ENCLOSURE SOLUTIONS

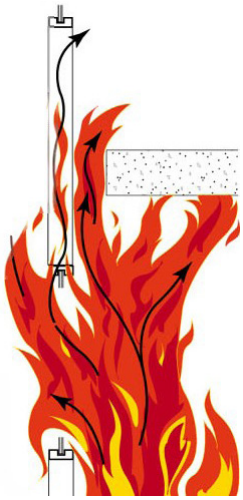
Technical Bulletin
CW-01

Aluminum-Framed Curtain Wall Perimeter Fire Containment System

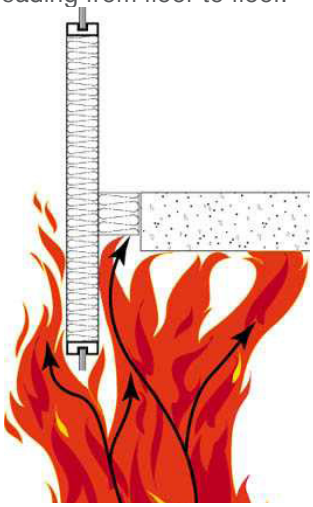
ASTM E2307

Perimeter Fire Containment

Perimeter fire containment systems 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 a rated floor assembly and a non-rated exterior wall. 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 will allow smoke and hot gases to flow freely from floor to floor. Fire can also pass through voids or combustible materials in the curtain wall itself. Given that the condition exists at each floor, the potential for fire and smoke spread is significant. The Owens Corning® Enclosure Solutions Thermafiber® Impasse® Curtain Wall Insulation System, a patented perimeter fire containment system, has all of the products and details necessary to design and construct aluminum-framed curtain wall perimeter fire containment systems in accordance with ASTM E2307 and the International Building Code (IBC)[1] to prevent fire from spreading from floor to floor.



Unprotected Perimeter Joint



Protected with a Perimeter Fire Containment System

International Building Code (IBC)

The 2015 IBC, Section 715.4, requires approved perimeter fire containment systems at the intersection of the non-rated exterior curtain wall and fire-resistance-rated floor assemblies. 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 systems must be tested or determined via an engineering judgment in accordance with ASTM E2307 and provide an "F-rating" for a time period at least equal to the fire resistance rating of the floor/ceiling assembly. Owens Corning® Enclosure Solutions Thermafiber® Patented Aluminum-Framed Perimeter Fire Containment system will serve any typical building situation with an F-rating of up to three hours.

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 or system such as Owens Corning® Thermafiber® Safing and FireSpan® Insulations to retard the interior spread of fire and hot gases between stories.

ASTM E2307

ASTM E2307[2] measures the ability of perimeter fire barrier systems to maintain a seal and prevent interior fire spread as the exterior wall assembly deflects/deforms during fire exposure. The ASTM E2307 test 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 are outlined in the ASTM test method for the first 30 minutes then essentially parallel the ASTM E119[3] time-temperature relationship for fire resistance. ASTM E2307 determines the period of time that the perimeter fire containment system will limit flame penetration through the opening between the exterior wall assembly and the floor assembly.

Perimeter Fire Containment System Design

Section 715.4 of the 2015 IBC, requires "approved" perimeter fire containment systems. Although exterior wall system designs vary significantly, the Owens Corning® Enclosure Solutions Thermafiber® Patented Perimeter Fire Containment System is specific in its construction and has all of the products and details necessary to design and construct aluminum-framed curtain wall perimeter fire containment systems in accordance with ASTM E2307 and the International Building Code (IBC). For complete details see tables 1 and 2 for wall section Details CW-GS-16 and CW-GS-17.

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Owens Corning® Thermafiber®
FireSpan® 90 Insulation

Horizontal Transom

Can be:
Spandrel Glass:
Nominal 1/4" thick opaque heat-strengthened glass

Aluminum Panels:
Nominal 1/8" with 1/4" edges

Stone Panels:
Nominal 1 3/16" thick polished granite panels

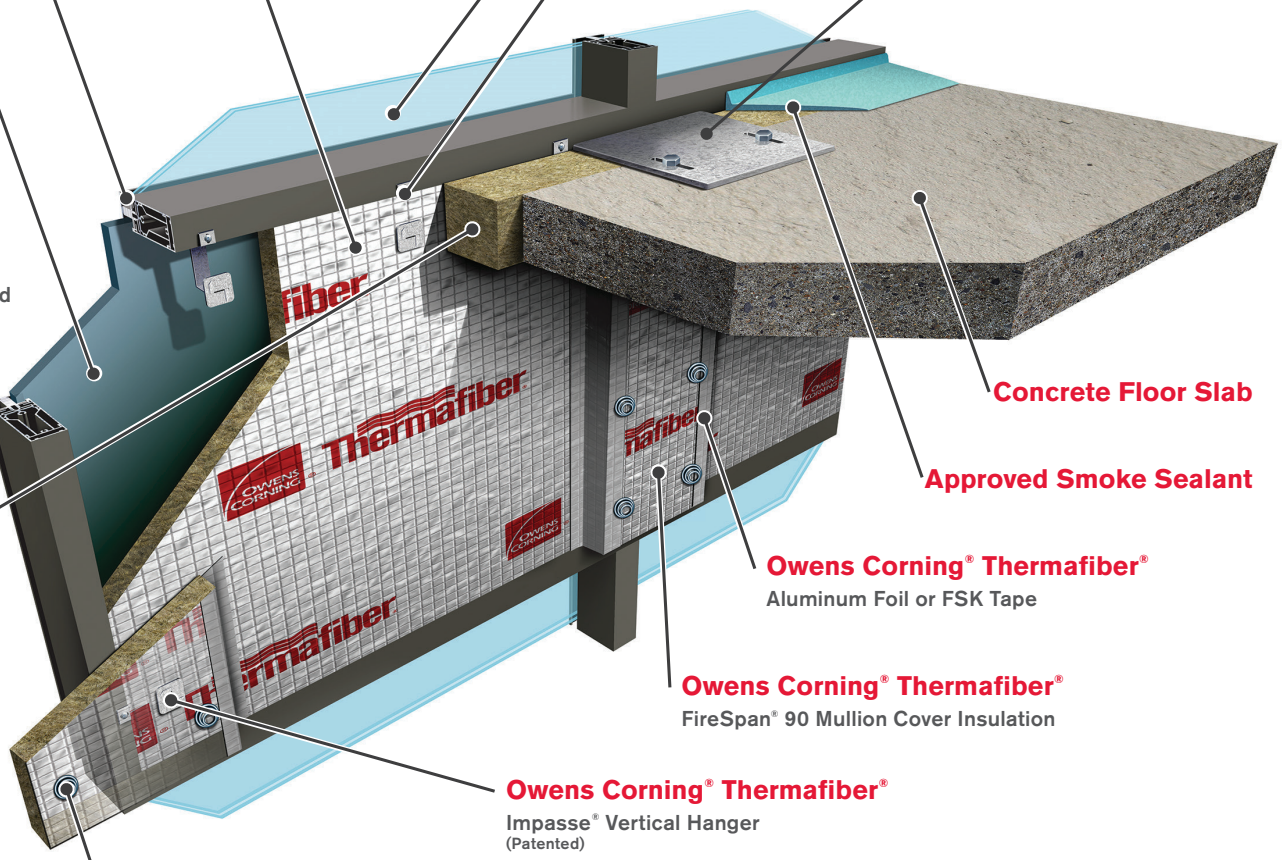
Vertical Mullion

Owens Corning® Thermafiber®
Safing Insulation

Owens Corning® Thermafiber®
Impasse® Horizontal Hanger
(Patented)

Vision Glass

Curtain Wall Anchor



Concrete Floor Slab

Approved Smoke Sealant

Owens Corning® Thermafiber®
Aluminum Foil or FSK Tape

Owens Corning® Thermafiber®
FireSpan® 90 Mullion Cover Insulation

Owens Corning® Thermafiber®
Impasse® Vertical Hanger
(Patented)

Owens Corning® Thermafiber®
Spiral Anchors

Owens Corning® Enclosure Solutions
Thermafiber® Patented Aluminum-Framed Perimeter Fire Containment System

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

ASTM E2307 room and exterior window burner fire exposure

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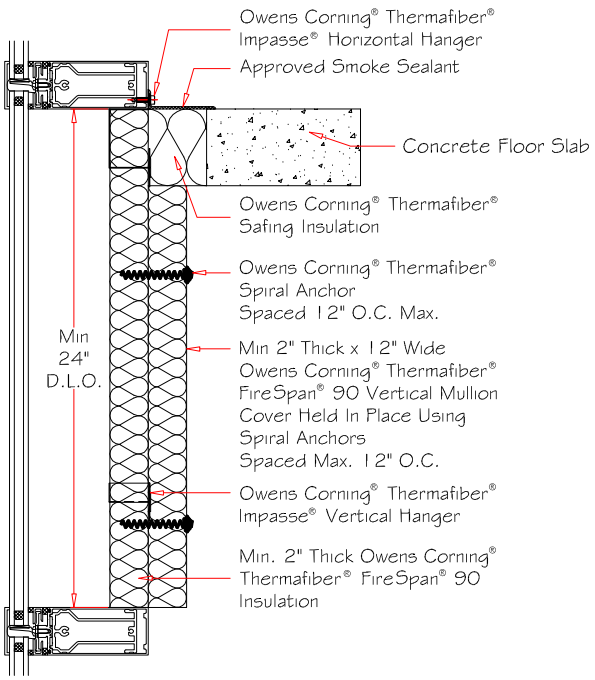
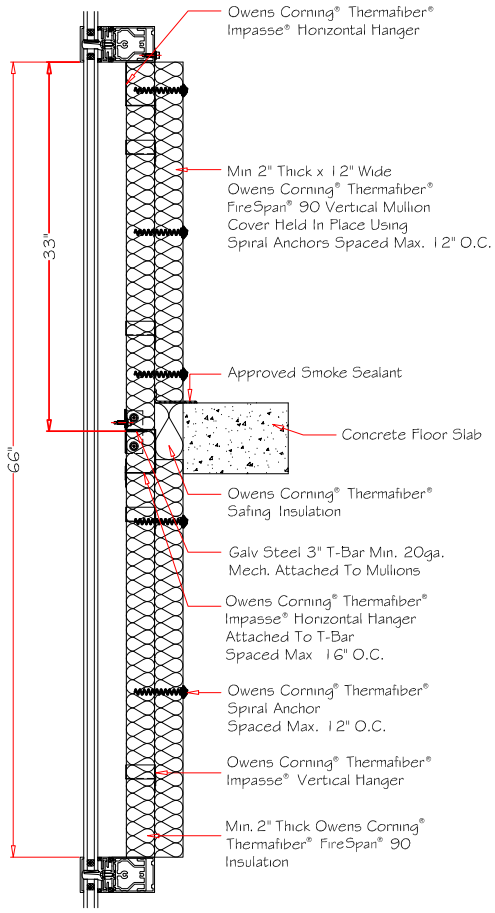
Thermafiber® Patented Aluminum-Framed Perimeter Fire Containment System



Detail CW-GS-16 based on UL Design CW-D-1014

For additional job specific details and accessory materials necessary to complete the Perimeter Fire Containment System, please refer to UL design listing.



Detail CW-GS-17 based on UL Design CW-D-2039

Table 1

Based on the following UL Designs:

UL Design	Approved Smoke Sealant
CW-D-1014	**Specified Technologies, Inc.**- SpecSeal AS200 Elastometric Spray or SpecSeal Fast Tack Spray
CW-D-1015	**Hilti-** CFS-SP WB Firestop Joint Spray, CP 672 FC Firestop Joint Spray, or CFS-SP SIL Firestop Silicone Joint Spray
CW-D-1016	**RectorSeal-** Metacaulk 1200 or 1500 Spray, Biostop 750 or 800 Spray or FlameSafe FS3000 Sprays
CW-D-1017	**3M FIRE PROTECTION PRODUCTS** —Fire-Dam Spray 200

Table 2

Based on the following UL Designs:

UL Design	Approved Smoke Sealant
CW-D-2039, CW-D-2040, CW-D-2041, CW-S-2058, and CW-S-2059	**Specified Technologies, Inc.**- SpecSeal AS200 Elastometric Spray or SpecSeal Fast Tack Spray
CW-D-2046	**Hilti-** CFS-SP WB Firestop Joint Spray, CP 672 FC Firestop Joint Spray, or CFS-SP SIL Firestop Silicone Joint Spray
CW-D-2047, CW-D-2049, and CW-D-2051	**RectorSeal-** Metacaulk 1200 Spray, Metacaulk 1200 Caulk Grade, or Metacaulk 1200 SL
CW-D-2048 and CW-D-2052	**RectorSeal**- Biostop 750 Spray, Biostop 750 Caulk Grade, or Biostop 750 SL
CW-D-2055	**3M FIRE PROTECTION PRODUCTS** — Fire-Dam Spray 200
CW-D-1020	**Tremco**- Fyre-Sil Sealant or TREMstop Acrylic SP
CW-D-1021 and CW-D-1022	**Tremco**- TREMstop Acrylic SP

Design Notes:

1 Perimeter fire containment systems are specific constructions consisting of a floor with an hourly fire endurance rating and an exterior wall typically with no hourly rating. The perimeter fire containment system consists of protecting the spandrel area and joint material installed in the void between the floor and the wall. The hourly rating applies only to the complete system. Individual components are not assigned a rating and are not to be interchanged between systems.

2 Section 715.4 of the 2015 IBC requires an "approved" perimeter fire containment system tested in accordance with ASTM E2307. 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 judgments.[1] Engineering judgments are based on testing, or data from similar perimeter fire containment system tests, or other evidence and third party engineering judgments that the proposed system meets the basic design principles necessary for providing a perimeter fire containment system. These basic design principles include:

1 Mechanical attachment of minimum 2" thick Owens Corning® Thermafiber® FireSpan® 90 Curtain Wall Insulation with Owens Corning® Thermafiber® Patented Impasse® Hangers, attached per the requirements of the specific tested design.

2 Typically, a backer/reinforcement member (min. 20 gauge, galvanized steel T-Bar, hat channel or L-angle depending on the requirements of the tested design) is required at the floor line behind the curtain wall insulation to keep it from bowing due to the compression-fit of the Safing Insulation. However, Thermafiber® Impasse® systems such as CW-D-1014 do not require a backer reinforcement member since the location of the horizontal transom, in combination with the Impasse® Horizontal Hangers, provides the support necessary to keep the Thermafiber® FireSpan® 90 insulation from bowing. Refer to the specific UL design[3] for details regarding the requirements for the backer/reinforcement member.

3 Compression-fit Owens Corning® Thermafiber® Safing Insulation within the safe-off void to create a tight seal that maintains its integrity, preventing the propagation of flame and hot gasses through the safe-off joint. Refer to the specific UL design for the proper Safing Insulation installation method and compression requirements.

4 Protect exposed vertical aluminum mullions with Owens Corning® Thermafiber® FireSpan® 90 Mullion Covers. Thickness and width of mullion covers are outlined in the specific UL Design. Typically, they are 2" thick x 12" wide and abut up to and extend down from the bottom of the Safing Insulation to the bottom of the vertical mullion. Mullion covers are also to extend from the top of the Safing Insulation and extend up to the top of the vertical mullion. Mullion covers are attached with spiral anchors every 12" oc. max. This detail is required to protect the aluminum vertical framing. If left unprotected, the flame and temperature exposure of a fire will cause the framing to melt and cause the system to fail.

5 Apply an approved smoke sealant material to provide a barrier against the passage of smoke through the safe-off void. The smoke sealant is typically spray applied to the top of the Owens Corning® Thermafiber® Safing Insulation (non fire exposure side). Typically a 1" over spray is specified extending the smoke seal onto the floor slab and the interior face of the curtain wall system. Refer to the specific UL listing for the proper application and approved smoke sealant manufacturer.

References:

1. International Building 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. Underwriters Laboratories (UL) Designs, Fire Resistance Directory, UL 333 Pfingsten Road, Northbrook, IL 60062

OWENS CORNING INSULATING SYSTEMS, LLC
ONE OWENS CORNING PARKWAY
TOLEDO, OHIO, USA 43659

1-800-GET-PINK®
www.owenscorning.com/enclosure

THERMAFIBER, INC.
ONE OWENS CORNING PARKWAY
TOLEDO, OHIO, USA 43659

888-TFIBER1 [834-2371]
www.thermafiber.com