



COMMERCIAL COMPLETE WALL SYSTEM

NFPA 285 Tested Wall Assemblies

INNOVATIONS FOR LIVING®

FOAMULAR® Insulation, JointSealR™ Foam Joint Tape, EcoTouch™ Flame Spread 25, EcoTouch™ Thermal Batt FIBERGLAS™ Insulation

NFPA 285 Fire Tested Wall Assemblies

Owens Corning's Commercial Complete Wall System has successfully passed the NFPA 285* fire test in many variations giving architects options in exterior wall design. The system is approved with FOAMULAR® extruded polystyrene continuous insulation under a variety of masonry veneer exterior finishes, over either steel stud frame or masonry back-up walls. This brochure summarizes NFPA 285 approved assemblies. See Table 2 and the family of Commercial Complete Wall System publications for more information.

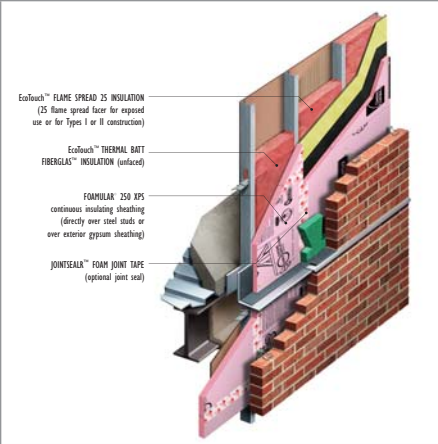
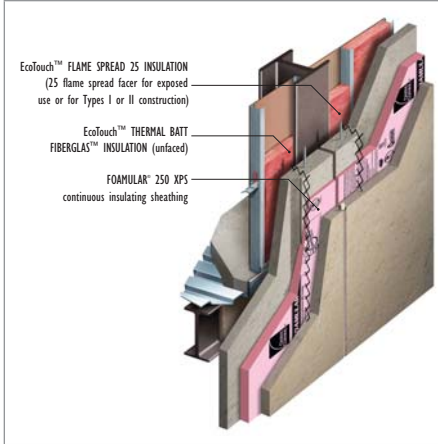
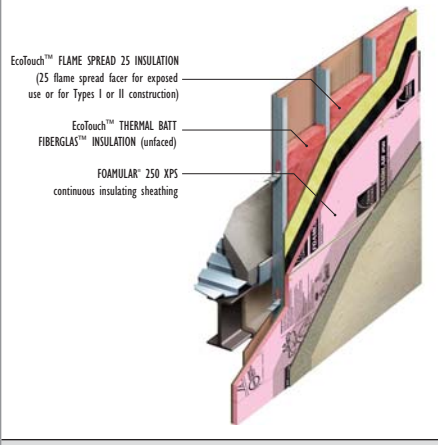
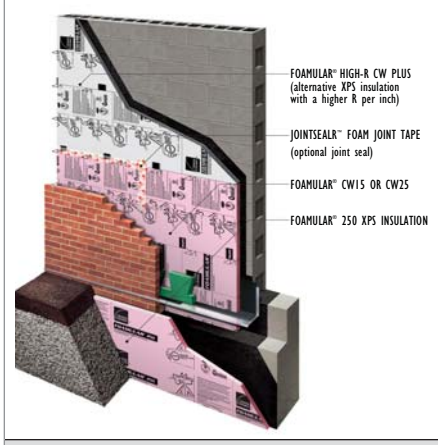
*NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components; National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02169

The Purpose of NFPA 285

The test is required in the International Building Code (IBC) when foam plastic insulation is used in the exterior walls of construction types I, II, III or IV. Those construction types, by code definition, have exterior walls constructed of non-combustible materials. The test is to determine that combustible foam plastic insulation, when exposed to fire on the exterior face of the wall, does not spread flame over the surface or through the core of the otherwise non-combustible wall assembly.

The test standard NFPA 285 is referenced in IBC Section 2603.5.5. That standard, or a variation of it, has been referenced in each edition of the IBC since its first edition in 2000, and since the 1980's in the three model codes that preceded it. The now defunct ICBO Uniform Building Code first included the concept in the 1988 edition, requiring testing in accordance with the UBC Standard 17-6, a predecessor of NFPA 285.

Owens Corning Commercial Complete Wall Systems

	
Brick, CMU, Stone, or Terra-Cotta Veneer	Pre-Cast Concrete Panel
	
PM EIFS (EIFS system by others)	Brick, CMU, Stone, or Terra-Cotta Veneer over CMU

COMMERCIAL COMPLETE WALL SYSTEM
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The other two national model building codes of that era also required full scale testing of this type for exterior walls. The 1982 SBCCI Standard, and the 1984 BOCA National (Basic) Building Codes stated in their foam plastics chapters, “Results of diversified or full scale fire tests reflecting an end use condition shall be submitted to the building official demonstrating that the (wall) assembly in its final form does not show any tendency to propagate flame over the surface or through the core when exposed on the exterior face to a fire source.” The intent was that a predecessor of NFPA 285 be utilized, the “Full Scale Multi-Story Test” as it was called at the time.

The NFPA 285 Methodology

The 30 minute test is conducted on a full scale two story wall assembly, built as it would be in the field, on the front side of a three sided test structure. (See Figures 1 and 2 that are excerpts from NFPA 285)

The test wall, has a window in the center of the lower floor. (Figure 3) The test scenario is that a flashover fire, unrelated to the foam plastic insulation, has occurred in the lower story room emitting a fire plume out of the room of origin through the window. Early in the 30 minute exposure the fire plume wraps around the window head, extending up the exterior surface of the wall. (Figure 4)

To pass, the wall assembly must demonstrate limited fire spread vertically and horizontally away from the window. The extent of fire spread is determined visually, measured in feet, and by temperature that is measured by thermocouples placed throughout the wall assembly. Figure 5 shows a successful FOAMULAR® Commercial Complete Wall System test with the brick veneer stripped away just above the window lintel. Note the very limited fire spread and melting of the foam.

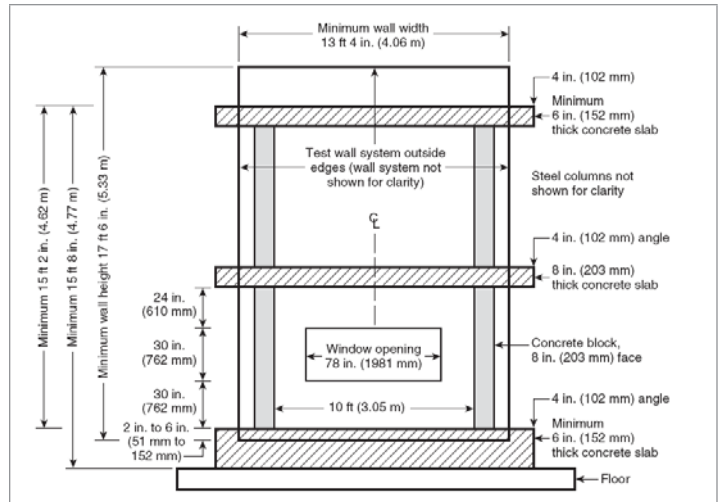


Figure 1: Elevation of test rig, test wall side

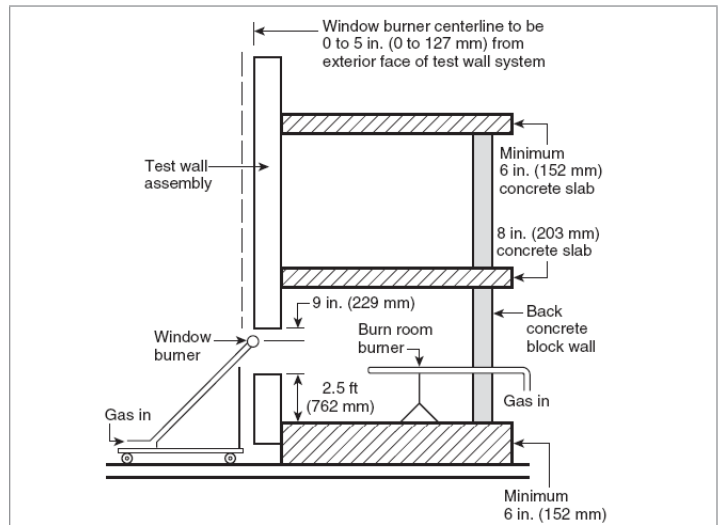


Figure 2: Section of test rig



Figure 3: Test wall under construction



Figure 4: Fire emitting from the test window



Figure 5: FOAMULAR® showing limited damage above the test window with brick veneer stripped away after the fire test

Table I

Owens Corning Commercial Complete Wall System Product Selection Guide								
FOAMULAR® Extruded Polystyrene Continuous Insulation								
Product Name Application	Thickness (inches)	R-Value ¹ (180 Day)		R-Value ¹ (LTTR)	Size ² (inches)	Compressive Strength (psi)	ASTM C 578 Type	Edge Type
		@75°F mean temp.	@40°F mean temp.	@75°F mean temp.				
FOAMULAR® CC Steel Stud Framing	2	10.0	10.8	10.6	2 x 48 x 96	16	X	Ship-lap long edge
	2½	12.5	13.5	13.4	2½ x 48 x 96			
	3	15.0	16.2	16.2	3 x 48 x 96			
FOAMULAR® 250 Steel Stud Framing	¾	4.0	4.3	5.0	¾ x 48 x 96	25	IV	Square (or T&G up to 2" thick only)
	1	5.0	5.4		1 x 48 x 96			
	1½	7.5	8.1		1½ x 48 x 96			
	2	10.0	10.8		2 x 48 x 96			
	2½	12.5	13.5		2½ x 48 x 96			
	3	15.0	16.2		3 x 48 x 96			
FOAMULAR® CC High R Steel Stud Framing	1¾	10.0	10.8	10.3	1¾ x 48 x 96	25	IV	Ship-lap long edge
	2⅞	12.0	13	12.5	2⅞ x 48 x 96			
	3	17.0	18.4		3 x 48 x 96			
FOAMULAR® CW15 Concrete Masonry	1	5.0	5.4	5.0	1 x 16 x 96	15	X	Square
	1½	7.5	8.1		1½ x 16 x 96			
	2	10.0	10.8	10.6	2 x 16 x 96			
	2½	12.5	13.5	13.4	2½ x 16 x 96			
	3	15.0	16.2	16.2	3 x 16 x 96			
FOAMULAR® CW25 Concrete Masonry	1	5.0	5.4	5.0	1 x 16 x 96	25	IV	Square
	1½	7.5	8.1		1½ x 16 x 96			
	2	10.0	10.8	10.6	2 x 16 x 96			
	2½	12.5	13.5	13.4	2½ x 16 x 96			
	3	15.0	16.2	16.2	3 x 16 x 96			
FOAMULAR® High R CW Plus Concrete Masonry	1¾	10.0	10.8	10.3	1¾ x 16 x 96	25	IV	Square
	2⅞	12.0	13.0	12.5	2⅞ x 16 x 96			
	3	17.0	18.4		3 x 16 x 96			

1. R-values vary depending on many factors including the mean temperature at which the test is conducted, and the age of the sample at the time of testing. Because rigid foam plastic insulation products are not all aged in accordance with the same standards, it is useful to publish comparison R-value data. The R-value for FOAMULAR® XPS is provided from testing at two mean temperatures, 40°F and 75°F, and from two aging (conditioning) techniques, 180 day real-time aging (as mandated by ASTM C 578), and, a method of artificially accelerating aging sometimes called "Long Term Thermal Resistance" (LTTR, CAN/ULC S770). The R-value at 180 day real-time aged, and 75°F mean temperature, is commonly used to compare products. It is recommended that the specifier verify testing and conditioning methods with the manufacturer before comparing the R-value of rigid foam plastic insulation products.

2. Availability may vary depending on sizes, edge configuration, and/or region. Some items are made to order. Check with your local FOAMULAR® representative for specific information.

EcoTouch™ Insulation							
Product Name Application	Thickness (inches)	R-Value		Perms maximum	Width (inches)	Length (inches)	ASTM C 665 Type
		@75° F	mean temp.				
EcoTouch™ Thermal Batt Unfaced	3½	11.0		NA	16 or 24	48 or 96	Type I
	3½	13.0		NA	(Specify full width for steel stud)	48 or 96	Type I
	6¼	19.0		NA		48 or 96	Type I
EcoTouch™ Flame Spread 25 Faced	3½	11.0		Depends on Facer Type	16 or 24	96	Depends on Facer Type
	3½	13.0			(Specify full width for steel stud)	96	
	6¼	19.0			96		
	9½	30.0			48		
Facer Types: FSK (foil) faced PSK (white) faced Poly (white) faced				0.02 0.02 0.70			Type III, Class A Type II, Class A Type II, Class A

JointSealR™ Foam Joint Tape for the Commercial Complete Wall System							
Function	Roll Widths (inches)	Roll Length (feet)	Backer				
Foam board joint sealing	3.5	90	Acrylic				

Architects Guide to NFPA 285 Tested Owens Corning Commercial Complete Wall Systems

Table 2 summarizes Commercial Complete Wall System options that are approved for use in NFPA 285 tested wall assemblies. The table provides information on approved variations including with and without FIBERGLAS™ Batt Insulation in the steel stud cavities, options for air barriers, foam thickness, window head closure details and other important system details.

Table 2*

Owens Corning Commercial Complete Wall System Specification Guide to Accepted NFPA 285 Options			
Wall Component	Material Options		
Base Wall System: <i>Select one</i>			
	<ul style="list-style-type: none"> • Concrete (cast-in-place, or, pre-cast) • Concrete Masonry Units • Steel Stud Framing, minimum 3½" depth, minimum 20 gauge, maximum 16 inches on center spacing, with lateral bracing every 4 ft. vertically. Cover on the interior with 1 layer of ½" thick, Type X, gypsum wallboard. 		
Floorline Firestopping: <i>Select one</i>			
<p><i>If a fire resistance rated floor or floor/ceiling assembly IS required use option 1.</i></p> <p><i>If a fire resistance rated floor assembly IS NOT required use option 2.</i></p>	<ol style="list-style-type: none"> 1. Install an ASTM E 2307 tested and rated fire stop joint assembly. 2. Install mineral wool fire stop, 4 pcf density, attached with Z-clips or equivalent, continuously at each floor line and/or in each stud cavity if the stud framing is continuous past the floor line. 		
Stud Cavity Insulation: <i>Select one</i>			
<p>See Table 1 for product properties, sizes, and facer configurations. Complete product data is available in related Owens Corning publications.</p>	<ul style="list-style-type: none"> • None • Any non-combustible insulation • EcoTouch™ Flame Spread 25 Batt Insulation (faced) • EcoTouch™ Thermal Batt FIBERGLAS™ Insulation (unfaced) • Spray Polyurethane Foam, Demilec Sealection 500 		
Exterior Sheathing: <i>Select one</i>			
	<ul style="list-style-type: none"> • None • Gypsum Sheathing, ½", exterior grade • Gypsum Sheathing, ⅝", Type X, exterior grade 		
Air & Weather Resistive Barrier Layer Over Base Wall System: <i>Select one</i>			
<p>All barriers are to be installed at recommended application rates and in strict accordance with the manufacturer's installation instructions.</p>	<ul style="list-style-type: none"> • None • Wall Guardian™ FW-100A, STS Coatings • Barritech™ VP, Carlisle Coatings & Waterproofing • Backstop® NT, Dryvit Systems Inc. • Air-Shield™ LMP (black only), W.R. Meadows • Perm-A-Barrier®, VPS, W.R. Grace & Co. • Tyvek® CommercialWrap®, Dupont • GreenGuard® Max™, Building Wrap, Pactiv 		
Continuous Insulation: <i>Select one</i>			
<p>See Table 1 for recommended product applications, and product properties, sizes, and edge configurations. Complete product data is available in related Owens Corning publications.</p> <p>Options: FOAMULAR® joints may be sealed with JointSealR™ Foam Joint Tape. FOAMULAR® may be installed directly over steel stud framing.</p>	<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> • FOAMULAR® CC • FOAMULAR® 250 • FOAMULAR® CC High-R • FOAMULAR® High-R CW Plus • FOAMULAR® CW15 • FOAMULAR® CW25 </td> <td style="vertical-align: top; padding-left: 20px;"> <ul style="list-style-type: none"> ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type X ASTM C 578 Type IV </td> </tr> </table> <p><i>Thickness: ½" minimum, to 3" maximum, use Window & Door Opening Detail 1. ½" minimum to 5" maximum, use details 2, 3 or 4.</i></p>	<ul style="list-style-type: none"> • FOAMULAR® CC • FOAMULAR® 250 • FOAMULAR® CC High-R • FOAMULAR® High-R CW Plus • FOAMULAR® CW15 • FOAMULAR® CW25 	<ul style="list-style-type: none"> ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type IV ASTM C 578 Type X ASTM C 578 Type IV
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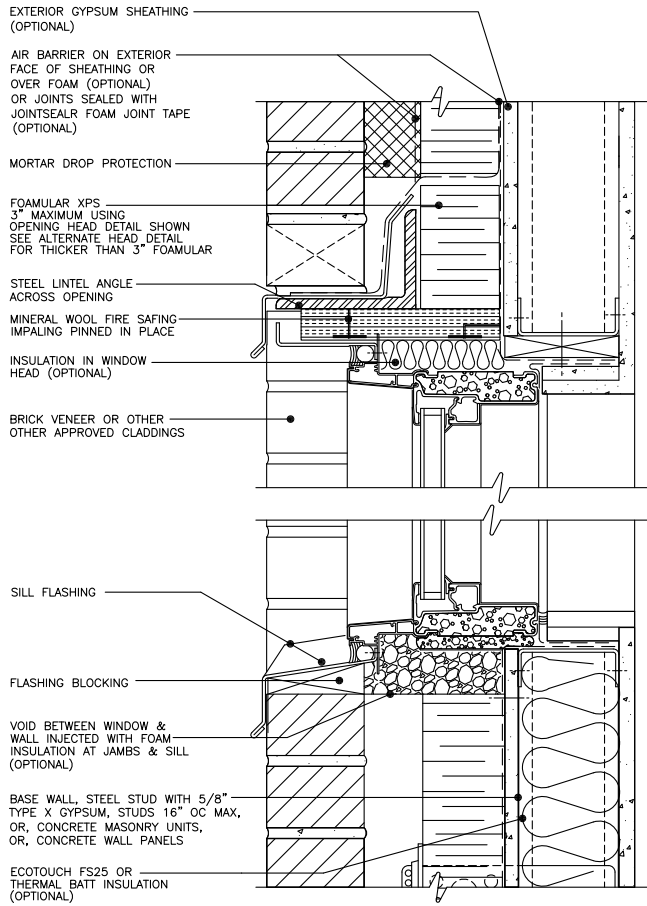
**DISCLAIMER: The sole purpose of the information provided in Table 2 is to identify certain Material Options, in assemblies, that have been shown by independent testing, as of the initial date of this publication, to be compliant with the NFPA 285 fire test. By providing this information, Owens Corning is not making, and specifically disclaims, any recommendations, warranties, or guarantees with respect to any of the listed Material Options. Complete product data for the Owens Corning products is available in related Owens Corning publications. Product data for non-Owens Corning products, including verification that such products continue to meet the NFPA 285 standards, must be obtained directly from the relevant manufacturer.*

Table 2* Continued

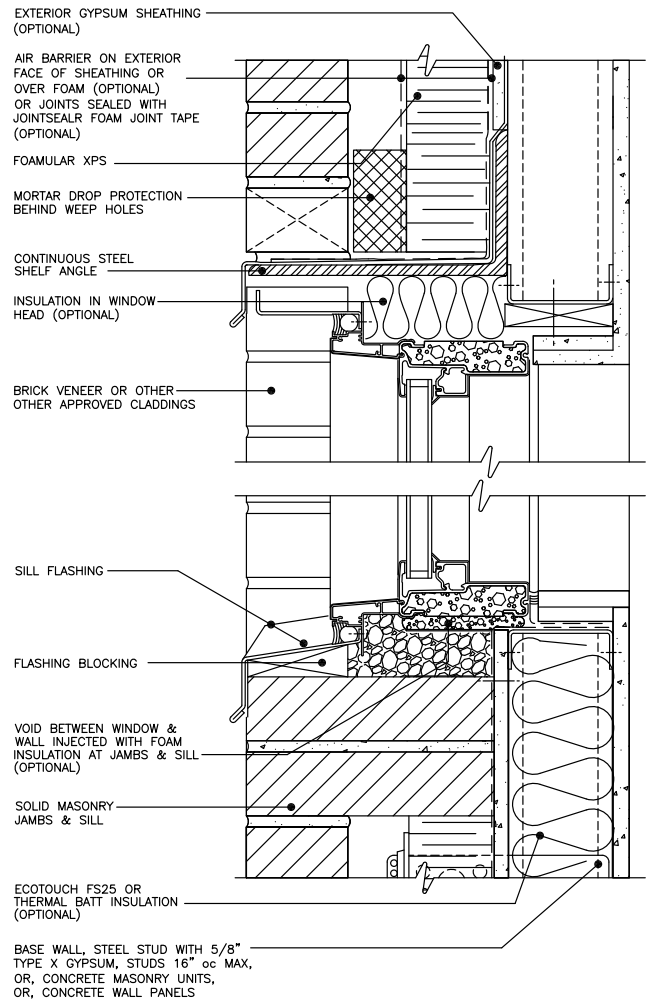
Wall Component	Material Options
Air & Weather Resistive Barrier over Continuous Insulation: Select one	
<p><i>Install in accordance with manufacturers instructions.</i></p>	<ul style="list-style-type: none"> • None • JointSealR™ Foam Joint Tape, Owens Corning • Tyvek® CommercialWrap®, Dupont • GreenGuard® Max™, Building Wrap, Pactiv
Exterior Cladding, Veneer: Select one	
	<ul style="list-style-type: none"> • Brick Veneer: Nominal 4" thick, clay brick. Veneer anchors, standard types, installed maximum 24" o.c. vertically on each stud, or, continuous ladder tie type if CMU backup is utilized. Maximum 2" air space between continuous insulation and brick. • Concrete Panels: Minimum 2" thick. Maximum 2" air space between continuous insulation and concrete. • Insulated Concrete Sandwich Panels: Minimum 2" thick outer face wythe. • Concrete Masonry Units: Minimum 4" thick. Maximum 2" air space between continuous insulation and CMU. • Stone Veneer: Minimum 2" thick, limestone or natural stone veneer, or minimum 1½" thick manufactured stone veneer. May use any standard closed joint installation technique such as ship-lap, etc. • Terracotta Panels: Terracotta cladding system, minimum 1¼" thick, with closed joint installation such as ship-lap, etc. • Stucco: Minimum 7/8" thick, exterior cement plaster and lath. Lath mechanically attached. • EIFS: Polymer Modified (PM) Exterior Insulation Finish Systems, with XPS base. Details as NFPA 285 tested and specified by PM EIFS manufacturer.
Window and Door Opening Details	
<p><i>See Table 3 for window and door opening details.</i></p>	<ul style="list-style-type: none"> • Detail 1: Window and door header openings must be firestopped with mineral safing as shown. Maximum 3" thick FOAMULAR® continuous insulation. • Detail 2: Window and door header openings must be firestopped with a continuous steel lintel or shelf angle as shown. Maximum 5" thick FOAMULAR® continuous insulation. • Detail 3: Steel stand-off window lintel or shelf angle. The void behind the lintel must be tightly filled with 4 pcf density mineral wool fire safing packed to 25% compression inside standoff shelf angle. Maximum 5" thick FOAMULAR® continuous insulation. • Detail 4: Same condition as detail 3, but, may be located at a floor line as shown. Maximum 5" thick FOAMULAR® continuous insulation. • Jams and Sill: For details 2, 3 and 4, must be solid masonry returned to the face of the gypsum sheathing or the face of the steel stud if gypsum sheathing is not used. • EIFS: Details as required by EIFS manufacturer. • Stucco: Heads and Jams must be stucco backwrapped to gypsum sheathing or steel framing.

Table 3

Window and Door Opening Details^{1,2}, NFPA 285



Detail 1: Steel Lintel/Shelf Angle with Mineral Wool over and Safing



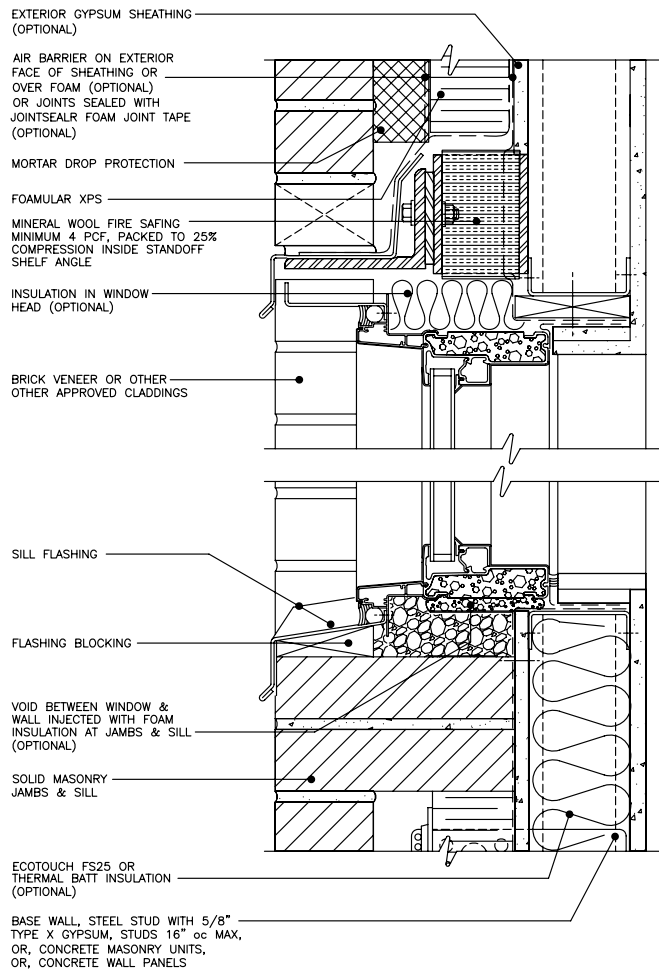
Detail 2: Continuous Steel Lintel/Shelf Angle on Steel Framing

1. The base wall is shown in Table 3, Details 1 through 4, as a steel stud assembly for illustration purposes only. Note that it may be any of the "Base Wall System" options described at the beginning of Table 2.

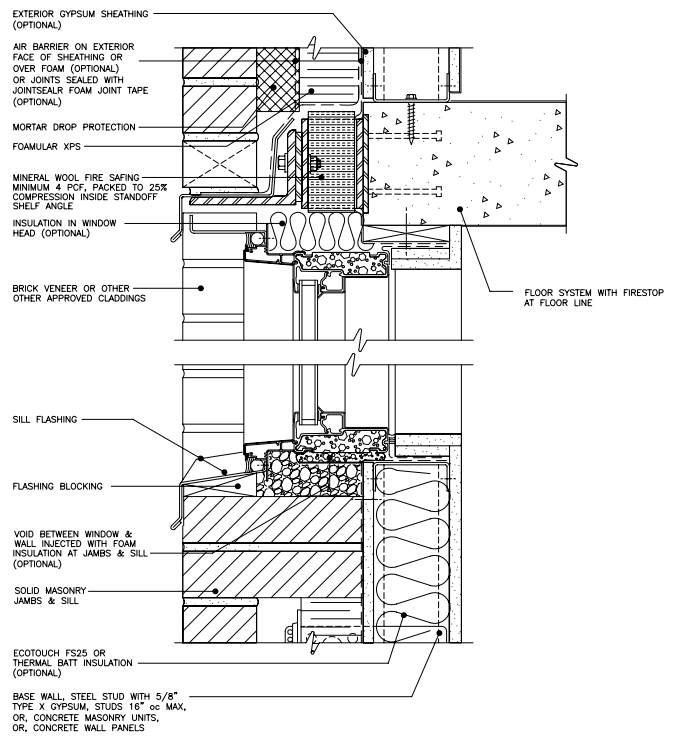
2. Window unit details such as glass type, extruded aluminum shapes and foam filled voids are not critical to NFPA 285 compliance. The actual NFPA 285 test is conducted with no window unit in the opening. However, it is critical to match the approved Foamular thickness with approved details for the opening head (continuous steel, or steel with mineral wool fire safing), and, jamb/sill details (not solid in Detail 1, solid masonry in Details 2, 3 and 4).

Table 3 Continued

Window and Door Opening Details^{1,2}, NFPA 285



Detail 3: Standoff Lintel/Shelf Angle on Steel Framing



Detail 4: Standoff Shelf Angle at Floor Line

Owens Corning™ Commercial Complete Wall Systems Resources:

For additional information see the complete set of Owens Corning™
Commercial Complete Wall System literature.

Visit www.foamular.com or www.owenscorningcommercial.com,
or call 1-800-GET-PINK®.



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