft (4,9 m)

**Maximum Coverage Area (CPVC Pipe)**  
 TY2199 4.2K. . . . . 196 ft<sup>2</sup> (18,2 m<sup>2</sup>)  
 TY3199 5.6K. . . . . 256 ft<sup>2</sup> (23,8 m<sup>2</sup>)

**Minimum Distance Between Model CC3 Sprinklers (CPVC Pipe)**  
 Minimum sprinkler spacing is 7 ft (2,1 m)

**NOTE:** *Minimum spacing does not apply to any additional sprinklers required for protection of CPVC pipe that is offset over an obstruction.*

- Deflector Position (CPVC Pipe)**
- 1-1/2 in. to 4 in. (40 to 100 mm) below upper deck for wood truss construction or bar joist construction, see Figure 2

- 1-1/2 in. to 4 in. (40 to 100 mm) below solid wood or composite wood joists, see Figure 3

**Minimum Distance Away From Trusses (CPVC Pipe)**  
 4-1/2 in. (114 mm)

**Remote Area (CPVC Pipe)**  
 The remote area is 1000 ft<sup>2</sup> (93 m<sup>2</sup>)

The remote area for unobstructed solid wood truss construction or unobstructed bar joist construction without the use of draft curtains is 9 sprinklers or 1000 ft<sup>2</sup> (93 m<sup>2</sup>), whichever is greater.

**NOTE:** *The remote area does not include any additional sprinklers required for protection of CPVC pipe that is offset over an obstruction.*

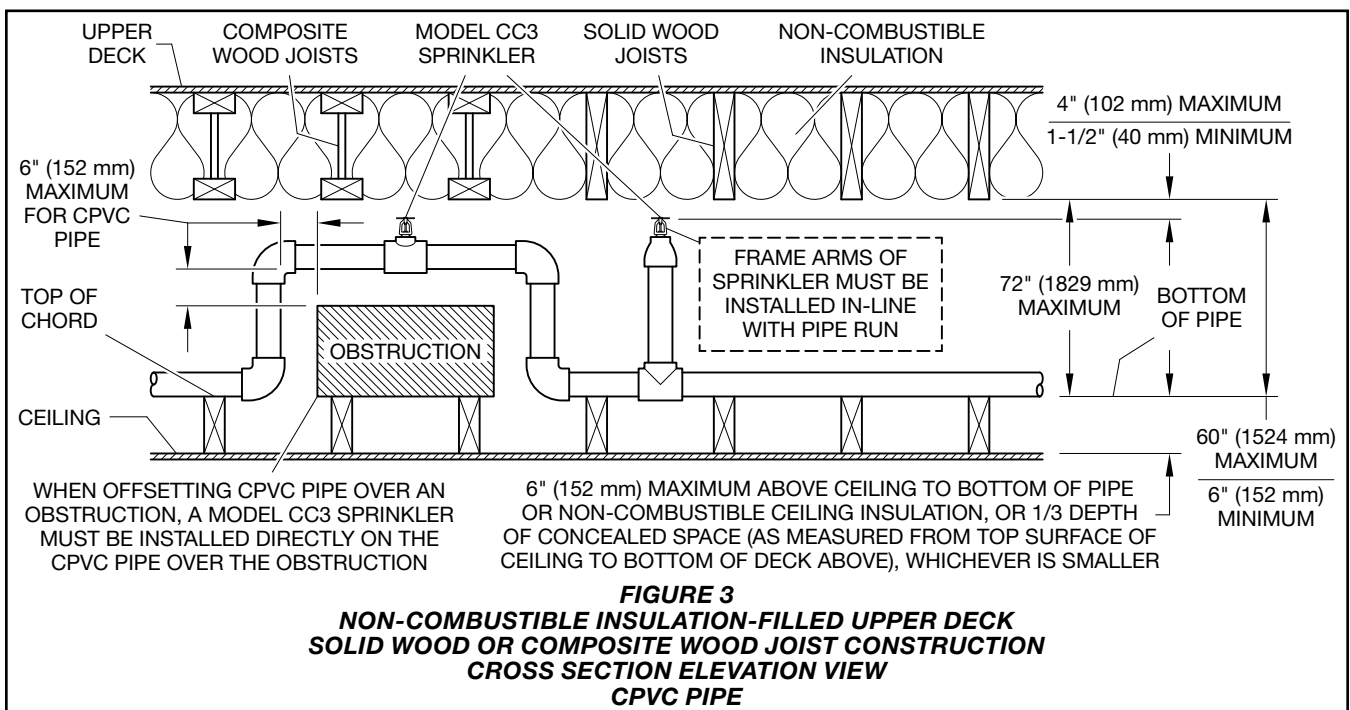
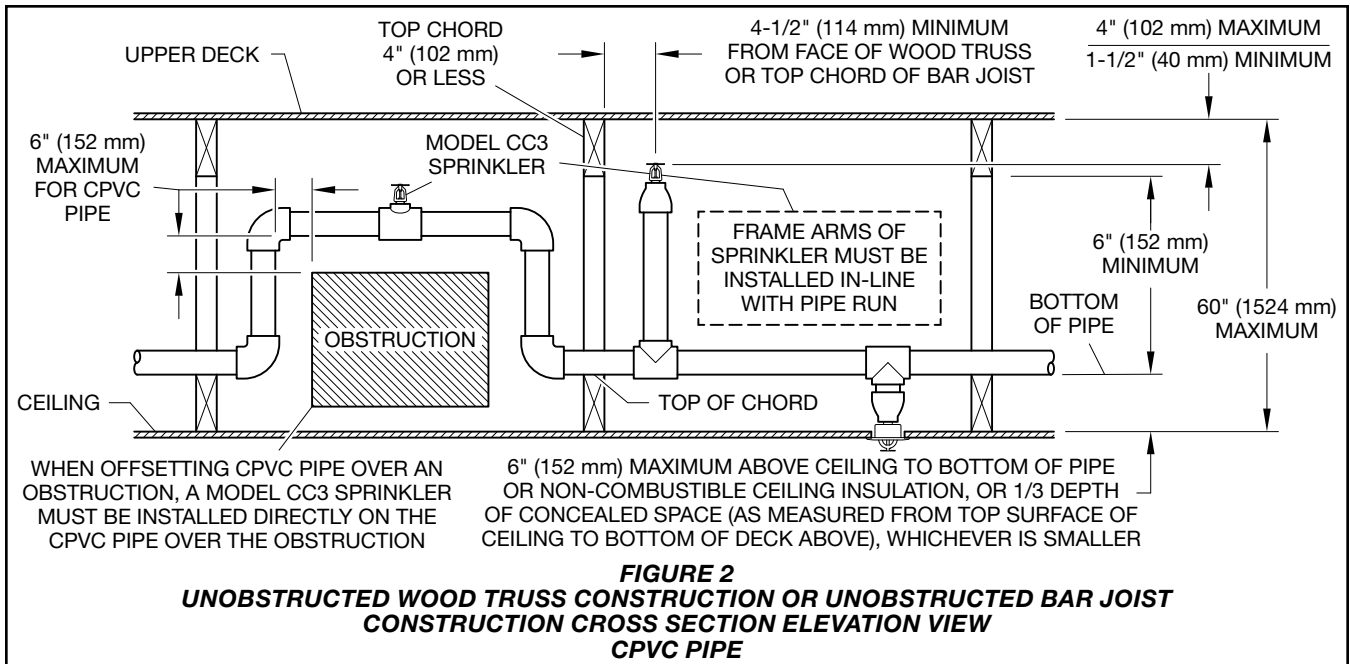
**Required Minimum Density (CPVC Pipe)**  
 0.10 gpm/ft<sup>2</sup> (4,1 mm/min)

**Minimum Operating Pressure (CPVC Pipe)**  
 7 psi (0,48 bar)

**Obstructions (CPVC Pipe)**  
 See Figure 8 in this data sheet for obstructions rules.

## Use of UL Listed BLAZEMASTER CPVC Pipe with Model CC3 Sprinklers

BLAZEMASTER CPVC product may be used in concealed spaces requiring automatic sprinklers, when used in conjunction with Model CC3 Sprinklers. In order to use the BLAZEMASTER CPVC product for wood truss or bar joist construction, the horizontal run of pipe must be a maximum of 6 in. (150 mm) above the ceiling or noncombustible ceiling insulation, or 1/3 the depth of concealed space (as measured from the top surface of the ceiling to the bottom of the deck



above), whichever is smaller, see Figure 2. For insulation-filled solid wood or composite wood joist construction, the horizontal run of pipe must be a maximum of 6 in. (150 mm) above ceiling or non-combustible ceiling insulation, or 1/3 the depth of concealed space (as measured from the top surface of the ceiling to the bottom surface of the joist insulation above), whichever is smaller, see Figure 3. The CPVC pipe can then be used to supply the Model CC3 Sprinklers, as well as the sprinklers below the ceiling. Unless modified by this technical data sheet,

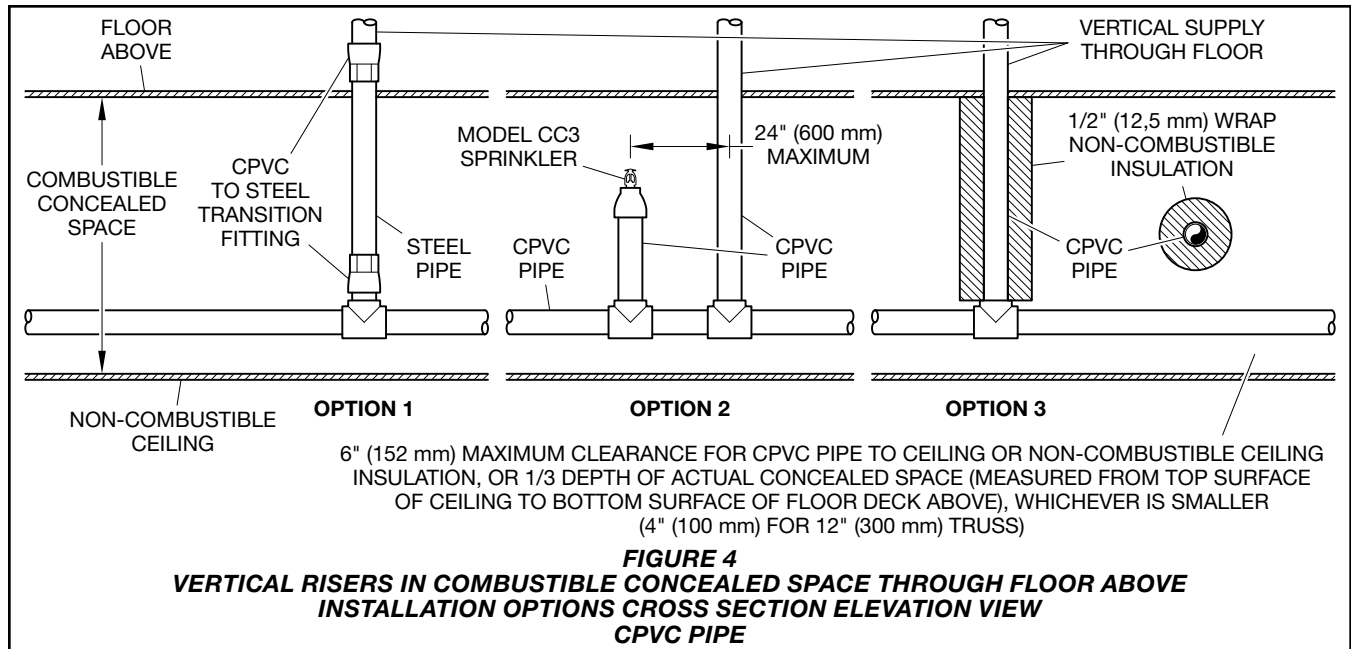
all other guidelines of the “BLAZEMASTER – Installation Instructions & Technical Manual” must be met. When using 1 in. (DN25) or larger pipe, a hanger must be located at the truss nearest a sprig for purposes of restraint. If using 3/4 in. (DN20) piping, all sprigs over 12 inches (305 mm) must be laterally braced using methods described in the NFPA standards.

Where the CPVC must be offset up and over an obstruction and the pipe exceeds the allowed horizontal positioning requirements specified above

as well as shown in Figures 2 and 3, additional Model CC3 Sprinklers are to be installed as shown in Figures 2 and 3 to protect the BLAZEMASTER CPVC product.

A minimum lateral distance of 18 in. (460 mm) must be maintained between the CPVC pipe and heat pumps, fan motors, and heat lamps.

Where CPVC piping is installed as a vertical riser to the next floor above, see Figure 4 for installation options.



## Design Criteria, Steel Pipe

### Area of Use (Steel Pipe)

Horizontal (slope not exceeding 2:12) combustibles concealed spaces of:

- unobstructed wood truss construction or unobstructed bar joist construction, see Figure 5
- solid wood joist construction, see Figure 6, where the upper deck and ceiling joists may have a maximum depth of 12 inches (300 mm) and typical on center joist spacing of minimum 16 inches (400 mm).
- non-combustible insulation-filled solid wood joist or wood composite joist construction, see Figure 7
- Obstructed wood truss construction, see Figure 8

**NOTE:** In order to be considered “non-combustible insulation-filled solid wood joist or composite wood joist construction”, the insulation (including insulation provided with a combustible vapor barrier), must completely fill the pockets between the joists to the bottom of the joists, and the insulation must be secured in place with metal wire netting. The metal wire netting is intended to hold the insulation in place should the insulation become wetted by the operation of the Model CC3 Sprinklers in the event of a fire.

### Concealed Space Area (Steel Pipe)

The area of the concealed space is not limited; however,

- For unobstructed wood truss construction or concealed spaces of non-combustible, unobstructed bar joist construction, see Figure 5, draft curtains or full height walls must be provided at 1000 ft<sup>2</sup> (93 m<sup>2</sup>) areas. In addition, the 5.6K sprinkler is UL Listed for a 2000 ft<sup>2</sup> (186 m<sup>2</sup>) draft curtain area as well as without draft curtains for unobstructed solid wood truss construction on edge or on face or unobstructed bar joist construction.

This draft curtain shall be at least 1/3 the depth of the concealed space or 8 in. (200 mm), whichever is greater, and be constructed using a material that will not allow heat to escape through or above the draft curtain.

- For solid wood joist construction, see Figure 6, and obstructed wood truss construction, see Figure 8:

Blocking must be provided in each upper deck and ceiling joist channel at a maximum 32 ft (9,75 m) intervals. This blocking shall be installed to the full depth of the joists and be installed so as to not allow heat to escape through or above the blocking. The blocking must be constructed using a non-combustible material or the joist construction material.

Draft curtains must protrude below the joist a minimum of 6 inches (150 mm) or 1/3 the depth of the concealed space, whichever is greater, and run parallel with the joist spaced at 31 ft (9,4 m) width maximum to limit the area to a maximum of 1000 ft<sup>2</sup> (93 m<sup>2</sup>). For information about the use of antifreeze see the Technical Data section.

The draft curtains are to be constructed using a material that will not allow heat to escape through or above the draft curtain.

- For non-combustible, insulation-filled solid wood joist or composite wood joist construction, see Figure 7, the requirement for draft curtains and blocking does not apply.
- For information about the use of antifreeze see the Technical Data section.

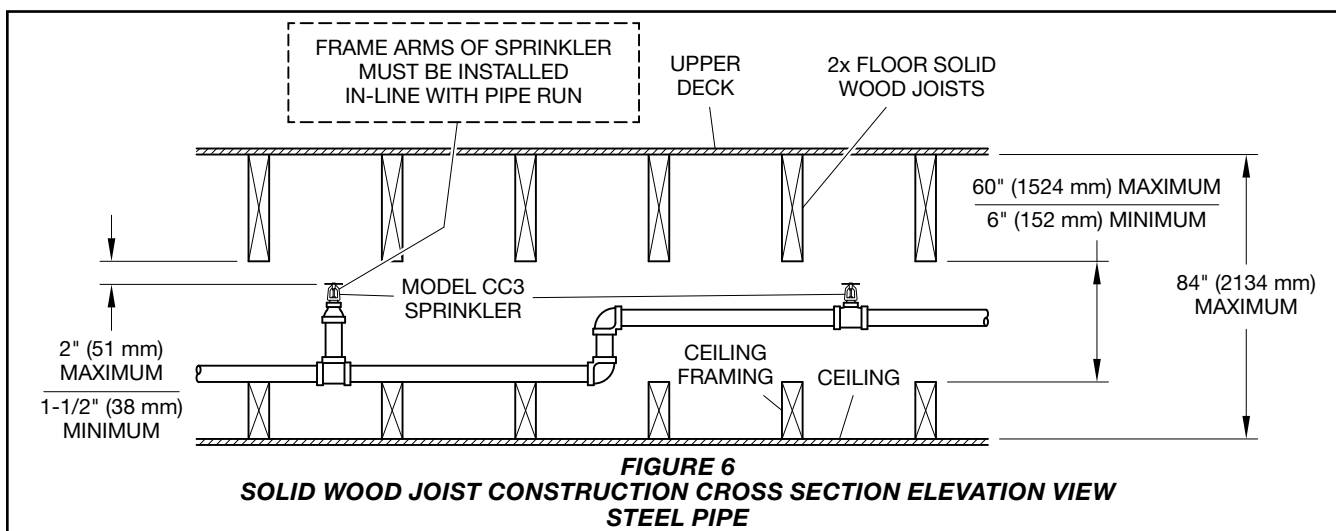
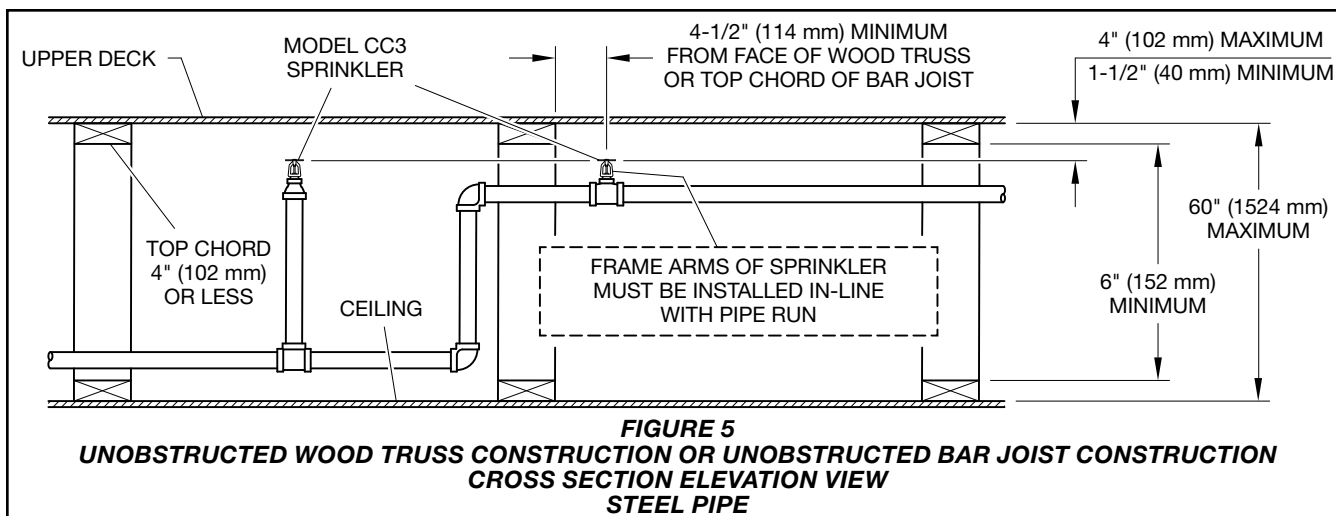
### Concealed Space Size (Steel Pipe)

The minimum and maximum concealed space depth is as follows:

For unobstructed wood truss construction or concealed spaces of unobstructed bar joist construction, see Figure 5, the maximum depth of the concealed space is 60 in. (1524 mm) from bottom of upper deck to top of ceiling, and the minimum depth is 6 in. (152 mm) from the bottom of the upper chords to the top of the lower chords.

For solid wood joist construction, see Figure 6, and solid wood or composite wood joist construction the maximum depth of the concealed space is 84 in. (2134 mm) from bottom of upper deck to top of ceiling, and the minimum depth is 6 in. (152 mm) from the bottom of the upper deck joists to the top of the ceiling joists. If joist construction is filled with non-combustible insulation the maximum height of the space is 84 in. (2134 mm). See Figure 6.

For obstructed wood truss construction, see Figure 8, the maximum depth of the concealed space is 84 in. (2134 mm) from bottom of upper deck to top of ceiling, and the minimum



depth is 6 in. (152 mm) from the bottom of the upper chord to the top of the lower chord.

**System Type (Steel Pipe)**

Light hazard, wet or dry pipe system

**NOTES:** Use of the 4.2K sprinklers in dry pipe systems is permitted by section 8.3.4.4 of NFPA 13 (2013 edition) where piping is corrosion resistant or internally galvanized.

**Maximum Distance Between Model CC3 Sprinklers (Steel Pipe)**

TY2199 4.2K. . . . . 14 ft (4,3 m)  
TY3199 5.6K. . . . . 16 ft (4,9 m)

**Maximum Coverage Area (Steel Pipe)**

TY2199 4.2K. . . . . 196 ft<sup>2</sup> (18,2 m<sup>2</sup>)  
TY3199 5.6K. . . . . 256 ft<sup>2</sup> (23,8 m<sup>2</sup>)

**Minimum Distance Between Model CC3 Sprinklers (Steel Pipe)**

Minimum sprinkler spacing is 7 ft (2,1 m)

**Deflector Position (Steel Pipe)**

1-1/2 in. to 4 in. (40 mm to 100 mm) below upper deck for wood truss construction or concealed spaces of non-combustible bar joist construction, see Figure 5.

1-1/2 in. to 2 in. (40 to 50 mm) below solid wood joist, see Figure 5, or top chord of a wood truss that has a depth greater than 4 in, see Figure 8.

1-1/2 in. to 4 in. (40 to 100 mm) below non-combustible insulation-filled solid wood joists or composite wood joists, see Figure 7.

**Remote Area (Steel Pipe)**

The remote area for wood truss construction or bar joist construction, see Figure 5, solid wood joist construction, see Figure 6, or obstructed wood truss construction, see Figure 8, is 1000 ft<sup>2</sup> (93 m<sup>2</sup>) for wet pipe or dry pipe systems.

The remote area for unobstructed solid wood truss construction or unobstructed bar joist construction without the use of draft curtains is 9 sprinklers or 1000 ft<sup>2</sup> (93 m<sup>2</sup>), whichever is greater, for both wet pipe or dry pipe systems.

The remote area for non-combustible insulation-filled solid wood joist or wood composite joist construction, see Figure 7, without draft curtains is to be calculated per the requirements of NFPA 13.

**Required Minimum Density (Steel Pipe)**

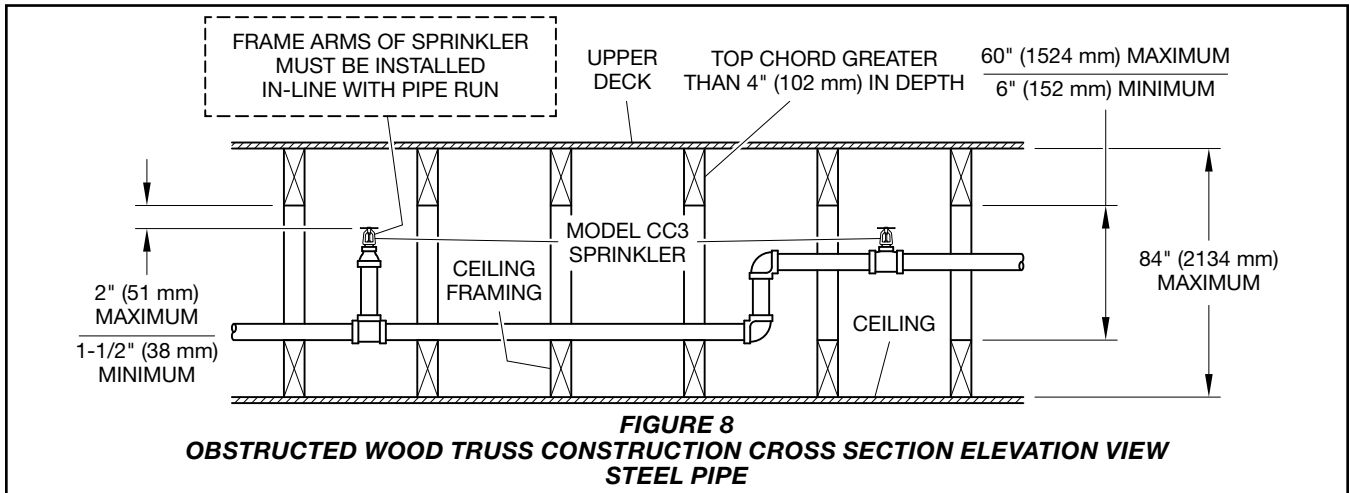
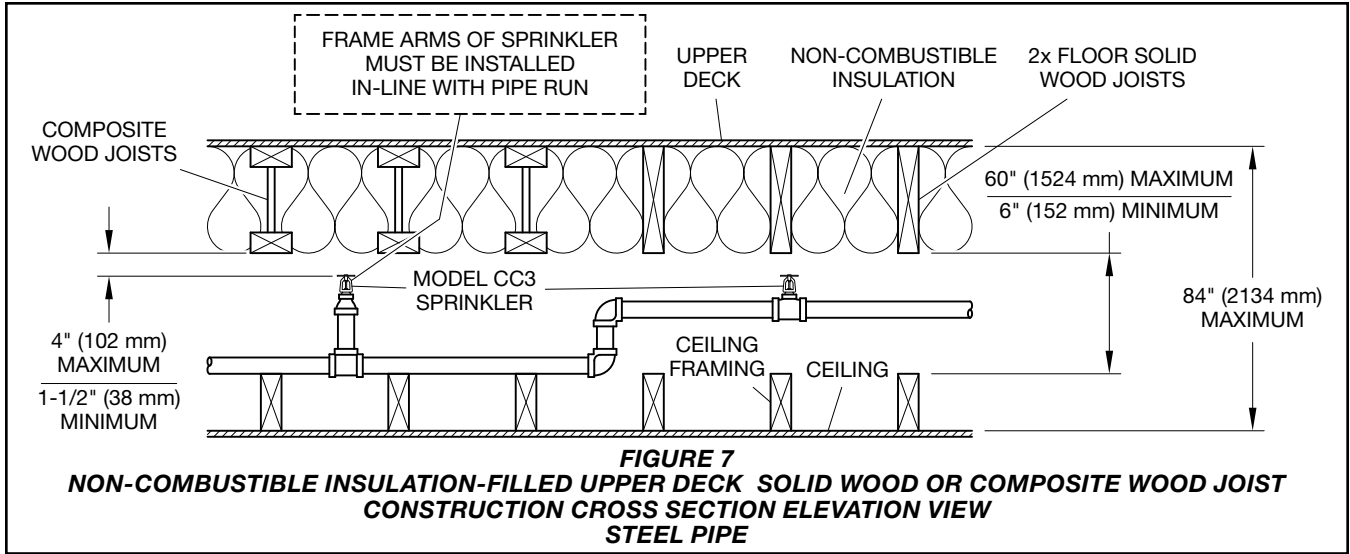
0.10 gpm/ft<sup>2</sup> (4,1 mm/min)

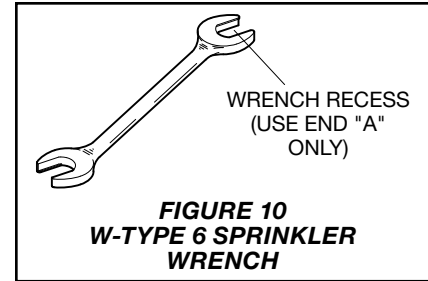
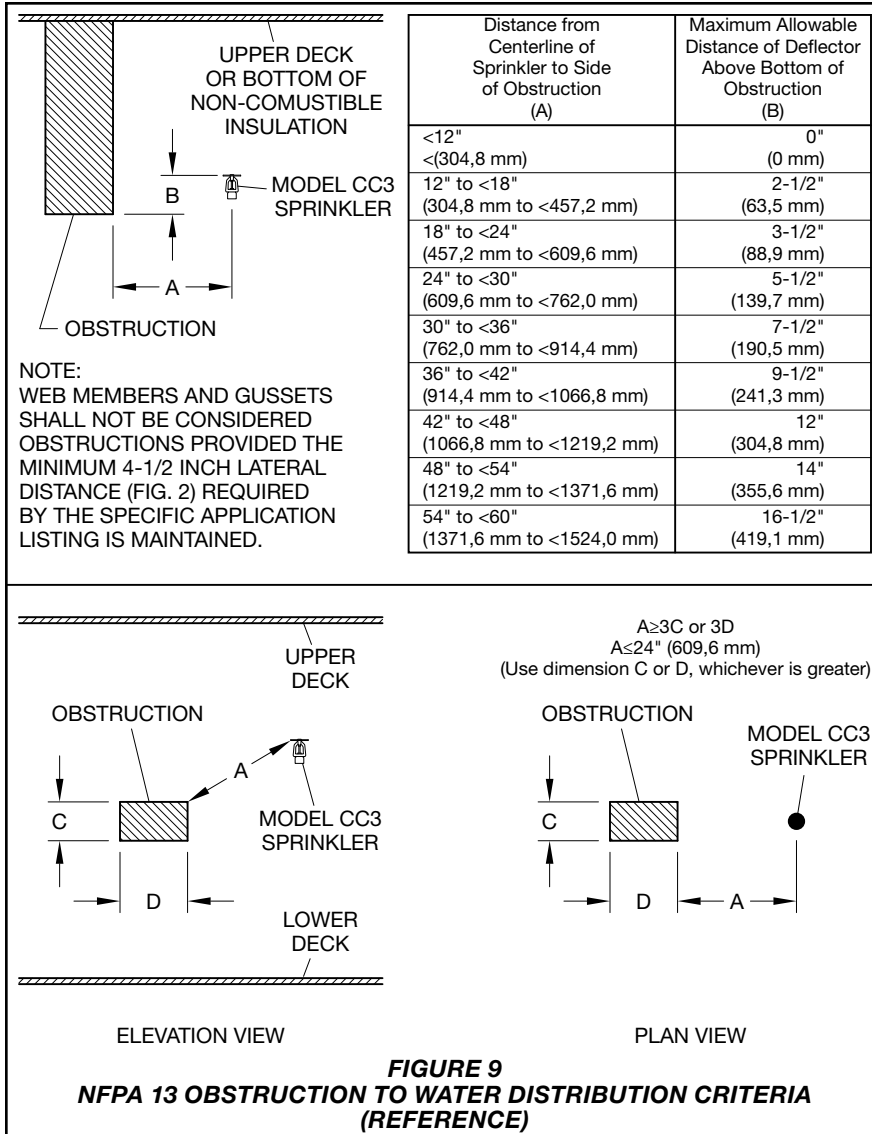
**Minimum Operating Pressure (Steel Pipe)**

7 psi (0,48 bar)

**Obstructions (Steel Pipe)**

See Figure 9 in this data sheet for obstructions rules.





## Installation

The Model CC3 Sprinklers must be installed in accordance with this section.

### General Instructions

The Model CC3 Sprinklers are to be installed upright and with their frame arms, see Figure 1, in-line with the pipe run. See Figures 2 through 8, as applicable.

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 200°F (93°C) temperature rating.

A leak-tight 1/2 in. NPT sprinkler joint should be obtained with a torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

The Model CC3 Sprinklers must only be installed in the upright position with the deflector parallel to the upper deck. With pipe thread sealant applied to the pipe threads, use only the W-Type 6 (End A) Sprinkler Wrench, see Figure 10, for installation of the Model CC3 Sprinklers by applying the wrench to the sprinkler wrench flats only.

## Care and Maintenance

The Model CC3 Sprinklers must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

Sprinklers that are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. See the Installation section.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, for example, NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

## Limited Warranty

For warranty terms and conditions, visit [www.tyco-fire.com](http://www.tyco-fire.com).

## Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

### Sprinkler Assemblies with NPT Thread Connections

Specify: SIN (specify), K-factor (specify), Model CC3 Combustible Concealed Space Sprinkler, Specific Application, Upright, 200°F (93°C), P/N (specify):

TY2199, 4.2K ..... 51-311-1-200  
TY3199, 5.6K ..... 51-301-1-200

### Sprinkler Wrench:

Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387





Worldwide  
Contacts

www.tyco-fire.com

## TFP633 Change History Appendix

ISSUE DATE	NOTES
03-23	Pages 3 and 4, end of Design Criteria, CPVC Pipe sub-section, added reference to new Figure 4 added to Page 4 providing guidance on protecting vertical risers passing through concealed space from floor below to floor above; Adjusted sequence and placement of all other later Figures and content accordingly.
08-22	Page 1, updated QR code and URL; Page 8, changed corporate address and telephone number to 1467 Elmwood Avenue, Cranston, RI 02910   Telephone +1-401-781-8220, formerly 1400 Pennbrook Parkway, Lansdale, PA 19446   Telephone +1-215-362-0700.
11-21	Added QR code and URL to allow convenient access to electronic version from printed document; Updated Design Criteria, Concealed Space Area (CPVC Pipe) section, clarifying: 4.2K sprinkler UL listed for 1000 ft <sup>2</sup> (93 m <sup>2</sup> ) draft curtain area; 5.6K sprinkler UL Listed for 2000 ft <sup>2</sup> (186 m <sup>2</sup> ) draft curtain area and without draft curtains in unobstructed wood truss construction, on edge or on face, or for unobstructed bar joist construction.
08-21	Added protection of unobstructed wood truss construction and unobstructed bar joist construction without use of draft curtains for 5.6K sprinkler in accordance with results of testing and Listing by UL; Removed specific language for UL Listing of LFP® Antifreeze with CC3 sprinklers due to change in antifreeze listing method.
04-19	Added UL Listing for 4.9K and 5.6K sprinklers in systems with LFP® Antifreeze; Changed extended coverage area for 5.6K sprinkler to 2000 ft <sup>2</sup> (186 m <sup>2</sup> ), formerly 1000 ft <sup>2</sup> (93 m <sup>2</sup> ).
12-18	Clarified use of BlazeMaster or other UL Listed CPVC pipe and fittings in sprinkler piping system within protected concealed space.
08-18	Updated Tyco® branding and document format; Added Johnson Controls copyright; Added disclaimer stating specifications and information subject to change without notice; Added reference to Regulatory and Health Warning Technical Data Sheet TFP2300.
12-16	Corrected concealed space maximum depth dimension shown in Figure 4, Unobstructed Wood Truss Construction or Unobstructed Bar Joist Construction, from 84 in. (2134 mm) to 60 in. (1524 mm), consistent with steel pipe system design criteria.
08-16	Corrected maximum height of space dimension location from underside of upper joists to underside of upper deck in Steel Pipe Non-Combustible Insulation-Filled Upper Deck Joist Construction illustration (Figure 6); Corrected maximum height of space for joist construction filled with non-combustible insulation from 72 in. (1829 mm) to 84 in. (2134 mm) in Steel Pipe Design Criteria Concealed Space Size sub-section (Page 4, middle column, 7th paragraph).
12-15	Corrected metric equivalents of maximum coverage areas shown in General Description, Design Criteria CPVC Pipe and Design Criteria Steel Pipe sections.
07-15	Updated installation criteria dimensions for various construction types shown in Figures 2 to 7.
12-14	Updated description of concealed space size in steel pipe design criteria.
11-14	Removed the TM trademark from document title.
10-14	New Technical Data Sheet TFP633 describes Model CC3 4.2 and 5.6 K-factor Combustible Concealed Space Sprinklers.