
FIRE PREVENTION AND BUILDING SAFETY COMMISSION
Department of Homeland Security**Written Interpretation of the State Building Commissioner****Interpretation #:** CEB-2021-21-2014 IBC-705.6**Building or Fire Safety Law Interpreted****[675 IAC 13-2.6](#) Indiana Building Code, 2014 Edition Section 705.6 [EXTERIOR WALLS] Structural stability.**

The wall shall extend to the height required by Section 705.11 and shall have sufficient structural stability such that it will remain in place for the duration of time indicated by the required *fire-resistance rating*. Where exterior walls have a minimum *fire separation distance* of not less than 30 feet (9144 mm), interior structural elements which brace the exterior wall but which are not located within the plane of the exterior wall shall have the minimum *fire-resistance rating* required by Table 601 for that structural element. Structural elements which brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum *fire-resistance rating* required in Tables 601 and 602 for the exterior wall.

Issue

Whether, in one-hour fire-resistance-rated exterior walls in multi-story structures of Type VA construction, Section 705.6 of the 2014 *Indiana Building Code* (IBC) requires the installation of the wall's interior membrane material on the portion of the wall that is within the interstitial space of intersecting floor and roof assemblies.

Interpretation of the State Building Commissioner

In one-hour fire-resistance-rated exterior walls in multi-story structures of Type VA construction, Section 705.6 of the 2014 IBC does not require the installation of the wall's interior membrane material on the portion of the wall that is within the interstitial space of intersecting floor and roof assemblies, if the structure is constructed in a manner that creates no voids or compromises in the required protection of the horizontal structure and the interstitial space it occupies.

Rationale

The case at the center of the interpretation request involves a multi-story structure of Type VA construction, with fire separation distances that require at least some of its exterior walls to carry a one-hour fire-resistance rating, rated for exposure from the inside of the structure. Since it is multi-story, and since it is platform framed, the exterior wall's interior plane is penetrated by the intermediate floor/ceiling assemblies, and by the roof/ceiling assembly. At the intersection of these horizontal structural assemblies and the rated exterior walls, the wall's interior membrane material has been eliminated within the interstitial structural space, i.e., the space between the ceiling materials at the underside of the structure and the subfloor materials above it. The question is whether this is acceptable, or whether the code section cited above requires the wall's membrane material to be installed in the interstitial space.

The penetration of exterior wall assemblies by floor and/or roof assemblies is the nature of platform framing in Type V construction. Walls are typically framed one story at a time, with the next higher horizontal structural assembly bearing on top of the walls below. If another story is planned, its walls are framed on top of that horizontal structure, usually on the subfloor or deck material, and so it goes, for the full height of the structure.

While these intersections of wall and floor (or wall and roof) are inconsequential on many Type V structures, they become problematic when the exterior wall is required to be fire-resistance-rated, particularly at the bearing conditions, where the horizontal elements run perpendicular to the wall. To bear on the wall below, the horizontal structure must penetrate the wall's interior plane, thereby interrupting the wall assembly's interior membrane material, and potentially compromising the efficacy of the wall's fire-resistance.

While penetrations through fire-resistance-rated assemblies are nothing new, and piecing the assembly's materials around the penetrations (and sealing those penetrations) is a commonly deployed solution, the question has arisen whether this continuation of the membrane material is required by code when the construction type is VA. The answer requires an examination of the difference between VA and VB construction.

Unlike Type VB construction, which has no intrinsic required fire protection, i.e., no fire protection that is necessary unless it is required by other code sections for other reasons, Type VA requires one hour of fire-resistance-rated protection of a variety of building elements regardless of the presence or absence of other fire protection requirements. This includes horizontal elements such as the floor and roof construction; they must be provided one-hour-rated fire-resistance in accordance with Table 601 of the 2014 IBC.

The local official has argued that a one-hour rated horizontal assembly only holds its one-hour fire-resistance rating when acting as a complete assembly, and because of that, neither membrane on its own – top (subfloor) or bottom (ceiling) – provides adequate protection for the interstitial space, where the wall's interior membrane has been interrupted. This argument, while a true statement, misunderstands or misstates the nature of the VA protection requirement, however. A one-hour rating for an entire horizontal assembly is not the same as one hour of protection of the horizontal structure within that assembly. For the structural members to be protected as required in VA construction, the required level of protection must be provided by the membrane materials that separate the structure from the adjacent spaces. In other words, the ceiling below and the subfloor above must each provide an hour of protection for the horizontal building elements.

Since the ceiling and floor materials themselves each provide no less than one full hour of fire protection of the structural members and their interstitial space, there is no practical reason to require the wall's membrane to be continuous within that space, provided the design and construction do not compromise the protection of the interstitial space in other locations. In other words, care must be exercised to ensure the integrity of the protection of the interstitial space throughout, and that there are no voids, breaks or other conditions which could compromise the required separation and allow a path for combustion or combustion byproducts to travel to the wall.

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