FIRESTOPPING VS. FIREBLOCKING

THE INTEGRITY OF ALL FIRESTOPS, FIREBLOCKS, AND DRAFTSTOPS SHALL BE MAINTAINED

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FIRESTOPPING VS FIREBLOCKING

THE INTEGRITY OF ALL FIRESTOPS, FIREBLOCKS, AND DRAFTSTOPS SHALL BE MAINTAINED...

Firestopping is required in multi-family residential and commercial construction wherever a fire-rated floor or wall separation is encountered. In multi-family residential construction, fire-rated separation walls are always required between units whereas fire-rated floors are *only* required in buildings of three stories or more. Although these are general construction design rules, there may be exceptions.

During the construction process, penetrations are made partially through (membrane penetration) or completely through (through penetration) these fire-rated separations. This is done by the trades to run electrical wires and cables, plumbing pipes, HVAC ducts, and other mechanical items. These penetrations violate the original integrity of the fire-rated floor/wall system allowing the passage of flame, smoke, and toxic gases to communicate to other areas of the building in the tragic event of a fire.

In the early 1980's, ASTM (American Society for Tested Materials) established the "Test Method for Fire Tests of Through-Penetration Firestops". This test procedure is known as "**ASTM-E814**" and has an equivalent UL test known as "**UL 1479**". These test standards have been adopted by all model building codes in the United States and have established specific guidelines to addressing the penetrations made through fire-rated floor and wall separations.

As a result, manufacturers have designed and tested complete lines of firestopping sealants and accessories, and educated architects, code enforcement officials, builders, contractors, and other construction industry personnel about the importance and proper application of firestopping procedures.

Important determining factors for proper firestop application are as follows:

1. **What does the fire-rated system consist of?**
   a. Wood, Gypsum, Concrete?
   b. Floor or Wall?
2. **What is the hourly rating?**
   a. 1, 2, 3, +... hours?
3. **What are the penetrating items and what size?**
   a. Conduit & EMT, Steel Pipe, PVC, Joints, etc.
   b. The size of the penetrants
   c. The size of the openings
4. **What firestop product(s) have documented testing that meet the established criteria?**

When practicing proper firestop applications, it is strongly recommended that you review the manufacturers "Firestop Products Application Guide", "UL Assembly Diagrams", and/or the Code Enforcement Municipality having jurisdiction. Using these guides as a reference will allow you to make the proper determination in selecting the firestop product that meets your application criteria.

Reminder:

Firestopping: ASTM-E814 / UL 1479 listed products for use in 1, 2, & 3+hour fire rated separations found in multi-family and commercial construction

Fireblocking wood frame residential construction predates actual through penetration testing standards such as ASTM-E814 and UL1479 by over 30 years. All model building codes prescribe applications for residential fireblocking and are all synonymous in code wording and intent. Recently, the International Residential Code for One and Two Family Dwellings (IRC) has helped clear the grey areas in determining the difference between firestopping and fireblocking. The IRC has done so by eliminating the term "Firestopping" from the text because the IRC is only a residential 1 and 2 family dwelling code. Firestopping is used for multi-family dwellings and commercial construction for 1, 2, and 3 + hour rated fire separations which are not found in single family homes; although there may be some exceptions, wood or steel-framed. Single-family residential requirements are **non-rated structures** and therefore have less than an hour rating.

Balloon framing was the general structure common to 40 year or older residential construction. This style of construction allowed large, open concealed spaces to run between floors from the basements or first floor continuously to the attic area. Today, western style or platform framing construction has become the standard in residential dwellings. This construction has the floor framing bearing on load bearing walls so there is no continuous concealed space through the story levels or floor framing. This creates a built in fireblock at ceiling and floor levels also known as top-plates. When these fireblocks are penetrated for the trades to run their wires, pipes, and other mechanical penetrating items, the integrity of the wood fireblocks are violated and they must be protected with a material that is equal to or greater than the burn time of that wood top-plate.

Traditionally, the fireblocking code section found in building codes predating the International Code Council, required openings around vents, pipes, ducts, and other mechanical penetrating items at ceiling and floor level to be fireblocked with "**noncombustible**" materials. The term noncombustible is defined in the IRC (International Residential Code) as "Materials that Pass the Test Procedure for Defining Noncombustibility of Elementary Materials Set Forth in **ASTM-E136**". Simply put, ASTM has a test standard defining a noncombustible building material as a material that will not flame, smoke, or have significant weight loss when subjected to 1382° F. Upon passing this test, a manufacturer can label their product or material as a "Noncombustible" or "ASTM-E136" tested

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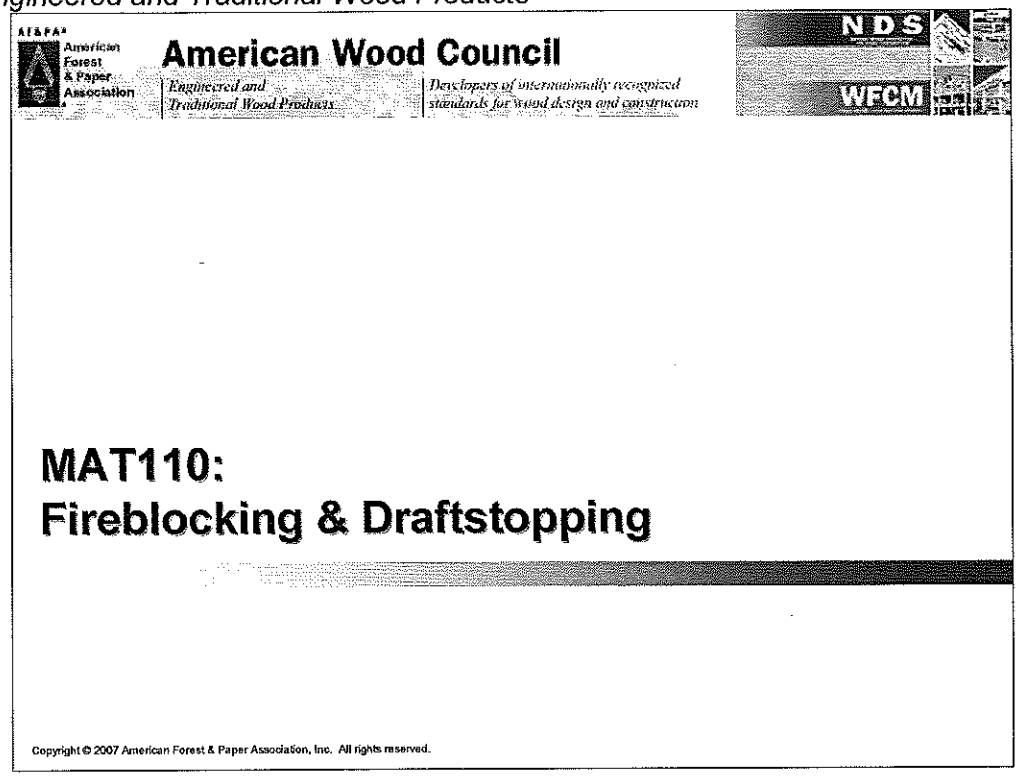
product. Using an ASTM-E136 rated product exceeds the code requirements for fireblocking penetrations because the material is tested and demonstrates not to smoke or burn at far higher temperatures than the burn time and burn temperature of wood.

Reminder: **Fireblocking:**	ASTM-E136 and ASTM-E814 tested products for use in non-rated steel and wood frame residential structures.

Today, the IRC specifies an **"Approved"** material to resist the free passage of flame and products of combustion. This wording allows for ASTM-E814, ASTM-E136, and other approved products to be used in fireblocking applications based upon the determination of the code enforcement official having jurisdiction. However, **ASTM-E136 and other fireblocking products are typically not compliant for ASTM-E814 applications**. As always, it is important to check the manufacturers suggested installation procedures and to consult your local building department.

For more information on the differences between Firestopping and Fireblocking, or for help in selecting and installing firestopping and fireblocking materials, contact Everkem Diversified Products. You may also view a wide selection of comprehensive Firestopping and Fireblocking solutions, including technical and safety data sheets online at EverkemProducts.com



Although it's not structurally related, fireblocking and draftstopping are fire-safety items that are specifically tied to the use of wood framing. In fact, it's only required in wood framed buildings.

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Fireblocking & Draftstopping

- Fireblocking
  - No longer called "firestopping"
  - Prevents movement of flame, smoke, gases through concealed spaces
  - Primarily addresses vertical movement (although code addresses horizontal direction in walls)
- Draftstopping
  - Prevent movement of smoke and gases through concealed spaces
  - Primarily addresses horizontal movement

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For a long time what the code now calls "fireblocking" was called "firestopping." However, the materials which provide annular protection around pipes and ducts are generically referred to as "firestopping," so the application that we will talk about here became "fireblocking."

Fireblocking and draftstopping have similar, but slightly different, purposes. As you see here, fireblocking is intended to resist the movement of flames, where draftstopping is intended to resist the passage of smoke and gases.

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Fireblocking & Draftstopping

FIREBLOCKING

- Locations
  - Walls at floors & ceilings & at 10' intervals (both vertical & horizontal)
  - Interconnections between concealed vertical and horizontal spaces (example: between walls and furrdowns)
  - Concealed spaces between stair stringers at top & bottom of run
  - Openings for vents, piping, chimneys, etc
  - Cornices of 2- or more family dwellings at unit separation line

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Fireblocking is intended to resist upward movement of flames, smoke, and gases. Here you see the general locations cited in the code. We'll show some simple examples in a moment, although it must be admitted that real-world applications of the code's requirements may be more complex than our examples.

While studs typically provide built-in protection horizontally and top and bottom plates do the same vertically, in high walls fireblocking must be added to limit the vertical distance to 10 ft or less.

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Fireblocking & Draftstopping

FIREBLOCKING

- Accepted materials
  - 2x lumbers
  - 2 layers of 1x lumber
  - 23/32" WSP or 3/4" particleboard
  - 1/2" gypsum board or 1/4" cement asbestos board
  - Batts or blanket mineral wool ~~or fiberglass insulation~~
  - Other approved materials

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You'll notice that acceptable fireblocking materials tend to be rather substantial since they're intended to inhibit the passage of fire. As we'll see in a moment, draftstopping materials are lighter materials because they're intended to reduce the passage of smoke and gases.

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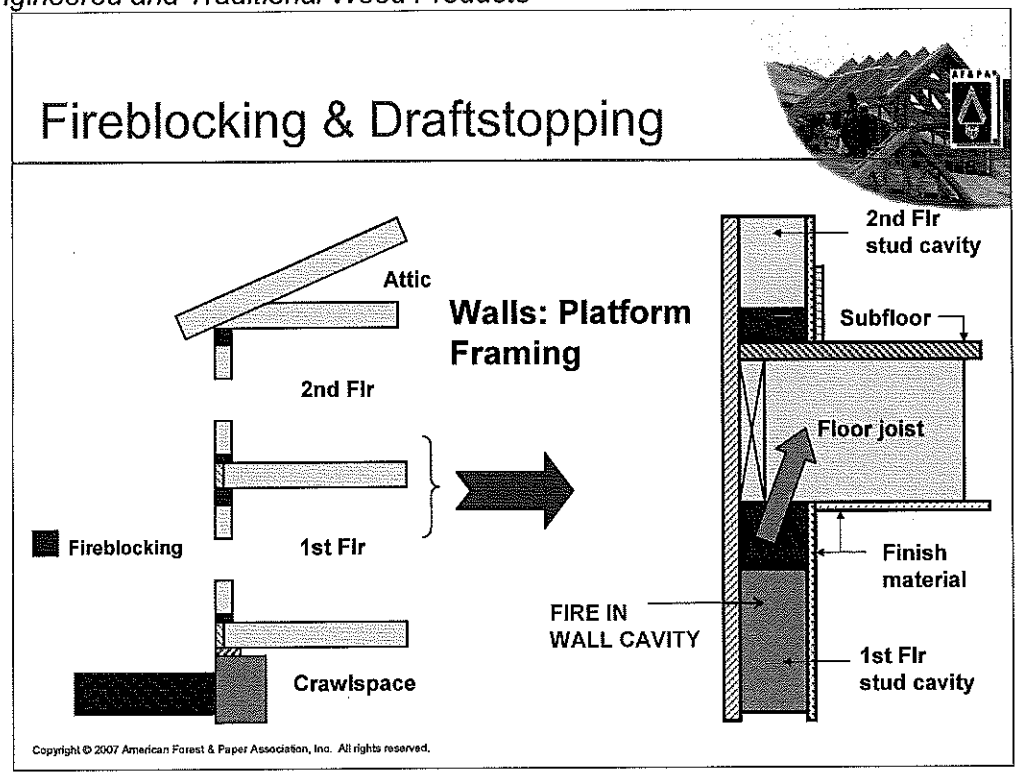

Here's the first of several admittedly simplified examples of what is intended by the code's requirements. Without the presence of the fireblocking fire in a concealed space could spread through interconnected concealed spaces as indicated by the orange arrow. Note that, as mentioned on an earlier slide, plates provide built-in fireblocking.

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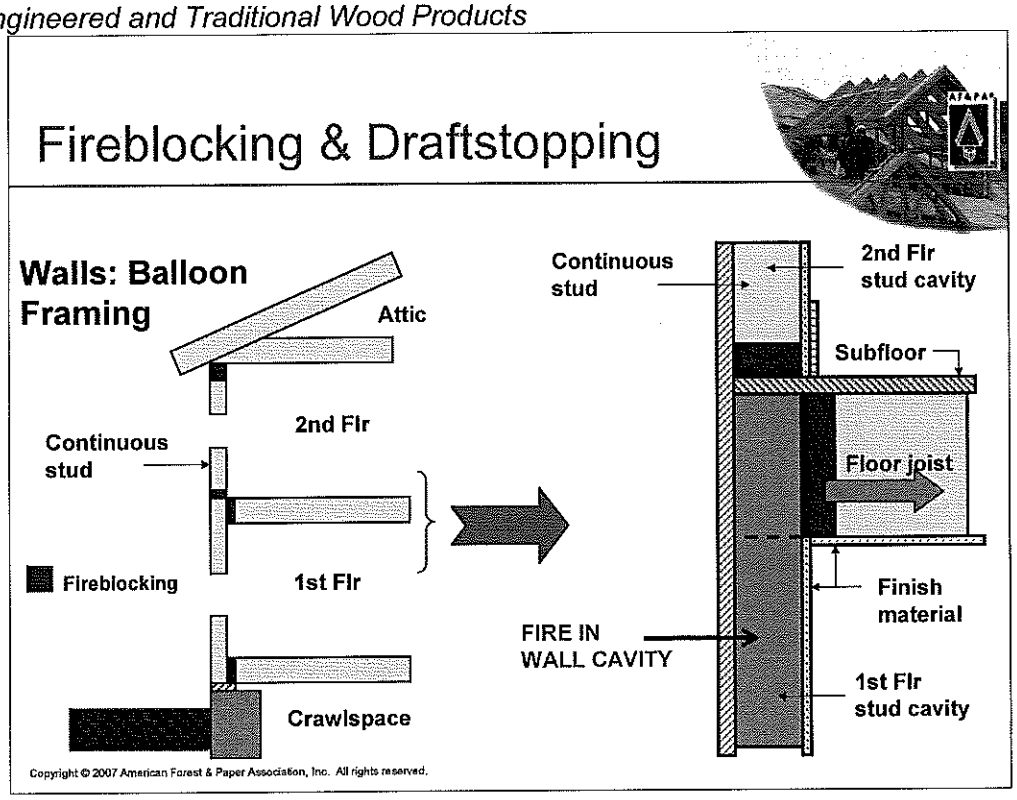

In balloon framing, or methods of framing with long studs in which the inherent protection offered by plates is missing, specific material must be added to act as fireblocking.

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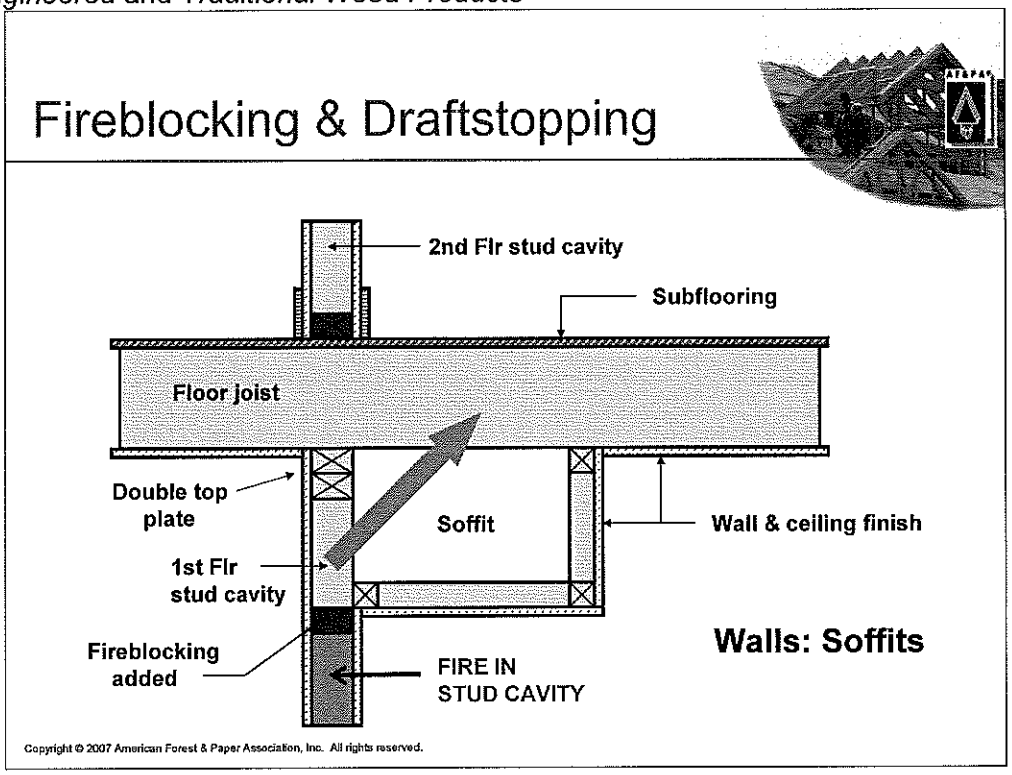

There are instances in which the plates may not provide the protection that they do otherwise. Here we see a soffit, similar to what you see above cabinets, in which the opening to the floor-ceiling assembly occurs below the top plate. In this instance, fireblocking is required as shown.

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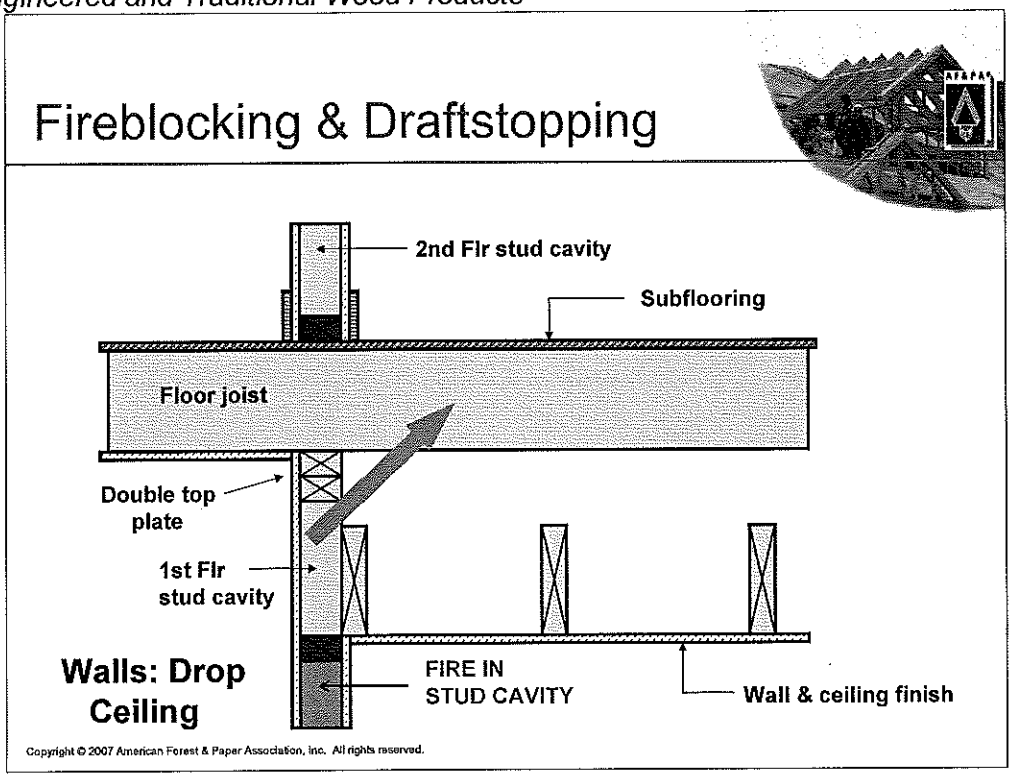

A similar situation may exist with a dropped ceiling.

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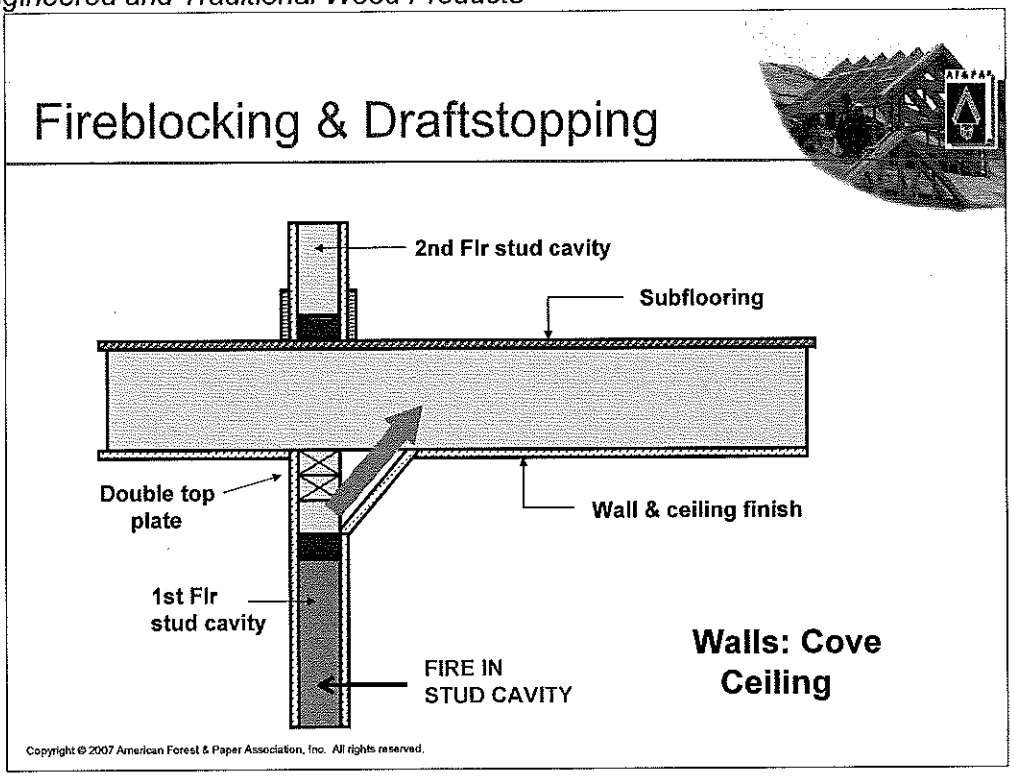

And cove ceilings may provide the same problem.

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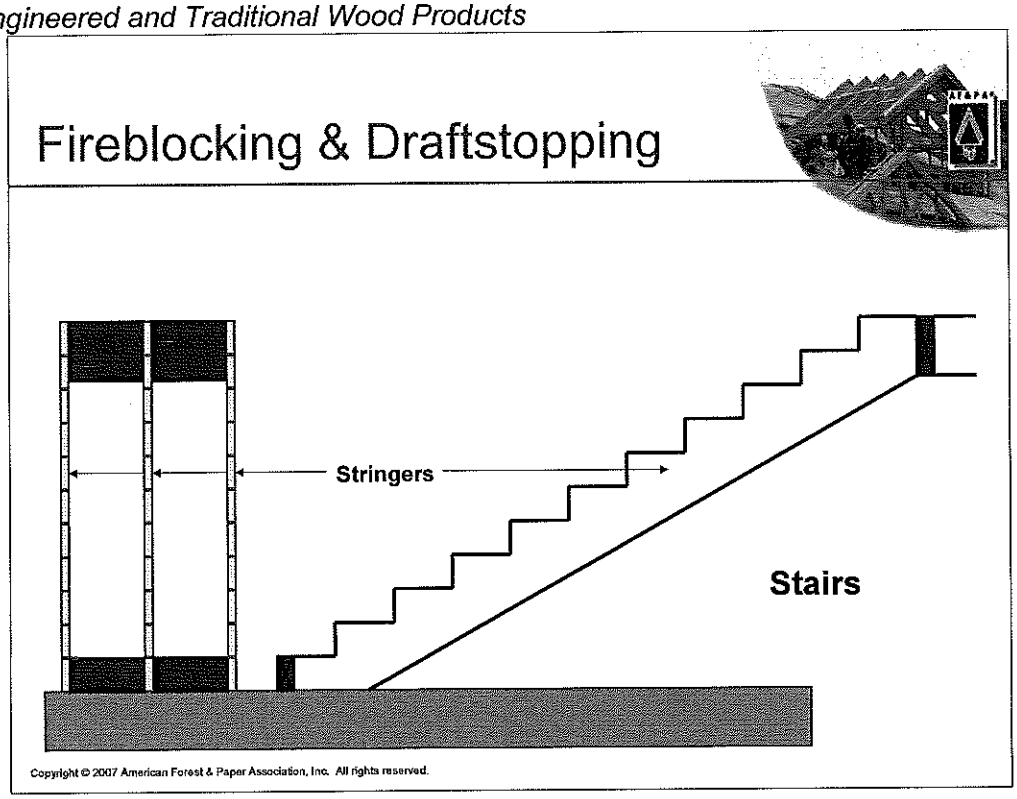

Stair stringers must be fireblocked, keeping fire in the floor assemblies from getting into the space below the stairs and burning the stringers away. It also prevents fire in the stringers from getting into the floor assemblies. Some of the older codes had more extensive requirements for fireblocking stairs than does the IRC.

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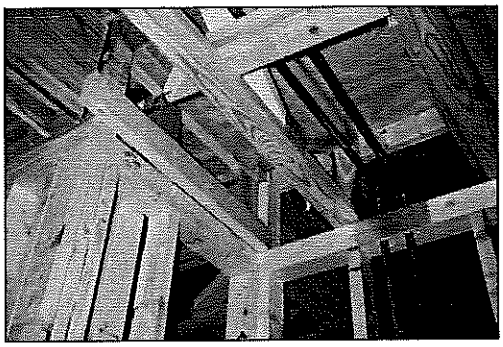
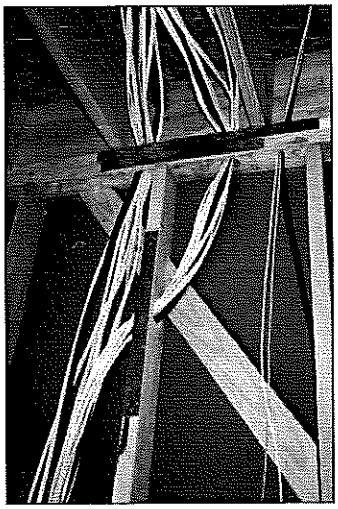
Fireblocking & Draftstopping





Holes in Plates

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Holes in plates must be fireblocked with approved material to "... resist the free passage of flame ..." This means that latex chaulk or foam insulation, which would likely melt out rather quickly, wouldn't be accepted.

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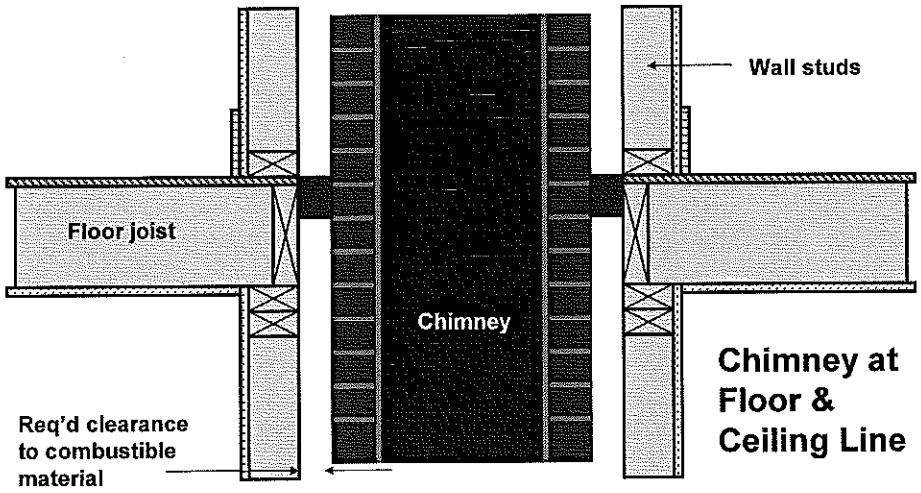

Chimney at Floor & Ceiling Line

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Fireblocking of spaces where chimneys pass through floors and ceilings, must be done with noncombustible material securely fastened in place. Some details are provided in Section R1001.16.

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Fireblocking & Draftstopping

DRAFTSTOPPING

- Where useable space is both above & below concealed space of floor/ceiling assemblies
- Concealed space not to exceed 1,000 sf on each side of draftstop & approximately of equal sizes

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There are some points to be made about the draftstopping requirements:

1. If there is no useable space above the assembly (an attic) or below it (a crawlspace), draftstopping isn't required.
2. If the assembly isn't concealed (an open floor/ceiling assembly above a basement), draftstopping isn't required.
3. If draftstopping is required the 1,000 sf limit applies but the divided spaces must be approximately equal. For example, in a 1,500 sf floor/ceiling assembly you can have 1,000 sf on one side of the protection and 500 sf on the other.

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Fireblocking & Draftstopping

DRAFTSTOPPING

- Accepted materials
  - 1/2" gypsum board
  - 3/8" WSP
  - 3/8" Type 2-M-W particleboard
  - Other approved materials

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Here you'll note that acceptable draftstopping materials are lighter materials than those required for fireblocking. However, it would seem logical that fireblocking materials could be used for draftstoppping since they will resist the passage of fire.

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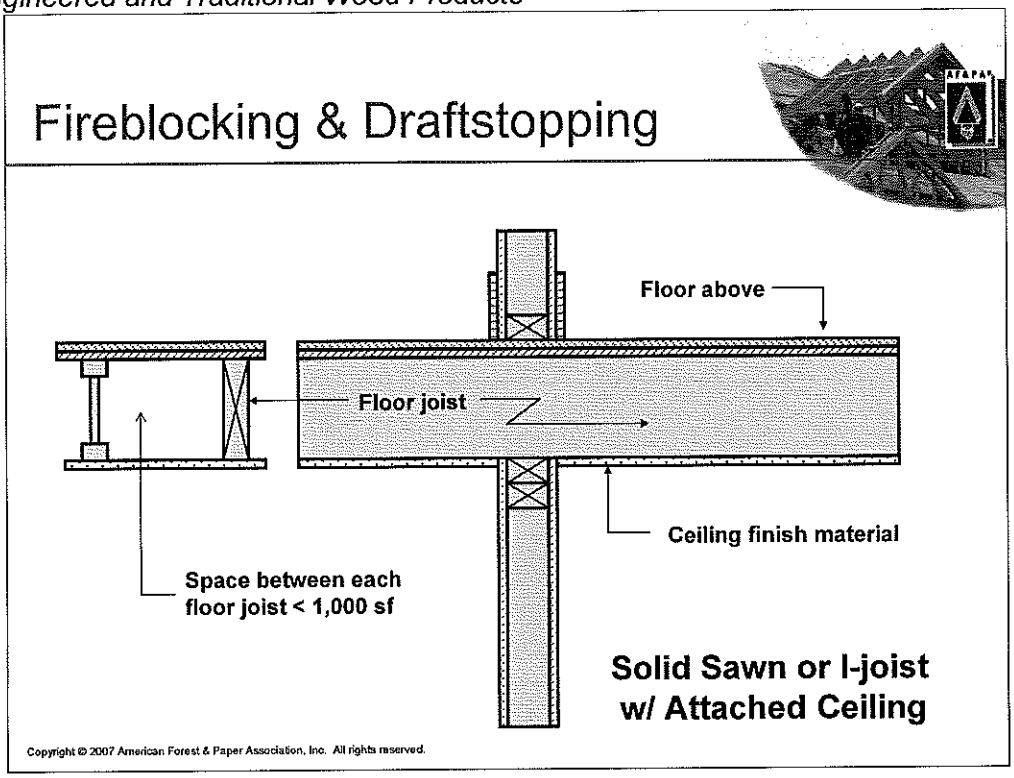

Solid sawn joists or other solid joists such as I-joists provide more than adequate draftstopping when the ceiling finish is added to the bottom of the joists. And it's very unlikely that the 1,000 sf limit would come into play here since the spans of the joists are going to be limited.

However, if the ceiling finish is added to a resilient channel for sound deadening purposes, the resulting space between the bottom of the joists and the finish material would have to be draftstopped.

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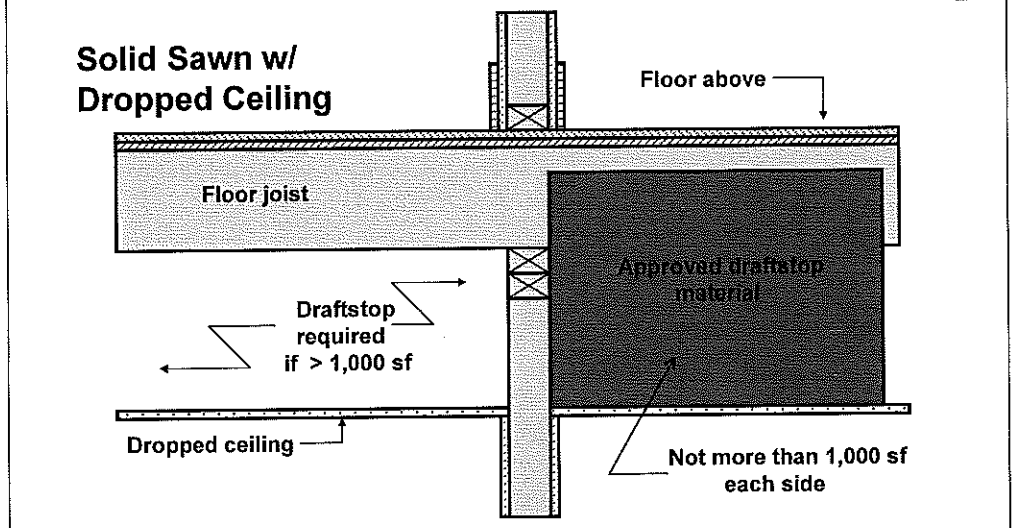
Fireblocking & Draftstopping



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Where a dropped ceiling is used, draftstop material must be suspended in some fashion to block the space between the joist and the ceiling material.

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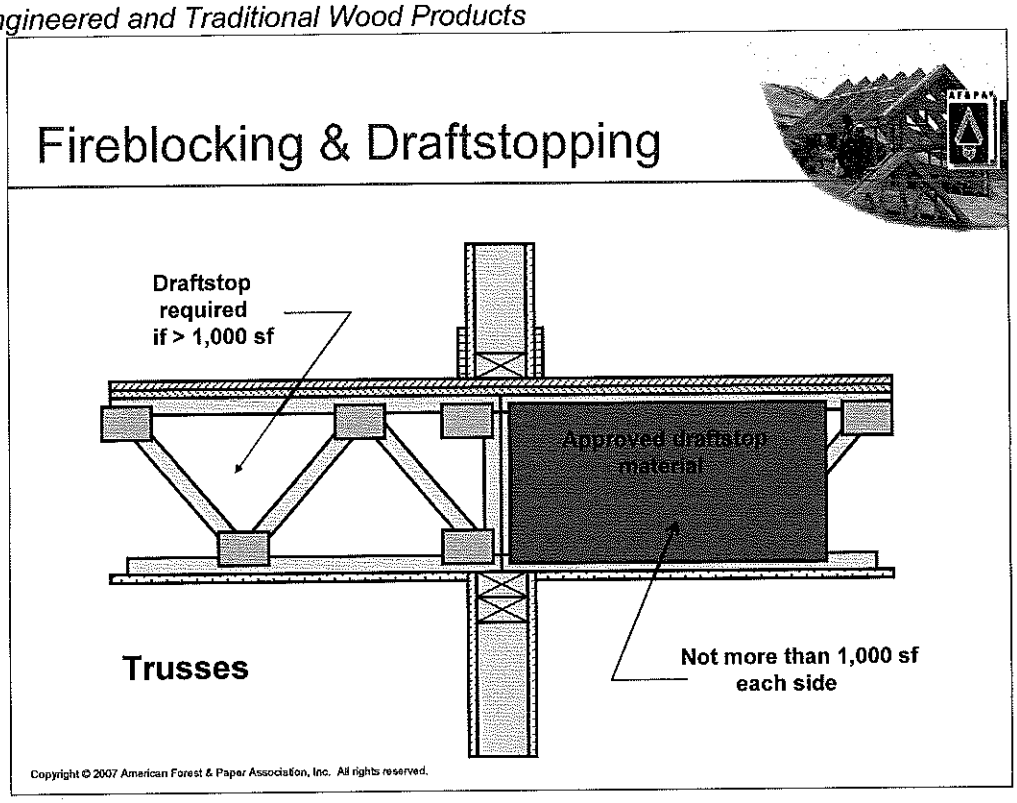

Even though the ceiling finish is added to the botom of a truss, the inside of the truss is open to the passage of smoke and gases. For that reason the draftstop material must be added as you see here.

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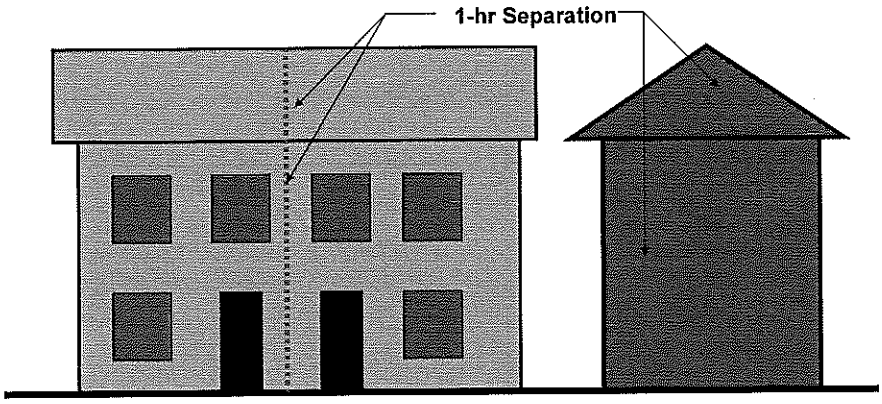
Fireblocking & Draftstopping



Two-Family Dwellings – Unit Separation

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Finally let's talk about fire separation between units of duplexes and multi-family dwellings.

The IRC requires that a 1-hour rated assembly must extend from the foundation to the roof.

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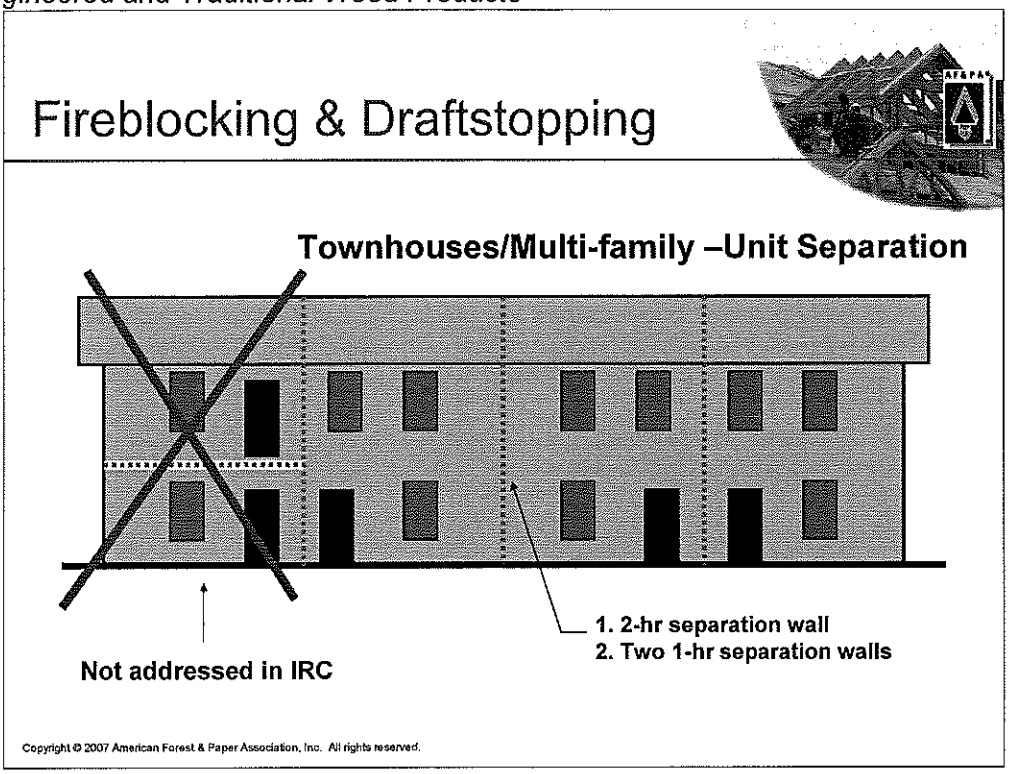

In multi-family dwellings that separation must be either a single 2-hr rated assembly or two 1-hr assemblies. The IRC is applicable to multi-family dwellings only when each unit extends from the foundation to the roof. So, the fire separation of stacked units as you see on the left isn't addressed.

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QUESTIONS?

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