Welcome

Firestopping vs. Fireblocking 101

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2-Hour In Person
Elective CE

Board Rule: 21 NCAC 12B .0301 Course Requirements

Disclaimer:

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Purpose of the Codes

Section 101.3 Purpose: Both the Building Code and the Residential Code state the purpose of the code is to establish minimum requirements to safeguard public safety, health and general welfare through:

- Affordability
- Structural strength.
- Facilitating means of egress.
- Stability.
- Sanitation.
- Light and ventilation.
- Energy conservation.
- Safety to life and property from fire and other hazards attributed to the built environment.

Both the commercial code and residential one-and-two family code have Firestopping & Fireblocking requirements

Earthquake

Hurricanes or High Wind Events

Structural Fire

Where is Firestopping required vs Fireblocking and what is the difference?

Tested for a specific performance time 1,2,3, or 4 hour

Stop or Block??

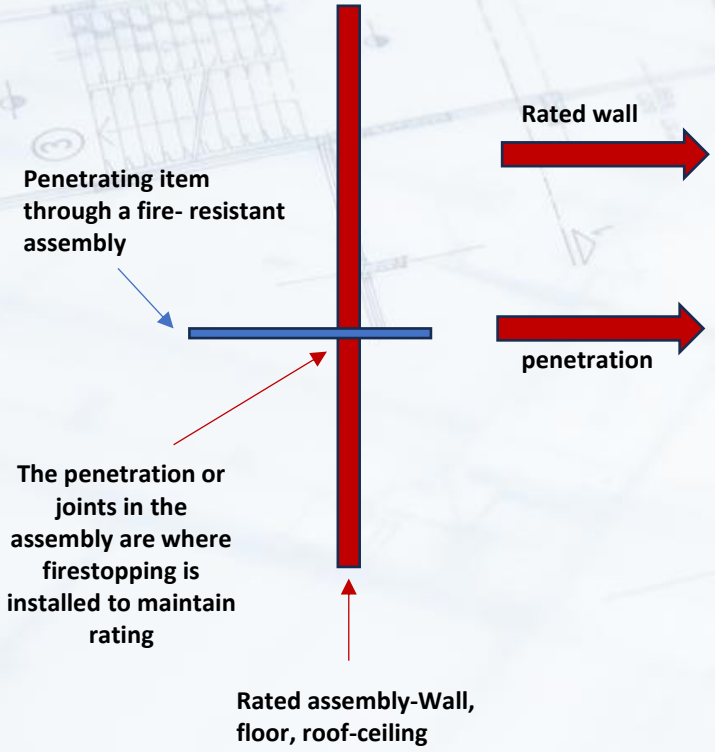
Prescriptive to slow a fire-no specific test or time

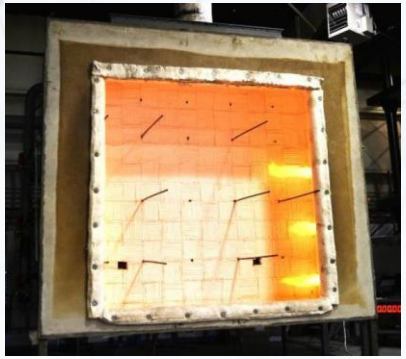
(Concealed spaces of wood frame construction)

Firestopping

To understand Firestopping need to know fire resistant construction.

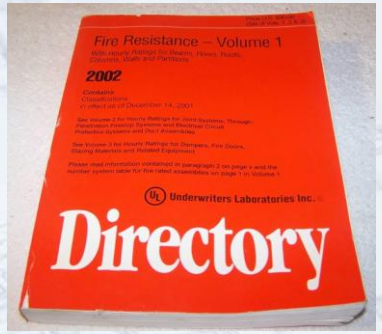
FIRE RESISTANCE. That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.





Assembly and penetrating item placed in a furnace and performance tested

Assembly and penetrating item passes the required hourly rating needed 1,2,3 or 4 hours



Assembly and penetrating item fire test is listed in a published directory for field installations

FIRE-RESISTANCE RATING. The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests,

Types of fire resistance rated walls

Source
Archicorner.com

Items that penetrate rated assembly must be firestopped to maintain rating. Let's look at firestopping.

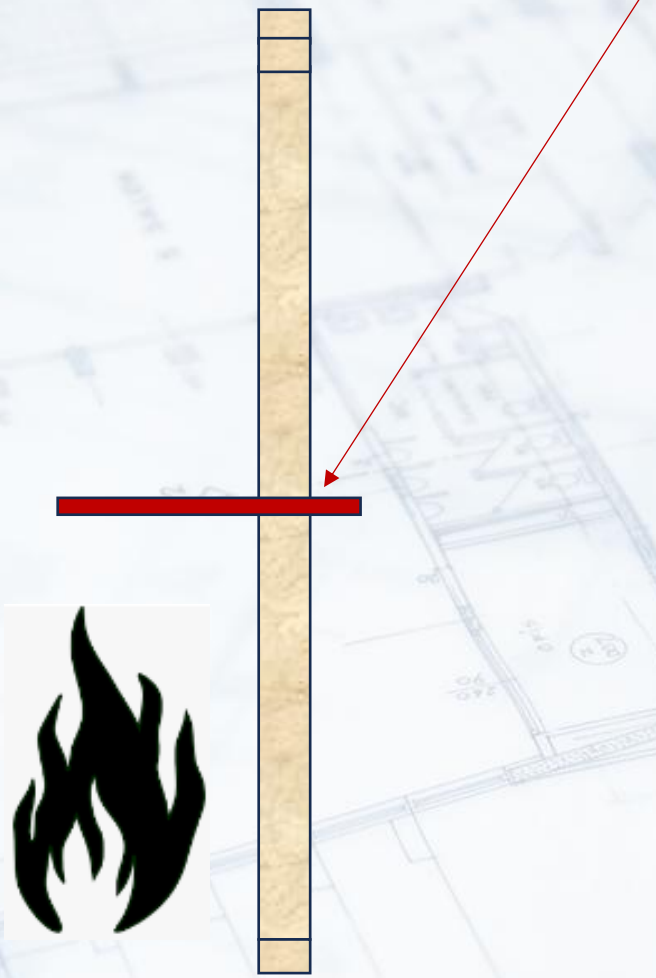
Rated walls

Commercial

FIRE WALL. A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

FIRE PARTITION. A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.



Residential (1 & 2 family)

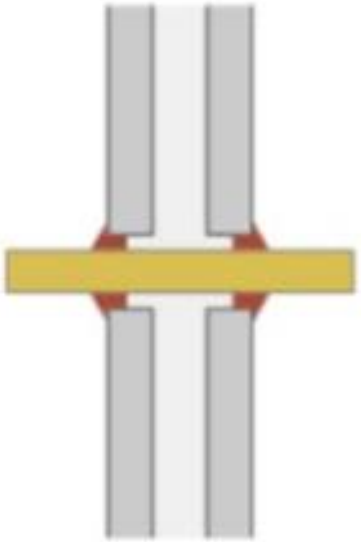
1. Where are rated walls required?

2. What type of rated walls (Fire wall, Fire Barriers or Fire Partitions)

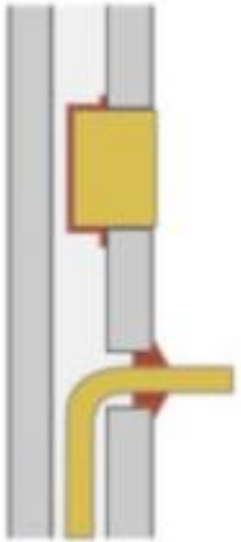
R302.4 Dwelling unit rated penetrations

R302.4 Dwelling unit rated penetrations. Penetrations of wall or floor-ceiling assemblies required to be fire-resistance rated in accordance with Section R302.2 or R302.3 shall be protected in accordance with this section.

Through Penetration



Membrane Penetration

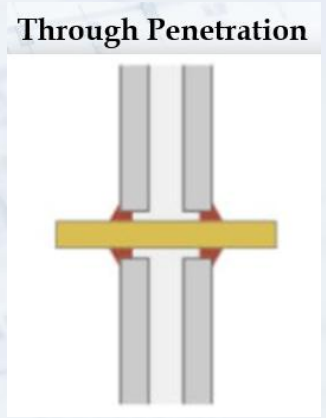


Penetration testing

Proper installation of firestopping material for rated wall penetrations

Training Video Source
Swinerton.com

R302.4 Dwelling unit rated penetrations



R302.4.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:

1. In concrete or masonry wall or floor assemblies, concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:
    1.1. The nominal diameter of the penetrating item is not more than 6 inches.
    1.2. The area of the opening through the wall does not exceed 144 square inches.
2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

R302.4.1.1 Fire-resistance-rated assembly. Penetrations shall be **installed as tested** in the *approved* fire resistance-rated assembly.

R302.4.1.2 Penetration firestop system. Penetrations **shall be protected** by an *approved* penetration firestop system installed as tested in accordance with ASTM E814 or **UL 1479**, with a positive pressure differential of not less than 0.01 inch of water (3 Pa) and shall have an F rating of not less than the required fire-resistance rating of the wall or floor-ceiling assembly penetrated.

R302.4 Dwelling unit rated penetrations

R302.4.2 Membrane penetrations. Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

Exceptions:

1. Membrane penetrations of not more than 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches in area provided that the aggregate area of the openings through the membrane does not exceed 100 square inches in any 100 square feet of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch. Such boxes on opposite sides of the wall shall be separated by one of the following:

1.1. By a horizontal distance of not less than **24 inches** where the wall or partition is constructed with individual noncommunicating stud cavities.

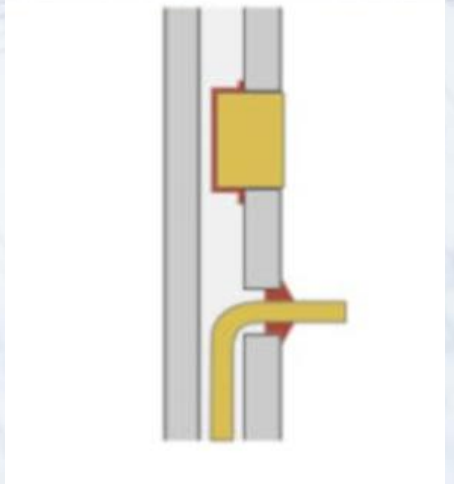
1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation.

1.3. By solid fireblocking in accordance with Section R302.11.

1.4. By protecting both boxes with *listed* putty pads.

1.5. By other *listed* materials and methods.

Membrane Penetration



R302.4 Dwelling unit rated penetrations (continued)

2. Membrane penetrations by *listed* electrical boxes of any materials provided that the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless *listed*
otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:

2.1. By the horizontal distance specified in the ***listing*** of the electrical boxes.
2.2. By solid **fireblocking** in accordance with Section R302.11.
2.3. By protecting both boxes with *listed* putty pads.
2.4. By other *listed* materials and methods.

3. The annular space created by the penetration of a fire sprinkler provided that it is covered by a metal escutcheon plate.

Various options for firestopping

Source:
STIfirestop.com

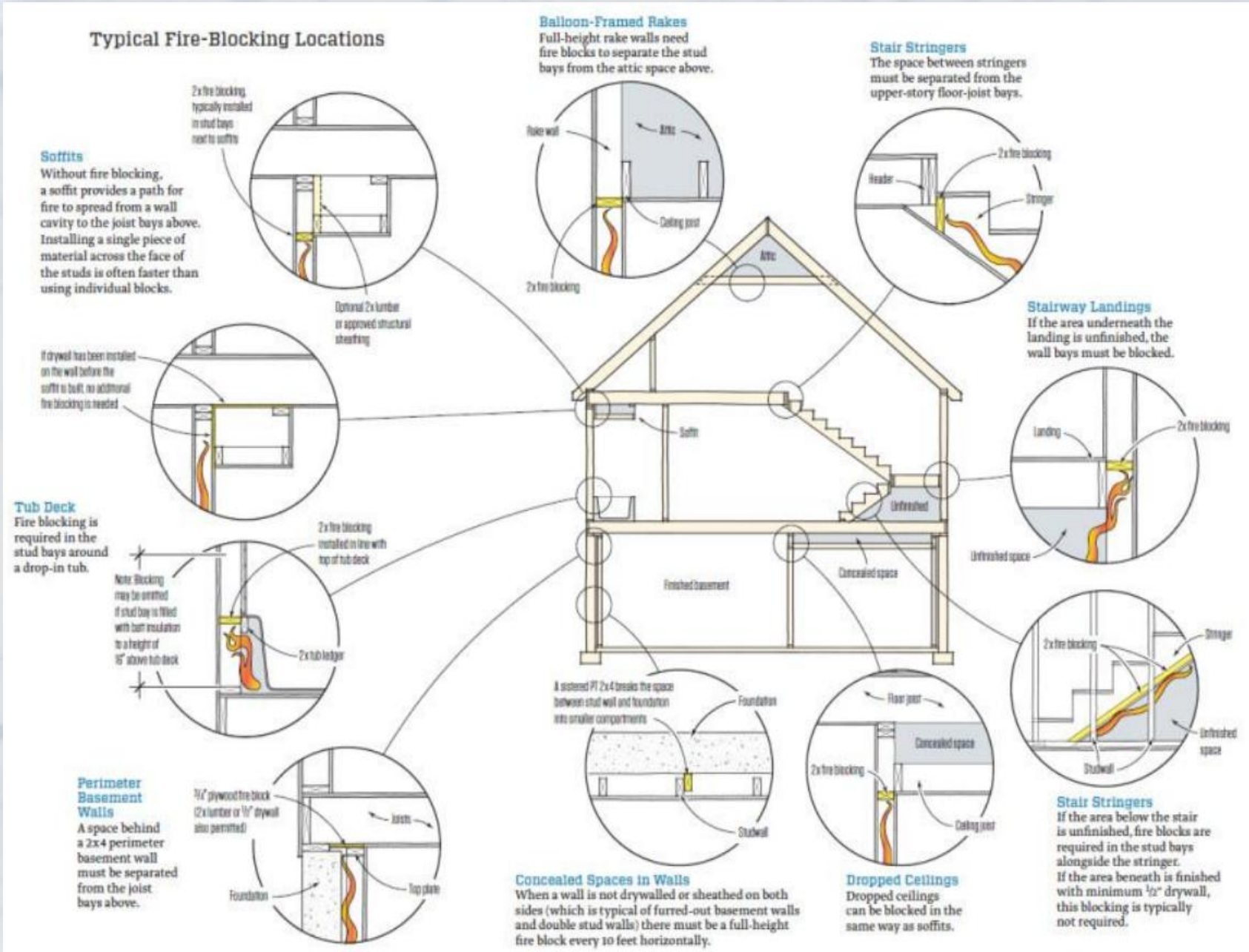
Questions

1. Why is firestopping more of a problem today than 15-20 years ago?
2. With regards to walls which wall carries the most stringent requirements?

R302.11 Fireblocking

See DOI's white paper on Fireblocking in detail

R302.11 Fireblocking. In combustible construction, Fireblocking shall be provided to cut off both vertical and horizontal **concealed** draft openings and to form an effective fire barrier between stories, and between a top *story* and the roof space. Fireblocking shall be provided in wood-framed construction in the following locations:

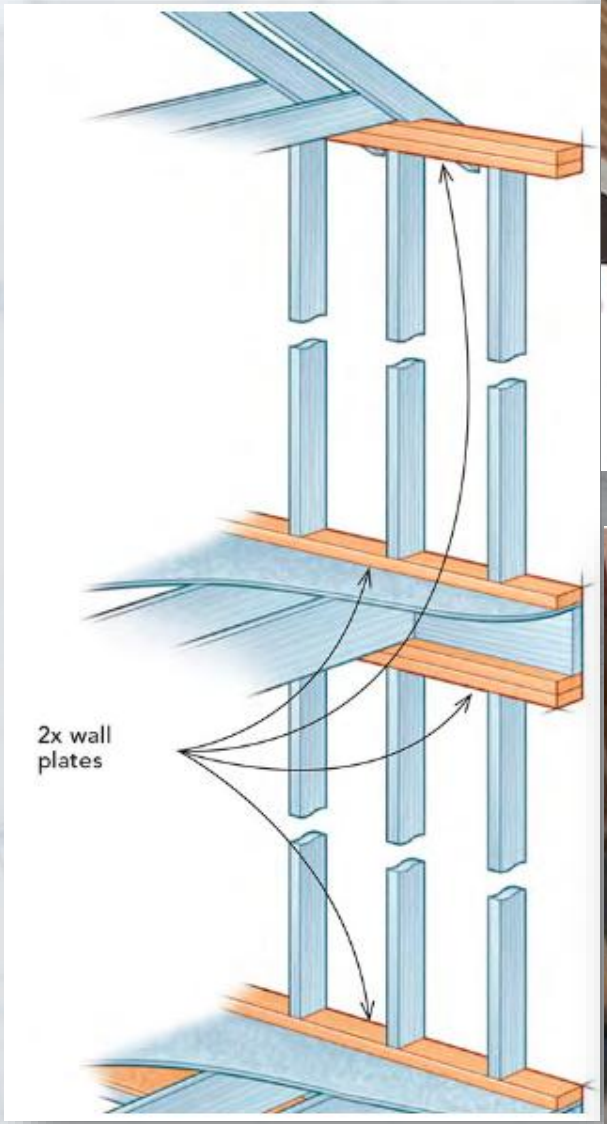


R302.11 Fireblocking

1. In concealed spaces of stud walls and partitions, as follows:

1.1. Vertically at the **ceiling** and **floor** levels.

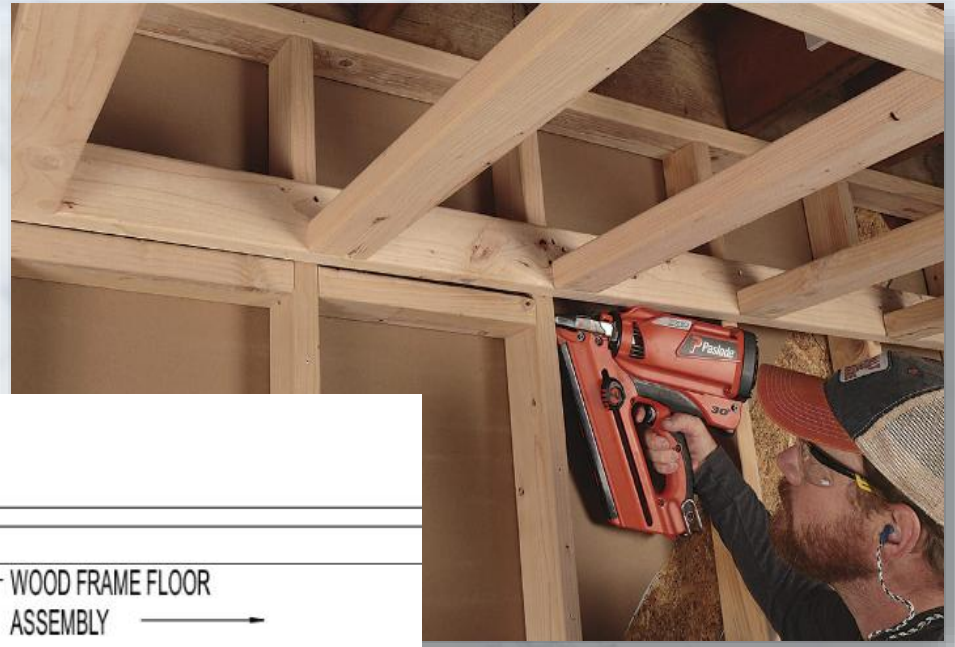
1.2. Horizontally at intervals not exceeding 10 feet in furred spaces and parallel rows of studs or staggered studs.

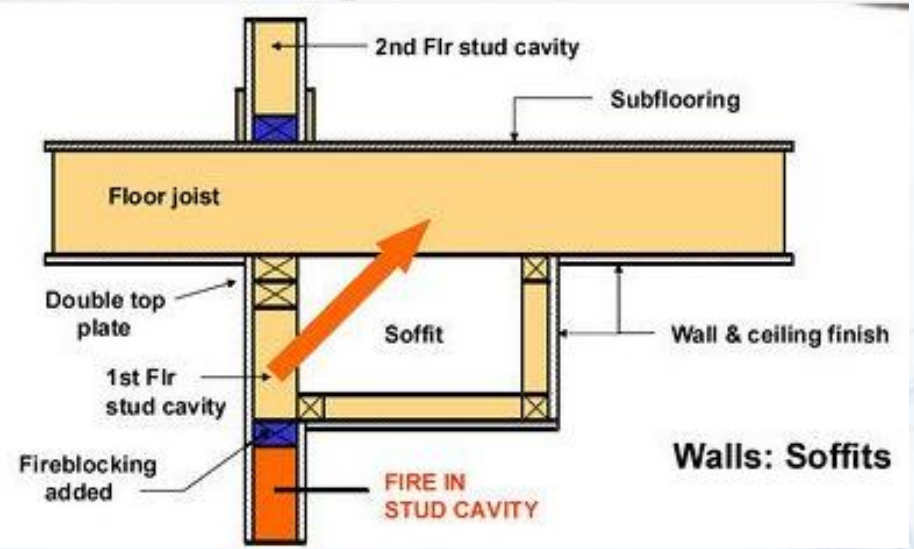


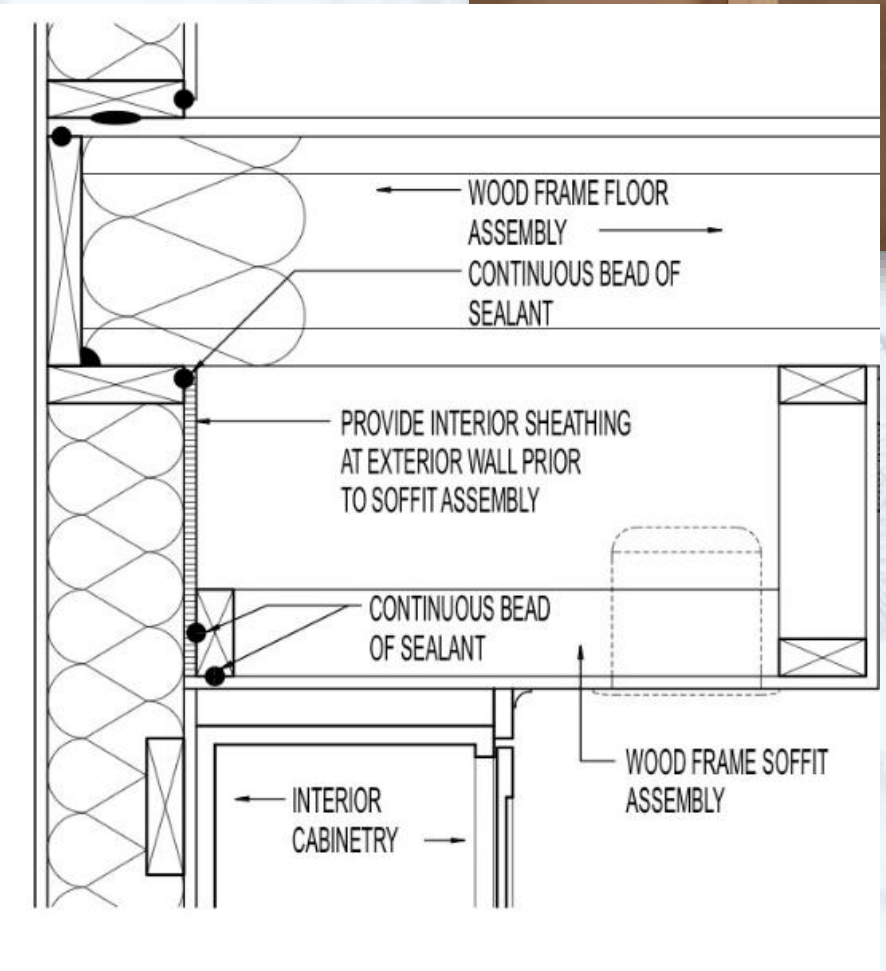
See DOI's white paper on Fireblocking in detail

R302.11 Fireblocking

2. At interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.







R302.11 Fireblocking

2. At interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.

Code Violations?

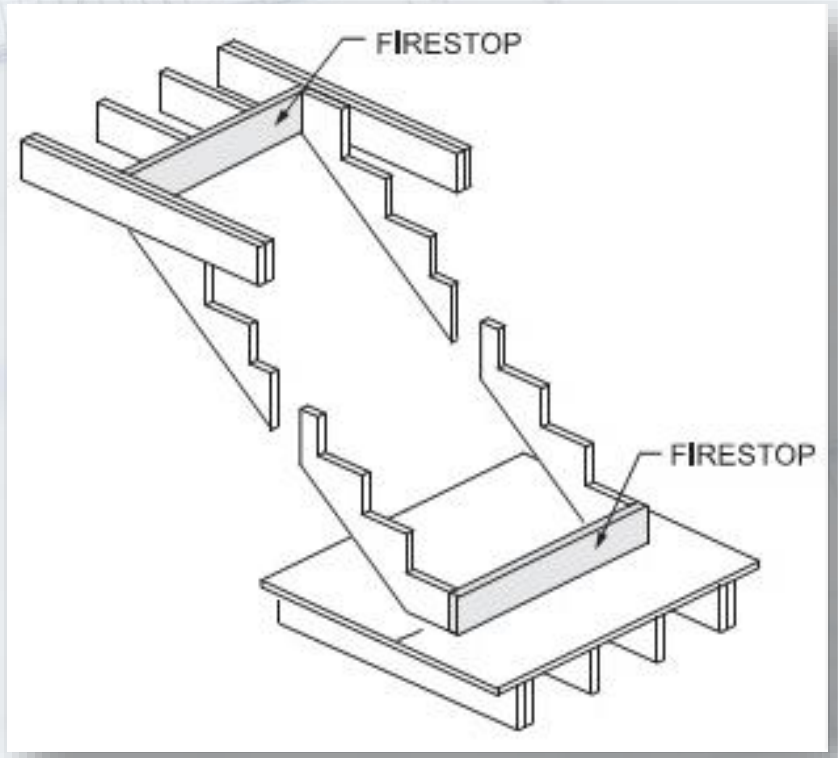
R302.11 Fireblocking

2. At interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.

Code Violations?

R302.11 Fireblocking (locations)

3. In concealed spaces between stair stringers at the **top and bottom** of the run. Enclosed spaces under stairs shall comply with Section R302.7.



Required Fireblocking?

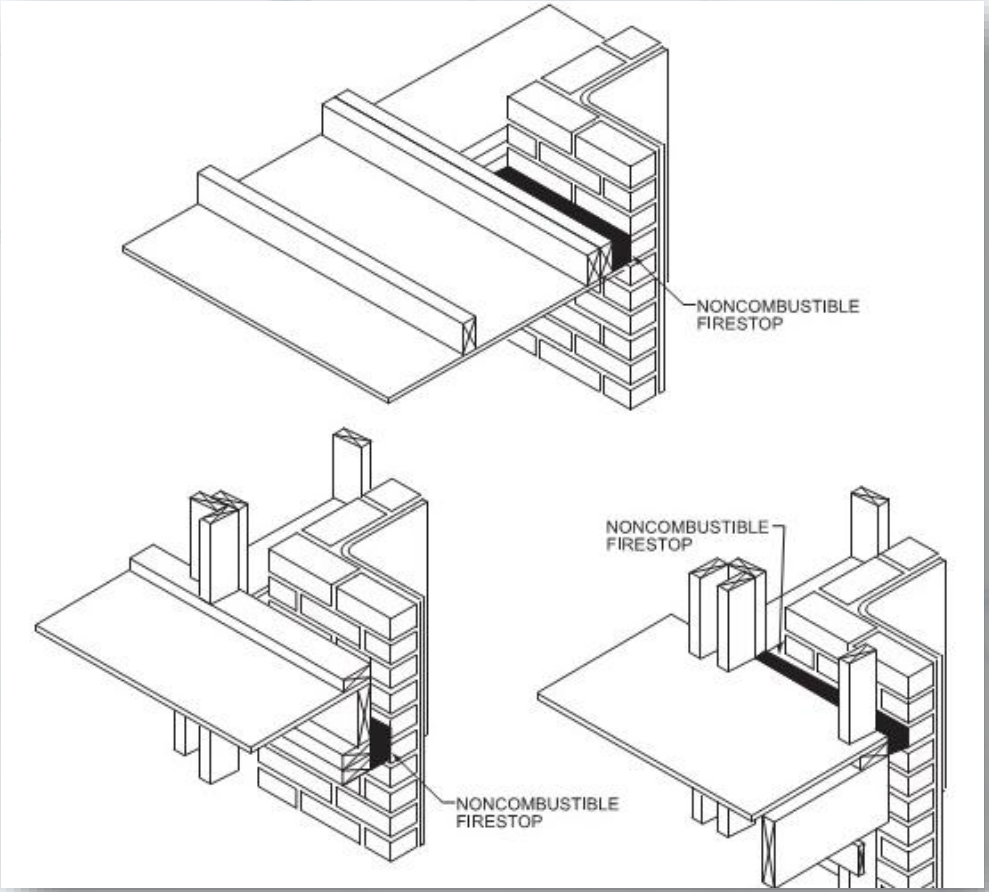
Any issues with missing Fireblocking?

R302.11 Fireblocking (locations)

4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an *approved* material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E136 requirements.

R302.11 Fireblocking (locations)

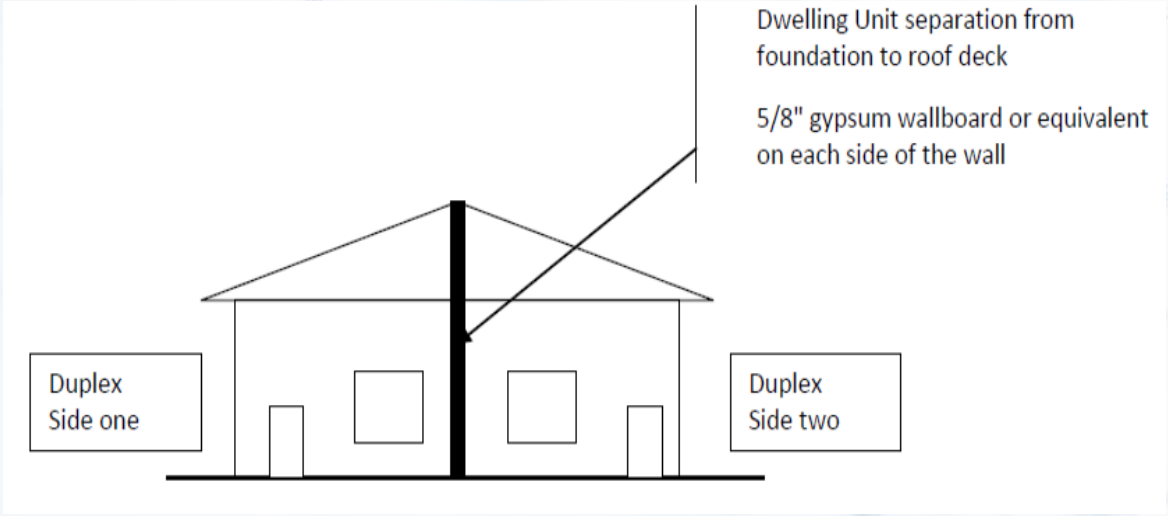
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.

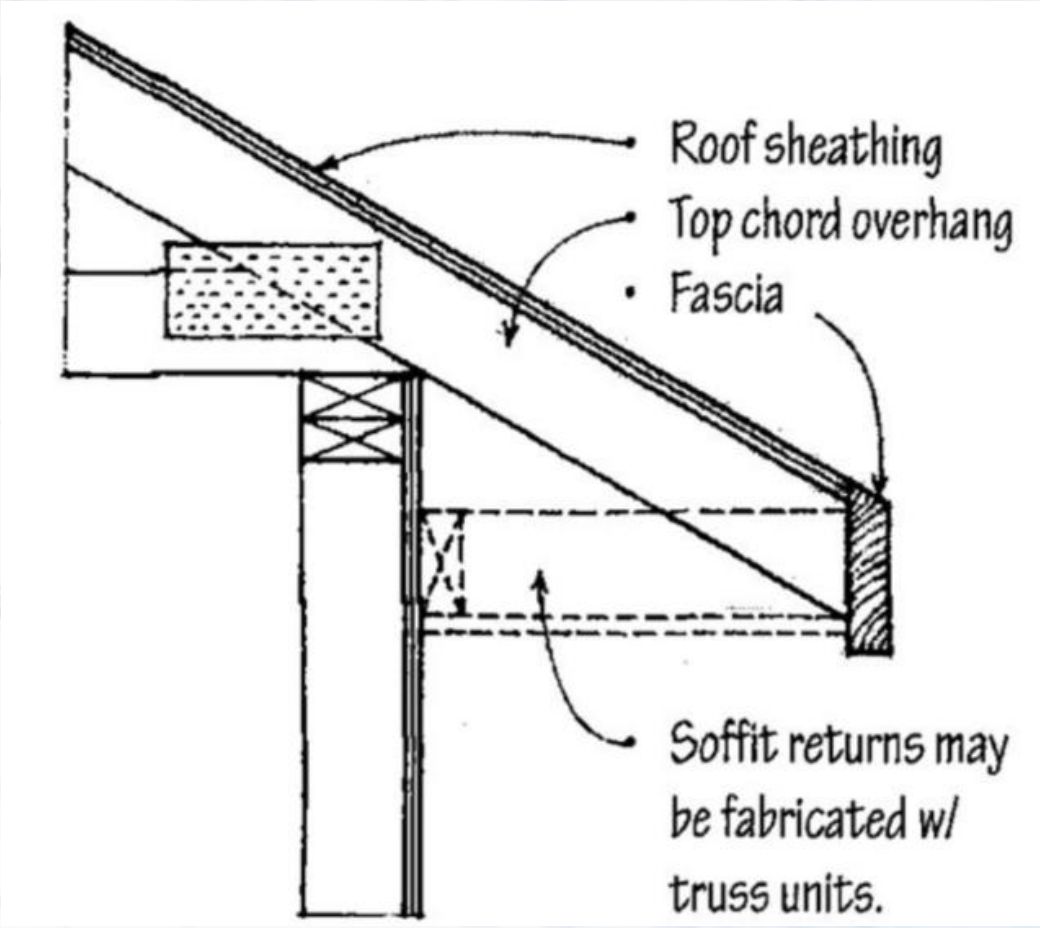


R1003.19 Chimney fireblocking. Spaces between **chimneys** and **floors** and **ceilings** through which chimneys pass shall be fireblocked with **noncombustible material** securely fastened in place. The fireblocking of spaces between chimneys and wood joists, beams or headers shall be self-supporting or be placed on strips of metal or metal lath laid across the spaces between combustible material and the chimney.

R302.11 Fireblocking (locations)

6. Fireblocking of cornices of a two-family *dwelling* is required at the line of *dwelling unit* separation.





R302.11.1 Fireblocking materials

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials.

1. Two-inch nominal lumber.
2. Two thicknesses of 1-inch nominal lumber with broken lap joints.
3. One thickness of 23/32-inch wood structural panels with joints backed by 23/32-inch wood structural panels.
4. One thickness of 3/4-inch particleboard with joints backed by 3/4-inch particleboard.
5. One-half-inch gypsum board.
6. One-quarter-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of mineral wool or glass fiber or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation installed as tested in accordance with ASTM E119 or UL 263, for the specific application.

R302.11.1 Fireblocking materials (continued)

R302.11.1.1 Batts or blankets of mineral or glass fiber. Batts or blankets of mineral or glass fiber or other *approved* nonrigid materials shall be permitted for compliance with the 10-foot horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

R302.11.1.2 Unfaced fiberglass. Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a height of not less than 16 inches (406 mm) measured vertically. Where piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

R302.11.1.3 Loose-fill insulation material. Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

R302.11.2 Fireblocking integrity. The integrity of fireblocks shall be maintained.

General Discussion

Q & A

Let’s discuss the following actual site examples of fireblocking defects

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking or Firestopping issue?

Fireblocking or Firestopping issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Fireblocking issue?

Questions?

Thank You!