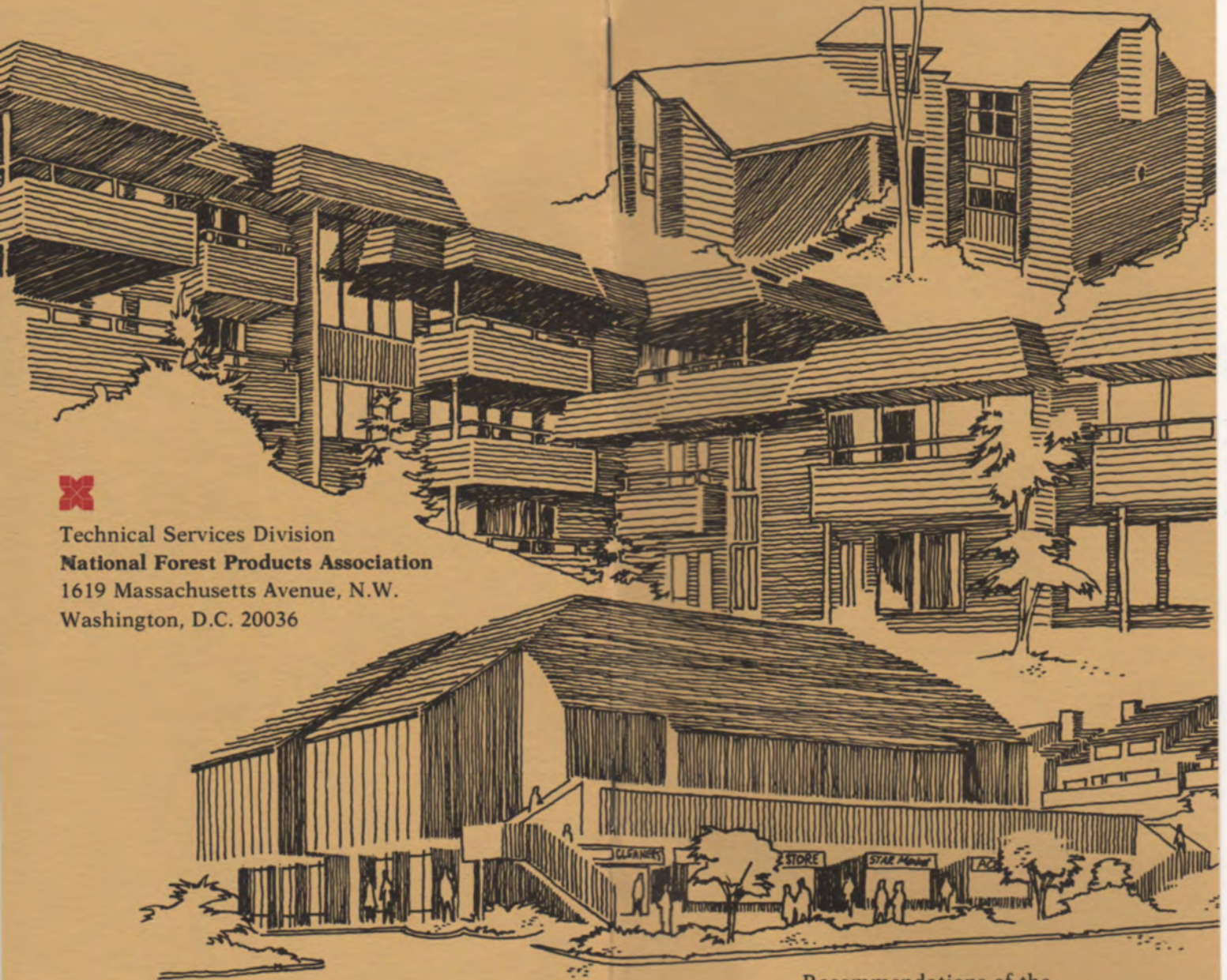


# IMPROVED FIRE SAFETY:

Design of Firestopping  
and Draftstopping  
for Concealed  
Spaces



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Recommendations of the  
National Forest Products Association

## Introduction

Building codes traditionally have required fire/draftstopping to control fire and smoke in concealed spaces of a building's structural components. However, few codes have kept pace with the impact new design and construction techniques have had on the effectiveness of fire/draftstopping requirements. This lag has been recognized by the model building code organizations who are seeking criteria on which to base new code requirements that will account for present conditions.

To encourage use of construction practices which improve fire safety and to assist in development of appropriate regulations, the National Forest Products Association has prepared recommendations on where and how fire/draftstopping should be used. Such stopping prevents spread of a fire by restricting movement of flame, air, hot gases and smoke that accompany a fire. Stopping is desirable in all buildings—regardless of whether a building or its components are classified as noncombustible, since combustibility of a building's structural components is often not a major factor in fire spread.

*Firestopping* prevents movement of flame and gases to other areas of the building through relatively small concealed passages in building components such as floors, walls, and stairs.

*Draftstopping* prevents movement of air, smoke, and gases and flame to other areas of the building through large concealed passages, such as attic spaces and floor assemblies with suspended ceilings or open-web trusses.

## **The Code Situation Today**

Building codes typically require firestopping in stud spaces at ceiling and floor levels to prevent spread of fire in the vertical direction in concealed spaces. Firestopping in the horizontal direction is provided by requiring solid blocking of floor joists over points of support and in some cases at partitions.

The need for draftstopping in large concealed spaces has been recognized for many years. Draftstopping is usually provided by requiring a plywood or gypsumboard barrier at 3,000 square foot intervals in attic spaces.

With new design techniques utilizing suspended or dropped ceilings, a need was created for draftstopping such concealed areas equivalent to that provided by solid blocked wood joist construction where the ceiling is applied directly to solid joists. Building codes have tended to consider an area of 1,000 square feet between draftstops to be reasonable and practical in non-residential buildings where suspended ceilings are used. This requirement is based on the rationale that the integrity of a floor is more critical than that of a roof; and, therefore, open areas should be smaller in floor spaces than in attics.

## **Need for Change**

The large open areas allowed between suspended ceiling draftstops are not consistent with the small areas allowed between firestops in the horizontal spaces of solid wood joisted floor/ceiling assemblies. A uniform rationale is needed to reconcile these differences.

Use of parallel chord trusses has created another new concealed space situation, particularly where such trusses are used in floor/ceiling construction. The probability of fire and smoke spread is greater in a floor/ceiling assembly constructed with parallel chord wood trusses with open webs than with solid wood joists. Further, there is an important difference in the open space created by a suspended ceiling and that created by use of parallel chord floor trusses. Under fire conditions in a ceiling suspended below wood joists, the joists themselves tend to serve as a baffle to the spread of heat in the concealed space. Conversely, in parallel chord wood truss construction, there is little such containment.

Lacking specific code requirements dealing with these differences, building and fire officials individually have been forced to address the issue. Some have required each truss to be protected with gypsumboard to limit the open area, or to require a 5/8" Type X gypsumboard ceiling wherever parallel chord trusses are used. Other officials have required concealed areas in parallel chord truss assemblies to be limited to areas ranging from 200 to 1,000 square-foot segments by draftstops.

Inequities and inconsistencies in present fire/draftstopping requirements and in their enforcement, which have been created by new construction techniques, point to the need for establishment of new fire/draftstopping code provisions.

## **Recommendations**

The National Forest Products Association has developed the following Fire/Draftstopping provisions as a recommended practice to be included in the model building codes. They are offered in the interest of improved fire safety in wood frame buildings.

# FIRESTOPPING AND DRAFTSTOPPING RECOMMENDATIONS

## FIRESTOPPING

Firestopping shall be provided in wood frame construction in the following locations:

- (1) In concealed spaces of stud walls and partitions, including furred spaces, at the ceiling and floor levels (See Figures 1 & 2).

Figure 1

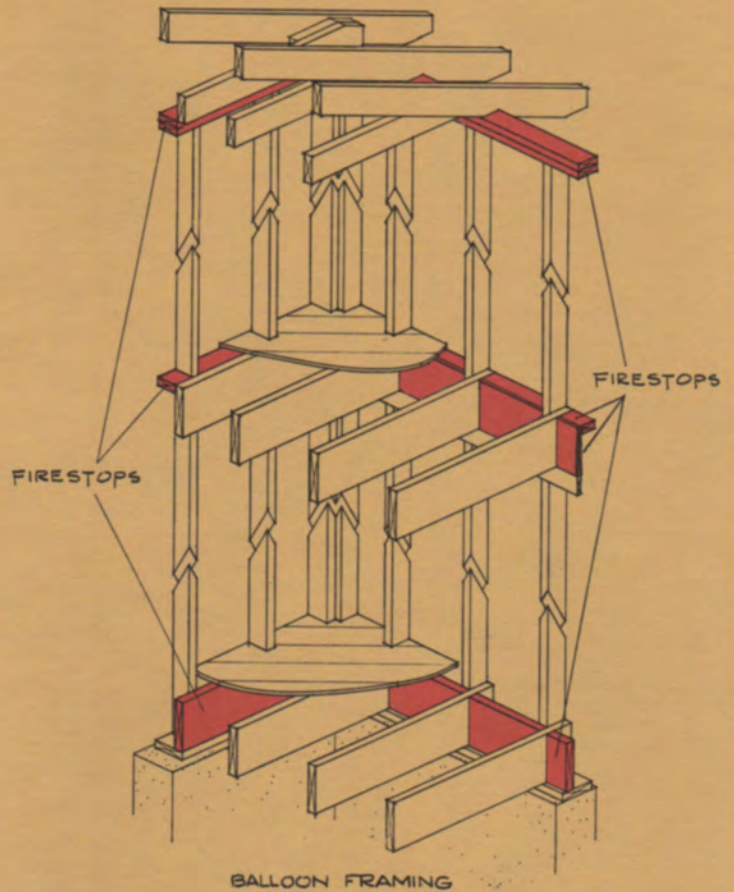
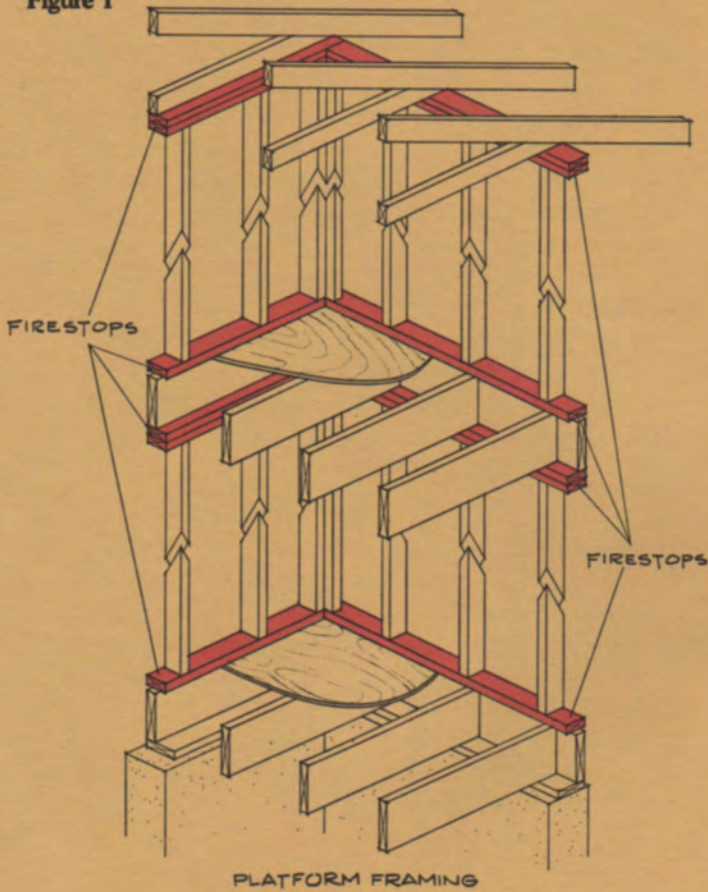
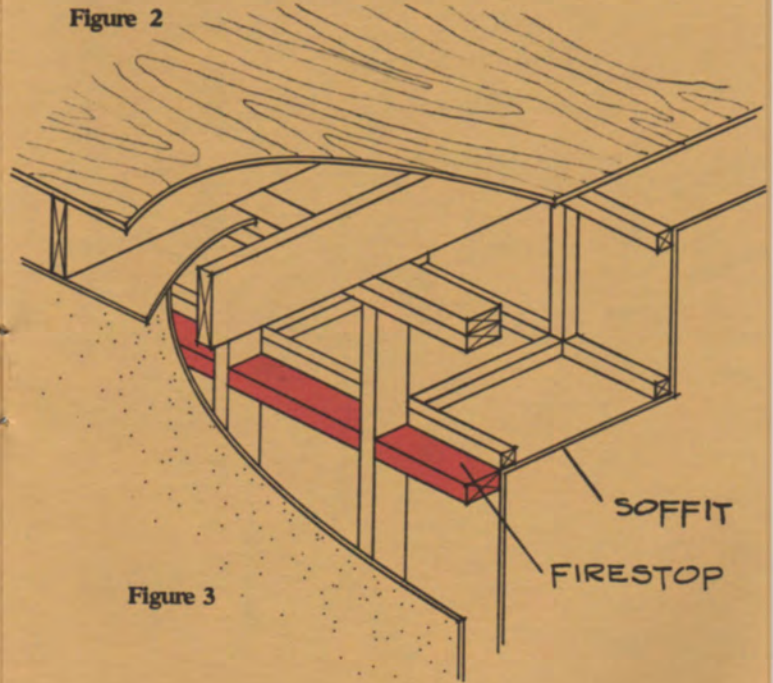


Figure 2



(2) At all interconnections between concealed vertical and horizontal spaces such as occur at soffits (Figure 3), drop ceilings (Figure 4), cove ceilings (Figure 5).

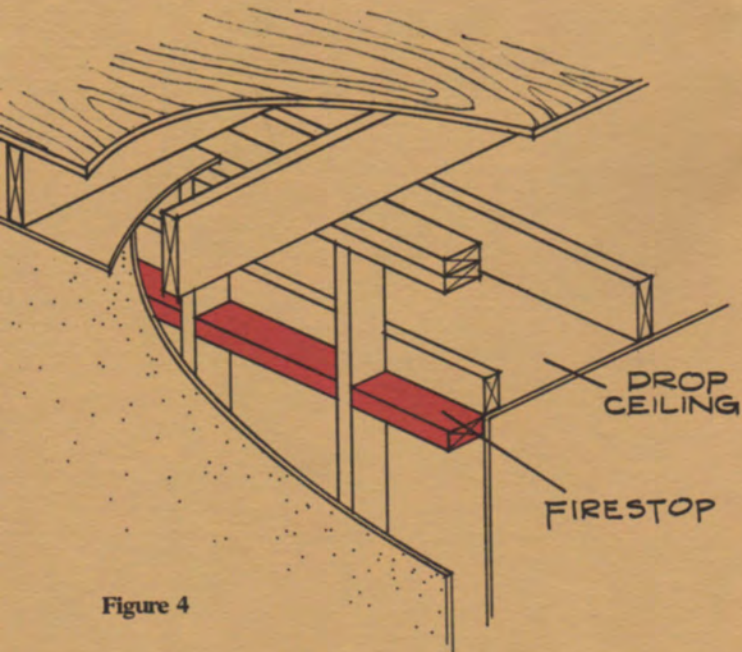


Figure 4

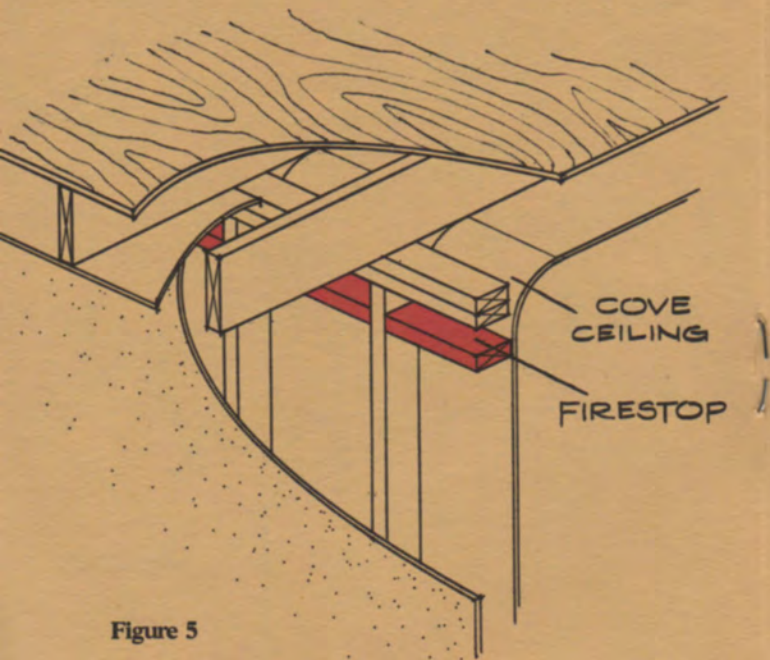


Figure 5

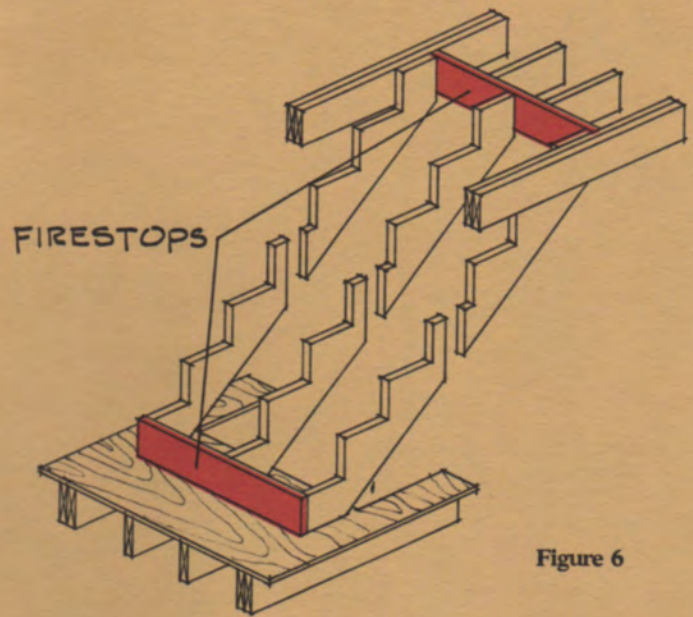


Figure 6

(3) In concealed spaces between stair stringers at the top and bottom of the run (Figure 6).

(4) At openings around vents, pipes, ducts, chimneys, and fireplaces at ceiling and floor levels, with noncombustible materials (Figures 7 & 8).

The integrity of all firestops shall be maintained.

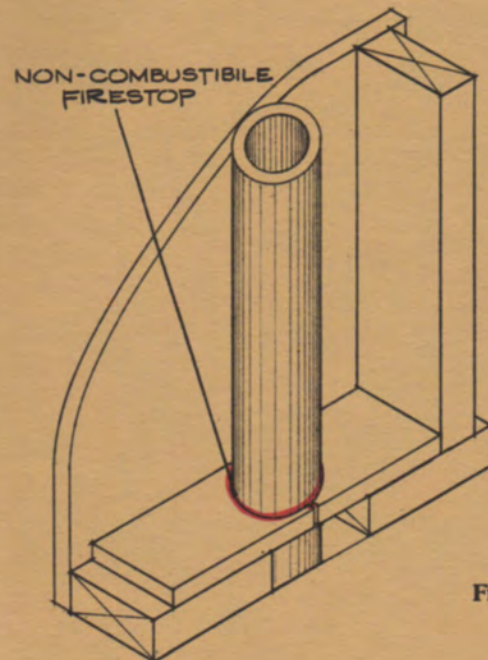
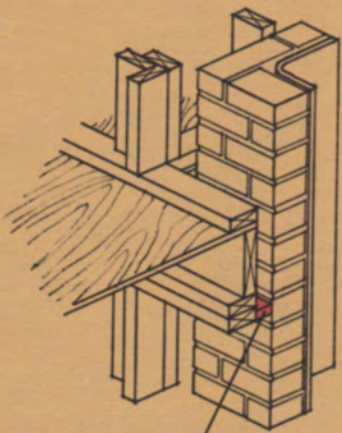
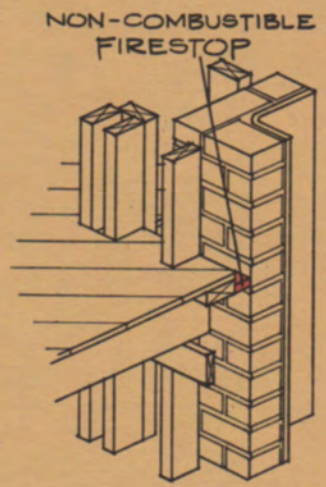


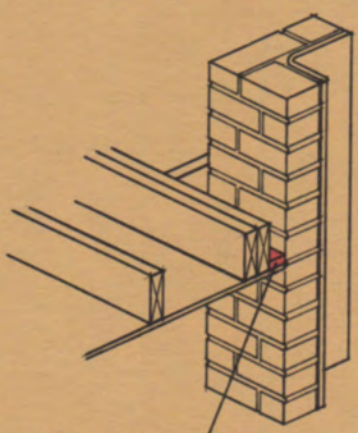
Figure 7



NON-COMBUSTIBLE  
FIRESTOP



NON-COMBUSTIBLE  
FIRESTOP



NON-COMBUSTIBLE  
FIRESTOP

Figure 8

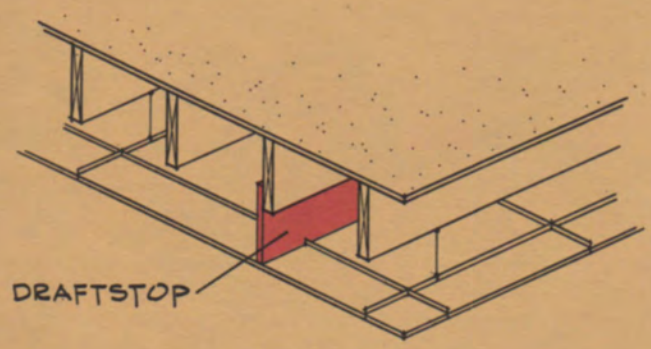
Except as provided in item (4) above, fire-stopping shall consist of 2" nominal lumber or two thicknesses of 1" nominal lumber with broken lap joints or one thickness of 3/4" plywood with joints backed by 3/4" plywood, or other approved materials.

## DRAFTSTOPPING

Draftstopping shall be provided in wood frame construction in the following locations:

### (1) Floor-Ceiling Assemblies

(a) Single Family Dwellings. In floor-ceiling assemblies separating usable spaces into two or more approximately equal areas with no area greater than 500 sq. ft. Draftstopping shall be provided parallel to the main framing members. (Figures 9 & 10)



DRAFTSTOP

Figure 9

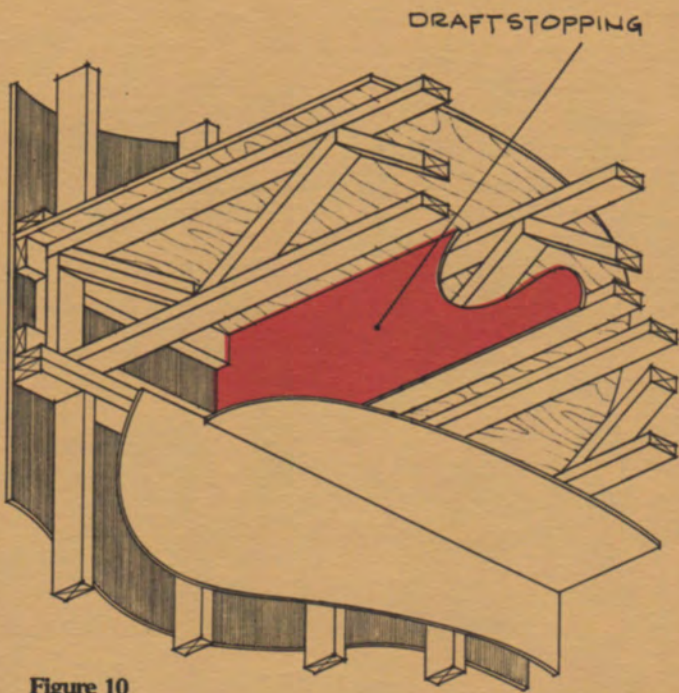


Figure 10

(b) Multi-Family (two or more) Dwellings, Motels, Hotels. In the floor-ceiling assemblies above and in line with the tenant separation, when tenant separation walls do not extend to the floor sheathing above. (Figure 11)

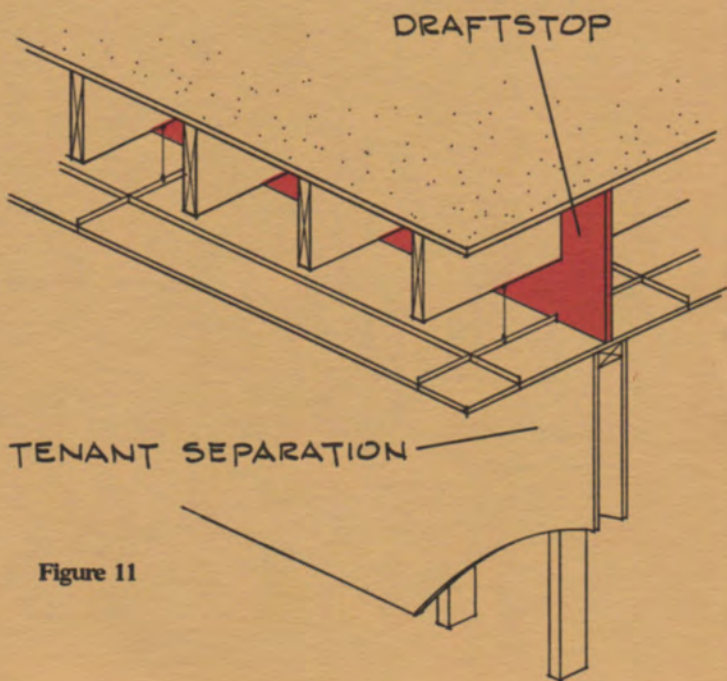


Figure 11

(c) Other Buildings. In floor-ceiling assemblies so that horizontal areas do not exceed 1000 sq. ft.

(2) Attics

(a) Single Family Dwellings. None required.

(b) Multi-Family (two or more) Dwellings, Motels, Hotels. In the attic, mansard, overhang, or other concealed roof space above and in line with the tenant separation when tenant separation walls do not extend to the roof sheathing above. (Figure 12)

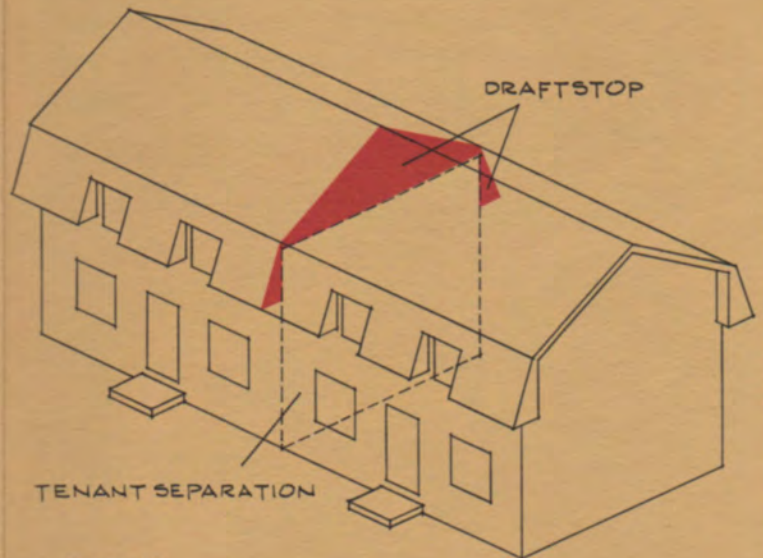


Figure 12

Exception (1)—Where corridor walls provide a tenant separation, draftstopping shall only be required above one of the corridor walls.

Exception (2)—Where flat roofs with solid joist construction are used, draftstopping over tenant separation walls is not required.

Exception (3) — Where approved sprinklers are provided, draftstopping shall not be required.

(c) Other Buildings. In attic spaces so that horizontal areas do not exceed 3000 sq. ft.

Exception (1)—Where flat roofs with solid joist construction are used, draftstopping over tenant separation walls is not required.

Exception (2)—Where approved sprinklers are provided, draftstopping shall not be required.

Ventilation of concealed roof spaces shall be maintained in accordance with the building code.

Draftstopping materials shall be not less than  $\frac{1}{2}$ " gypsumboard,  $\frac{3}{8}$ " plywood, or other approved materials adequately supported.

The integrity of all draftstops shall be maintained.