

# Concealed Space Sprinkler Requirements and Design Area requirements. NFPA 13 - 2019

## 9.2 Enhanced Content

It is important to note the following two points regarding Section 9.2:

- 1) It is imperative that when the elimination of sprinklers from a space based on this section is being considered, the space must comply exactly with the description and requirements found within the applicable paragraph(s). **In other words, any deviation from the description in the applicable paragraph negates its application, and, as a result, the space must be sprinklered.**
- 2) If a space is not specifically detailed in this section, it is intended to be protected by sprinklers under 9.1.1(1).

### 19.3.3.1.5.1\*

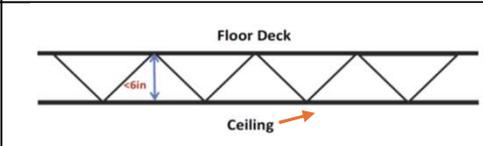
When using the density/area or room design method, unless the requirements of 19.3.3.1.5.2 are met for buildings having unsprinklered combustible concealed spaces, as described in 9.2.1 and 9.3.18, the minimum area of sprinkler operation for that portion of the building shall be 3000 ft<sup>2</sup> (280 m<sup>2</sup>).

### 19.4.1.2\* Residential

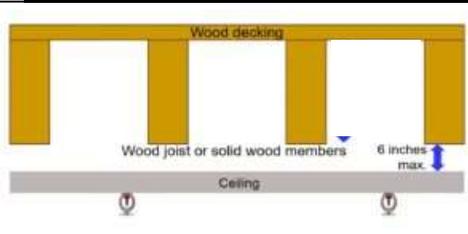
Unless the requirements of 19.3.3.1.5.2 are met for buildings having unsprinklered combustible concealed spaces, as described in 9.2.1 and 9.3.18, the minimum design area of sprinkler operation for that portion of the building shall be eight sprinklers.

9.3.18.1 Unless the requirements of 9.2.2 are met, sprinklers shall be installed in spaces under all combustible ground floors and combustible exterior docks and platforms.

## 9.2.1 / 9.3.18 / 19.3.3.1.5.2

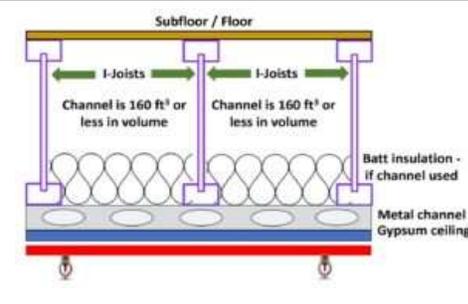
NFPA 13 - Chapter 9	Examples	NFPA 13 - Chapter 19, 19.3.3.1.5.2	Minimum Design Area Requirements
<p>9.2.1.1* Concealed spaces of noncombustible and limited-combustible construction with minimal combustible loading having no access shall not require sprinkler protection.</p> <p>9.2.1.1.1 The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.</p> <p>9.2.1.1.2 Small openings with both of the following limits shall be permitted:</p> <p>(1) A combined total area of not more than 20 percent of the ceiling, construction feature, or plane shall be used to determine the boundaries of the concealed space.</p> <p>(2) Gaps greater than 4 ft (1.2 m) long shall not be more than 8 in. (200 mm) wide.</p>		<p>(1) Noncombustible and limited-combustible concealed spaces with minimal combustible loading having no access. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.</p> <p>(2) Noncombustible and limited-combustible concealed spaces with limited access and not permitting occupancy or storage of combustibles. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.</p>	
<p>9.2.1.3 Concealed spaces formed by studs or joists with less than 6 in. (150 mm) between the inside or near edges of the studs or joists shall not require sprinkler protection. (See Figure 10.2.6.1.5.1.)</p>			<p>3000 sqft Residential 8 head</p>
<p>9.2.1.4 Concealed spaces formed by bar joists with less than 6 in. (150 mm) between the roof or floor deck and ceiling shall not require sprinkler protection.</p>			<p>3000 sqft Residential 8 head</p>

9.2.1.5\* Concealed spaces formed by ceilings attached directly to or within 6 in. (150 mm) of wood joist or similar solid member construction shall not require sprinkler protection.



3000 sqft  
Residential 8 head

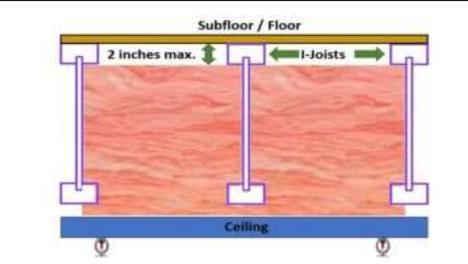
9.2.1.6\* Concealed spaces formed by ceilings attached to composite wood joist construction either directly or onto metal channels not exceeding 1 in. (25 mm) in depth, provided the joist channels as measured from the top of the batt insulation are separated into volumes each not exceeding 160 ft<sup>3</sup> (4.5 m<sup>3</sup>) using materials equivalent to the web construction and at least 3 1/2 in. (90 mm) of batt insulation is installed at the bottom of the joist channels when the ceiling is attached utilizing metal channels, shall not require sprinkler protection.



(10)\* Light or ordinary hazard occupancies where noncombustible or limited-combustible ceilings are attached to the bottom of composite wood joists either directly or on to metal channels not exceeding 1 in. (25 mm) in depth, provided the adjacent joist channels are firestopped into volumes not exceeding 160 ft<sup>3</sup> (4.5 m<sup>3</sup>) using materials equivalent to 1/2 in. (13 mm) gypsum board, and at least 3 1/2 in. (90 mm) of batt insulation is installed at the bottom of the joist channels when the ceiling is attached utilizing metal channels.

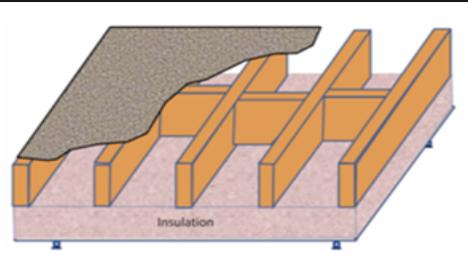
3000 ft<sup>2</sup> design for LH and OH. when firestopped compartmentized with material equal to TJI  
  
Normal design when compartmentized and firestopped using material equal to 1/2" drywal

9.2.1.7 Concealed spaces filled with noncombustible insulation shall not require sprinkler protection.  
9.2.1.7.1 A maximum 2 in. (50 mm) air gap at the top of the space shall be permitted.



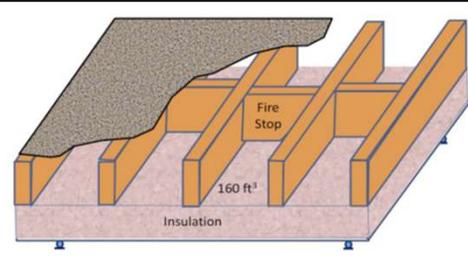
(3) Combustible concealed spaces filled entirely with noncombustible insulation.

9.2.1.8 Concealed spaces within wood joist construction having noncombustible insulation filling the space from the ceiling up to the bottom edge of the joist of the roof or floor deck shall not require sprinkler protection.



(3) Combustible concealed spaces filled entirely with noncombustible insulation.

9.2.1.9 Concealed spaces within composite wood joist construction having noncombustible insulation filling the space from the ceiling up to the bottom edge of the composite wood joist of the roof or floor deck and with the joist channels separated into volumes each not exceeding 160 ft<sup>3</sup> (4.5 m<sup>3</sup>) to the full depth of the composite wood joist, with material equivalent to the web construction, shall not require sprinkler protection.



3000 sqft  
Residential 8 head

9.2.1.10 Concealed spaces over isolated small compartments not exceeding 55 ft<sup>2</sup> (5.1 m<sup>2</sup>) in area shall not require sprinkler protection.



(7) Concealed spaces over isolated small rooms not exceeding 55 ft<sup>2</sup> (5.1 m<sup>2</sup>) in area.

9.2.1.11 Concealed spaces where rigid materials are used and the exposed surfaces, in the form in which they are installed, comply with one of the following shall not require sprinkler protection:

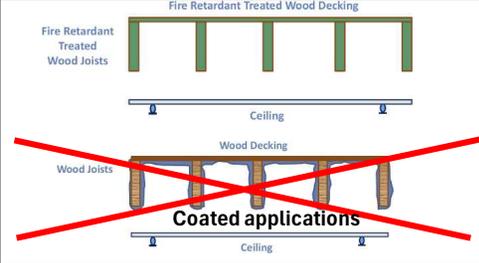
(1)The surface materials have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire more than 10.5 ft (3.2 m) when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, or UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes.

(2)The surface materials comply with the requirements of ASTM E2768, Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test).

Normal

9.2.1.12\* Concealed spaces in which the exposed materials are constructed entirely of fire retardant-treated wood as defined by NFPA 703 shall not require sprinkler protection.

A.9.2.1.12 The allowance to omit sprinklers for fire retardant-treated wood requires a pressure-treated application. It does not apply to coated applications.



(f) Concealed spaces in which the exposed materials are constructed entirely of fire- retardant treated wood as defined by NFPA 703.

**NOT PERMITTED**

Normal

9.2.1.13 Noncombustible concealed spaces having exposed combustible insulation where the heat content of the facing and substrate of the insulation material does not exceed 1000 Btu/ft2 (11,400 kJ/m2) shall not require sprinkler protection.



(5)Concealed spaces where rigid materials are used and the exposed surfaces comply with one of the following in the form in which they are installed in the space:

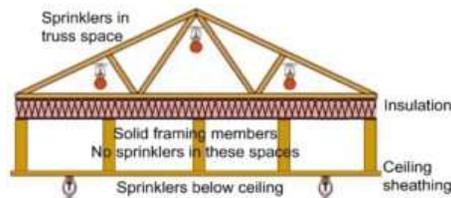
(a)The surface materials have a flame spread index of 25 or less and the materials have been demonstrated to not propagate fire more than 10.5 ft (3.2 m) when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, or UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed in the space or

(b)The surface materials comply with the requirements of ASTM E2768, Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test).

(6)Concealed spaces in which the exposed materials are constructed entirely of fire-retardant-treated wood as defined by NFPA 703.

Normal

9.2.1.14 Concealed spaces below insulation that is laid directly on top of or within wood joists or composite wood joists used as ceiling joists in an otherwise sprinklered concealed space, with the ceiling attached directly to the bottom of the joists, shall not require sprinkler protection.



(4)\* Light or ordinary hazard occupancies where noncombustible or limited-combustible ceilings are directly attached to the bottom of solid wood joists or solid limited-combustible construction or noncombustible construction so as to create enclosed joist spaces 160 ft3 (4.5 m3) or less in volume, including space below insulation that is laid directly on top or within the ceiling joists in an otherwise sprinklered concealed space.

>160sqft

3000 sqft  
Residential 8 head

9.2.1.15 Sprinklers shall not be required in vertical pipe chases under 10 ft2 (0.9 m2).

9.2.1.15.1 Pipe chases in accordance with 9.2.1.15 shall contain no sources of ignition.

9.2.1.15.2 In buildings having more than a single story, pipe penetrations at each floor shall be firestopped using materials equivalent to the floor construction.

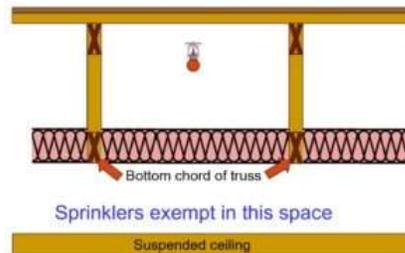
(8) Vertical pipe chases under 10 ft2 (0.9 m2), provided that in multifloor buildings the chases are firestopped at each floor using materials equivalent to the floor construction, and where such pipe chases contain no sources of ignition, piping shall be noncombustible, and pipe penetrations at each floor shall be properly sealed.

9.2.1.16 Exterior columns under 10 ft2 (0.9 m2) in area, formed by studs or wood joist supporting exterior canopies that are fully protected with a sprinkler system, shall not require sprinkler protection

(9) Exterior columns under 10 ft2 (0.9 m2) in area formed by studs or wood joists, supporting exterior canopies that are fully protected with a sprinkler system.

9.2.1.17\* Concealed spaces formed by noncombustible or limited-combustible ceilings suspended from the bottom of wood joists, composite wood joists, wood bar joists, or wood trusses that have insulation filling all of the gaps between the bottom of the trusses or joists, and where sprinklers are present in the space above the insulation within the trusses or joists, shall not require sprinkler protection.

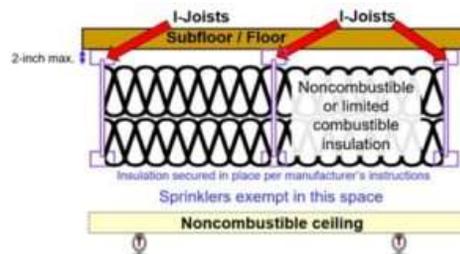
9.2.1.17.1 The heat content of the facing, substrate, and support of the insulation material shall not exceed 1000 Btu/ft2 (11,400 kJ/m2).



3000 sqft  
Residential 8 head

9.2.1.18\* Concealed spaces formed by noncombustible or limited-combustible ceilings suspended from the bottom of wood joists and composite wood joists with a maximum nominal chord width of 2 in. (50 mm), where joist spaces are full of noncombustible batt insulation with a maximum 2 in. (50 mm) air space between the decking material and the top of the batt insulation shall not require sprinklers.

9.2.1.18.1 Facing that meets the requirements for noncombustible or limited-combustible material covering the surface of the bottom chord of each joist and secured in place per the manufacturer's recommendations shall not require sprinklers.



3000 sqft  
Residential 8 head

<p>9.2.2 Spaces Under Ground Floors, Exterior Docks, and Platforms. Sprinklers shall be permitted to be omitted from spaces under ground floors, exterior docks, and platforms where all of the following conditions exist:</p> <p>(1) The space is not accessible for storage purposes and is protected against accumulation of wind-borne debris.</p> <p>(2) The space contains no equipment such as conveyors or fuel-fired heating units.</p> <p>(3) The floor over the space is of tight construction.</p> <p>(4) No combustible or flammable liquids or materials that under fire conditions would convert into combustible or flammable liquids are processed, handled, or stored on the floor above the space.</p>		<p>Depending on construction refer to exemptions listed above in this column to see if any may apply.</p>	
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4.10.2\* Limited-Combustible Material.

A material shall be considered a limited-combustible material where both of the following conditions of 4.10.2(1) and 4.10.2(2), and the conditions of either 4.10.2.1 or 4.10.2.2, are met:

- (1) The material does not comply with the requirements for a noncombustible material in accordance with 4.10.1.
- (2) The material, in the form in which it is used, exhibits a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg), when tested in accordance with NFPA 259. [5000:7.1.4.2]

4.10.2.1

The material shall have a structural base of noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) where the surfacing exhibits a flame spread index not greater than 50 when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, or UL 723, Standard for Test for Surface Burning Characteristics of Building Materials. [5000:7.1.4.2.1]

4.10.2.2

The material shall be composed of materials that in the form and thickness used, neither exhibit a flame spread index greater than 25 nor evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723 and are of such composition that all surfaces that would be exposed by cutting through the material on any plane would neither exhibit a flame spread index greater than 25 nor exhibit evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723. [5000:7.1.4.2.2]

4.10.2.3

Materials shall be considered limited-combustible materials where tested in accordance with ASTM E2965, Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter, at an incident flux of 75 kW/m<sup>2</sup> for a 20-minute exposure, and both the following conditions are met:

- (1) The peak heat release rate shall not exceed 150 kW/m<sup>2</sup> for longer than 10 seconds.
- (2) The total heat released shall not exceed 8 MJ/m<sup>2</sup>. [5000:7.1.4.2.3]

4.10.2.4

Where the term limited-combustible is used in this standard, it shall also include the term noncombustible. [5000:7.1.4.2.4]