

Perimeter Fire Containment Joint

ASTM E2307

Perimeter Fire Containment

Perimeter fire containment joints are designed to prevent fire and hot gases from entering the room above the room of origin through voids that exist at the intersection of the floor slab edge and any exterior wall assembly. An unprotected void at the edge of the slab potentially creates a pathway for fire and/or smoke to spread from floor to floor in a building. Although such joints are often small, 2"-3" wide, consider that for a building with a floor plate size of 200' x 200', 800 lineal feet, an unprotected joint 3" wide creates 200 square feet of open area along the perimeter that may allow smoke and hot gases to flow freely from floor to floor. Given that the condition exists at each floor, the potential for fire and smoke spread is significant. The CavityComplete® Wall System for Steel Stud with Masonry Veneer has all of the products and details necessary to design and construct perimeter fire containment joints in accordance with ASTM E2307 and the International Building Code¹ (IBC) when they are required.

at least equal to the fire resistance rating of the floor/ceiling assembly. The CavityComplete® Wall System perimeter fire containment joint will serve any typical building situation with an F-rating of two hours, equal to type I-A construction, the highest floor/ceiling assembly fire resistance rating specified in Table 601 of the IBC.

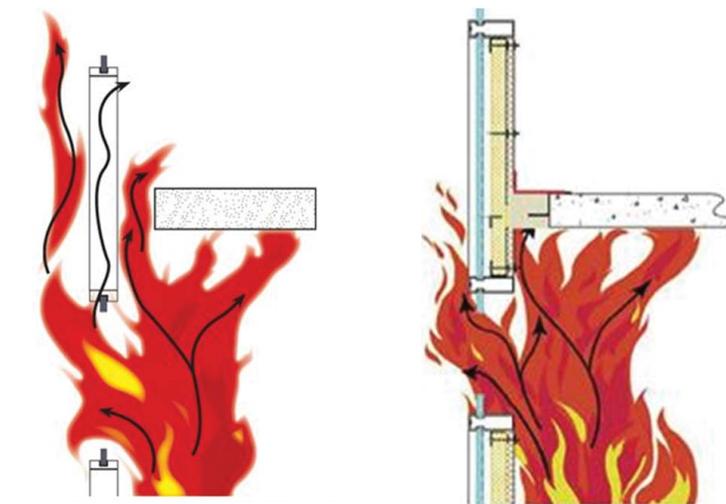
Even when the floor/ceiling assembly is not required to be fire resistance rated, Section 715.4.1 still requires that the joint be sealed with an approved material such as Owens Corning® Thermafiber® Safing Insulation to retard the interior spread of fire and hot gases between stories. See 2012 IBC Section 705.8.5 for additional requirements and exceptions regarding height and fire resistance requirements for curtain wall spandrels.

ASTM E2307

ASTM E2307² measures the ability of perimeter fire containment joints to maintain a seal and prevent fire spread as the exterior wall assembly deflects/deforms during fire exposure. The ASTM E2307 test fire exposes the joint to fire from the room of fire origin, and the exterior wall to fire from both interior and the exterior as the fire plume exits the room of fire origin through a window opening. The fire exposure conditions used essentially parallel the ASTM E119³ time-temperature relationship for fire resistance. ASTM E2307 determines the period of time that the perimeter fire containment joint will limit flame penetration through the system, or around its boundaries.

Perimeter Fire Containment Joint Design

Section 715.4 of the 2012 IBC, requires "approved" perimeter fire containment joints which the IBC defines as "acceptable to the building official or authority having jurisdiction". Although exterior wall system designs vary significantly, the CavityComplete® Wall System for Steel Stud with Masonry Veneer is specific in its construction and has all of the products and details necessary to design and construct perimeter fire containment joints in accordance with ASTM E2307 and the International Building Code (IBC) when they are required. For complete details see the table "CavityComplete® Wall Systems Perimeter Fire Containment Joint Design", and wall section Detail CC-SS-12.



Unprotected Perimeter Joint

Perimeter Fire Containment Joint

International Building Code (IBC)

The 2012 IBC, Section 715.4, requires approved perimeter fire containment joints at the intersection of the exterior curtain wall and floor assemblies when the floor/ceiling assembly is required to be fire resistance rated. Although local codes may vary, generally fire resistance rated floor/ceiling assemblies are required in construction types I-A, I-B, II-A, III-A, and V-A. Perimeter fire containment joint systems must be tested or determined via an engineering judgment in accordance with ASTM E2307 and provide an "F-rating" for a time period

Owens Corning® Thermafiber®
Firespan® 40 or 90 Insulation

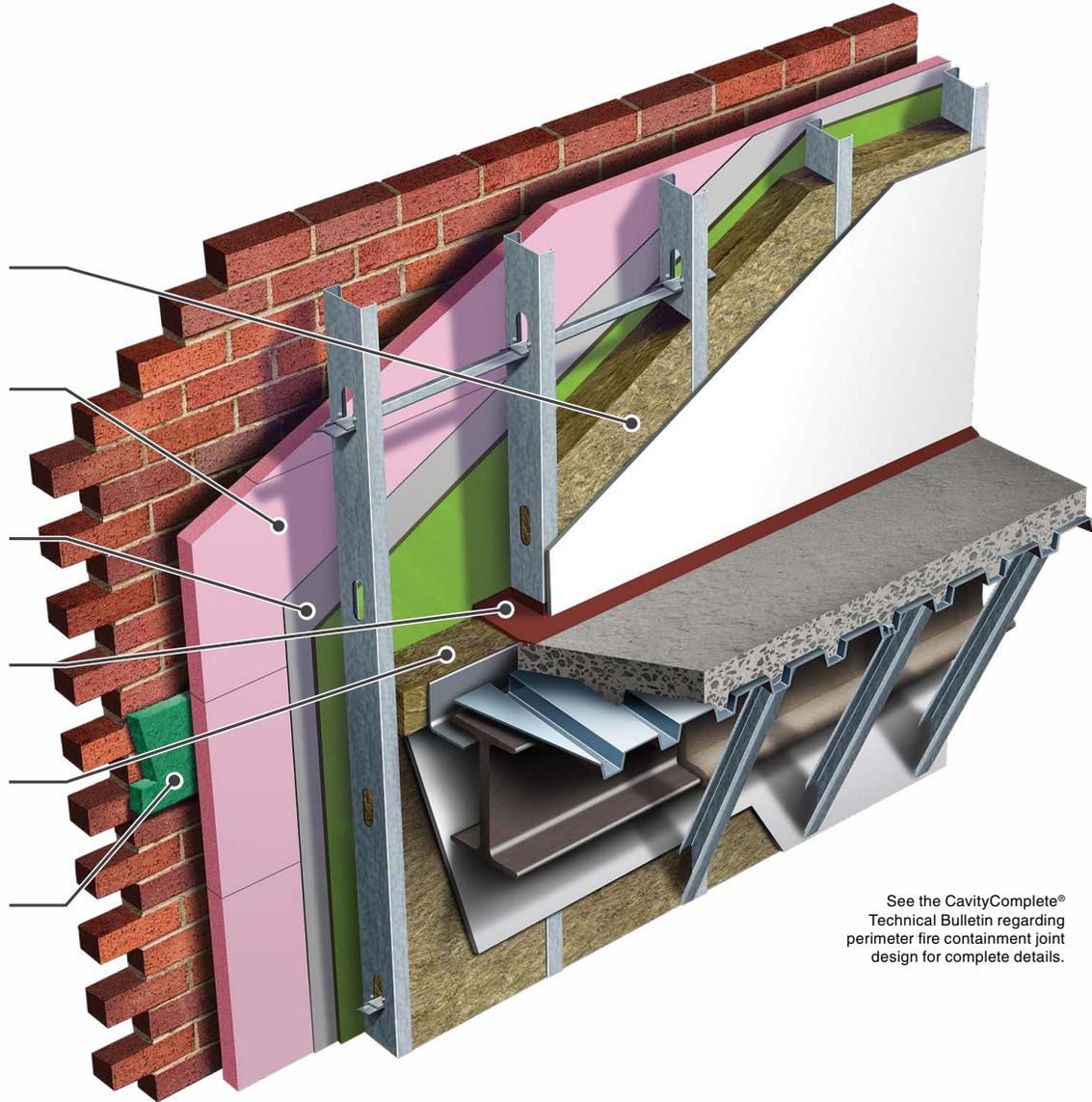
Owens Corning®
FOAMULAR® 250 Extruded Polystyrene
(XPS) Rigid Foam Insulation

Tremco® Incorporated
ExoAir® 230 Air Barrier Membrane

Tremco® Incorporated
TREMstop® Acrylic SP Smoke Sealant

Owens Corning® Thermafiber®
Safing Insulation

Mortar Net Solutions™ Inc.
MortarNet® (at each floorline)



See the CavityComplete®
Technical Bulletin regarding
perimeter fire containment joint
design for complete details.

CavityComplete® Wall Systems Perimeter Fire Containment Joint

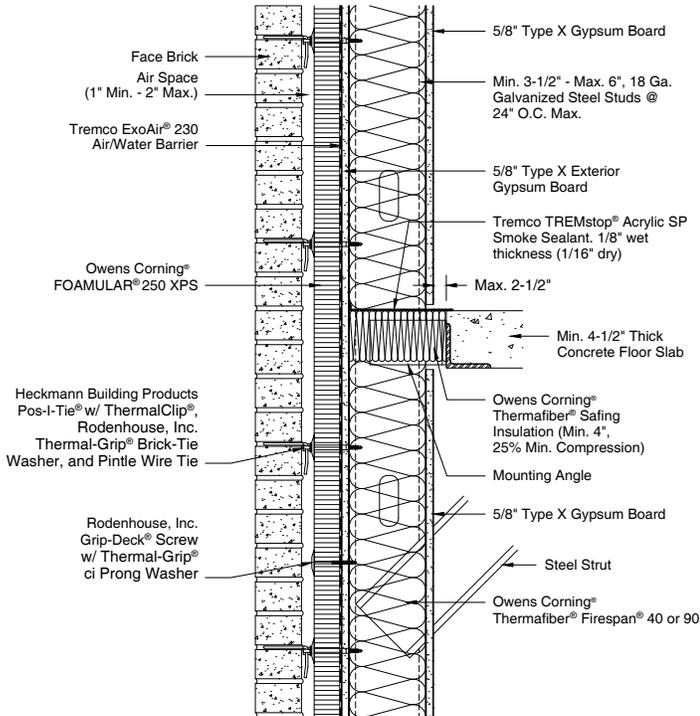


ASTM E2307 intermediate scale, multi-story, test furnace and the test wall frame used to hold the test wall and joint system



ASTM E2307 room and exterior window burner fire exposure

Note: See CavityComplete® Technical Bulletin regarding perimeter fire containment joint design for complete details.



For additional job specific details and accessory materials necessary to complete the building envelope air barrier such as window to wall, roof to wall, foundation to wall, and for the air barrier membrane transition to other components please visit www.tremcosealants.com.

DETAIL CC-SS-12:
CavityComplete® Wall Systems Perimeter Fire Containment Joint

Design Notes:

- 1 Perimeter fire containment joint systems are specific constructions consisting of a floor with an hourly fire endurance rating, an exterior wall typically with no hourly rating, and joint material installed in the void between the floor and the wall. The hourly rating applies only to the complete joint system. The individual components are not assigned a rating and are not to be interchanged between systems.
- 2 Section 715.4 of the 2012 IBC requires "approved" perimeter fire containment joints "acceptable to the building official or authority having jurisdiction". Every building has unique design details that may not exactly match the system details published. The IBC recognizes that there may be variations per individual buildings that may require adjustment via engineering judgments⁴ and therefore enables "approval acceptable to the building official". Approvals are typically based on testing, or data from similar joint system tests, or other evidence and third party engineering judgments that the proposed system meets the basic principles necessary for perimeter fire containment systems.
- 3 Install a reinforcing mounting angle from the floor edge to the stud framing in the safing area. Although that is a typical structural detail commonly used to secure the framing to the building structure, the stiffener in conjunction with the angled steel strut also reinforces the studs against bowing during fire exposure, and insures that the compression fit of the Owens Corning® Thermafiber® Safing Insulation will be secure.
- 4 Safing Insulation is to be 25% compression fit between the slab edge and the wall system. Compression of the Safing Insulation creates a tight seal that maintains its integrity preventing flame and hot gasses from breaching through to the floor above.
- 5 Apply the TREMstop® Acrylic SP Smoke Sealant to the top of the Safing Insulation to make the system smoke tight. The smoke seal is commonly spray applied to the top of the Safing (non fire exposure side). Typically a 1" over spray is specified extending the smoke seal onto the floor slab one side, and the gypsum board surface on the other, to create a continuous bond that seals and contributes to holding the Safing Insulation in place during the fire exposure.

References:

- 1 International Building Code; International Code Council, Inc.; 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795
- 2 ASTM E2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus; ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959
- 3 ASTM E 119-12a, Standard Test Methods for Fire Tests of Building Construction and Materials; ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959
- 4 Engineering Analysis of perimeter fire barrier system in the CavityComplete® wall assembly, Hai Project IAJP00135.000, June, 2014, Hughes Associates, 3610 Commerce Dr, Suite 817, Baltimore, MD 21227

The CavityComplete® Wall System excludes the masonry veneer, steel studs and interior and exterior gypsum board. A detailed list of the components is available at www.CavityComplete.com.

CavityComplete.com | 844-CAV-COMP

CavityComplete® is a registered trademark of Owens Corning.
Pub. No. 10019109-C. Printed in U.S.A. April 2016. © 2016 Owens Corning. All Rights Reserved.
© 2016 Thermafiber, Inc. All Rights Reserved. Trademarks are the properties of their respective owners.

