



Continuity Head-of-Wall Joint Systems

An integral part of a building's passive fire protection.

The 2012 International Building Code (IBC) introduced requirements to protect the voids where a fire barrier wall intersects the lower side of a non-fire-resistance rated roof assembly. The intent of the new requirement is to prevent flame passage over the top of a wall in the event of a fire. This article describes one method available to comply with these requirements.

2012 IBC requirements

Prior to the 2012 edition of the IBC, Section 707.5 required fire barriers to extend from the top of a floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and to be securely attached thereto. The fire barriers were required to be continuous through concealed space, such as the space above a suspended ceiling. If joints were provided at the intersection of fire barriers with the underside of the floor or roof sheathing, slab or deck above, Section 707.8 required the assembly to comply with the Section 714 requirements for fire-resistant joint systems (this is now Section 715 in the 2012 IBC).

However, since the provisions of Section 714 only covered the methods used to protect joints in or between fire-resistance rated assemblies, there were no specific requirements to cover the situation where the floor or roof sheathing, slab, or deck above did not have a fire-resistance rating.

Section 707.9 was added to the 2012 IBC and requires voids created at the intersection of a fire barrier and a nonfire-resistance rated roof assembly to be filled with an approved material or system that is securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases. One example of such a void is a fire barrier used to separate occupancies in a metal building.



ASTM E 2837 solutions

At the time Section 707.9 was proposed, no consensus test standard existed to test head of-wall systems involving nonfire-resistance rated horizontal assemblies. Therefore, the 2012 code described how the void protection is to be provided. However, it is rather subjective for the designer and code official to determine whether the material used to protect a void will not dislodge, will accommodate expected building movements and will prevent the passage of fire and hot gases.

To address this situation, the ASTM E 2837 Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies was developed.

This standard includes a procedure in which a joint system is installed within a test assembly at the intersection of a rated wall assembly and a non-rated roof assembly.

Once cured, the assembly is subjected to a cyclical movement in the direction, magnitude and frequency as requested by the test sponsor based on the intended use of the system. Following the movement cycling, the system is subjected to a fire exposure representing a fully involved building fire for the time period equivalent to the fire-resistance rating of the wall construction. The fire exposure test is followed by the hose stream test, intended to evaluate the structural integrity of the test specimen. After these tests, the system is assigned an F rating and a T rating.

The F rating relates to the ability of the system to:

- 1) Accommodate cyclical movement
- 2) Prevent the passage of flames and hot gases sufficient to ignite cotton waste on the unexposed side of the assembly
- 3) Prevent the projection of water through the system during the hose stream test.

The T rating adds the requirement that a system limit the temperature rise at any individual point on the unexposed side of the system to 325°F. Systems with a maximum joint width greater than 4 inches must also limit the average temperature rise on the unexposed side of the system to 250°F.

The ASTM E 2837 F and T ratings directly address the requirements of Section 707.9 of the 2012 IBC, they verify that the material or system will not dislodge, loosen or otherwise impair its

ability to accommodate expected building movements and to retard the passage of fire and hot gases.

UL certifications

UL has certified over a dozen systems to ASTM E 2873 under the Continuity Head-of-Wall Joint Systems (XHBO) product category, which can be found in the UL Online Certifications Directory at www.ul.com/database. Each system describes the construction of the wall assembly and the roof assembly, along with the material or materials used to fill the linear opening between the two assemblies. UL's certification information also includes the movement capabilities of the system in terms of intended use, magnitude and direction, and the established F and T ratings. Tests done to date have achieved the rating without additional protection or modifications to the nonrated roof assembly.

When selecting or approving a continuity head-of-wall joint system for use in a particular application, it is important to ask:

- Does the construction of the wall assembly in the system match the field conditions?
- Does the construction of the roof assembly in the system match the field conditions?
- Does the published joint width match the field conditions?
- Do the published movement capabilities of the system match the field needs?
- Does the published F Rating of the system match the required rating of the wall assembly?