Impact of NFPA 285 on Air Barrier Specification and Design

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Outline

- Summarize the **impact of NFPA 285** on building enclosure wall assembly design and construction.
- Evaluate **material appropriateness** for inclusion in an NFPA 285 ‘approved’ wall assembly.
- Investigate **detailing considerations** to reduce the risk of fire spread.
- Recall **vapor transmission performance** between different insulation and air barrier assemblies.

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NFPA 285

History, Overview, Impact

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History of Fire Protection

- Late 1800's:
  - Time of change, growth, new technology
- Needs:
  - consistent rules
  - association to administer the rules
- Why:
  - control loss of life and property
- How:
  - Codes, research, training, education, outreach, advocacy
- Noteworthy:
  - NFPA 251 – Society of Plastics Industry

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NFPA 285-12 Overview

Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components

- Test procedure to evaluate the ability of a wall assembly to:
  1. Resist flame propagation over exterior face of wall assembly
  2. Resist vertical flame propagation within combustible components from one story to the next
  3. Resist vertical flame propagation over interior surface of wall assembly from one story to the next
  4. Resist lateral flame propagation from the compartment of fire origin to adjacent compartments or spaces

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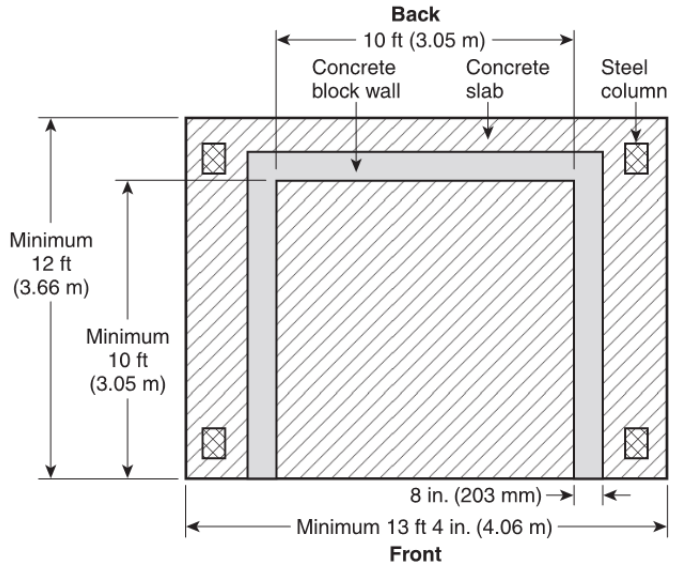
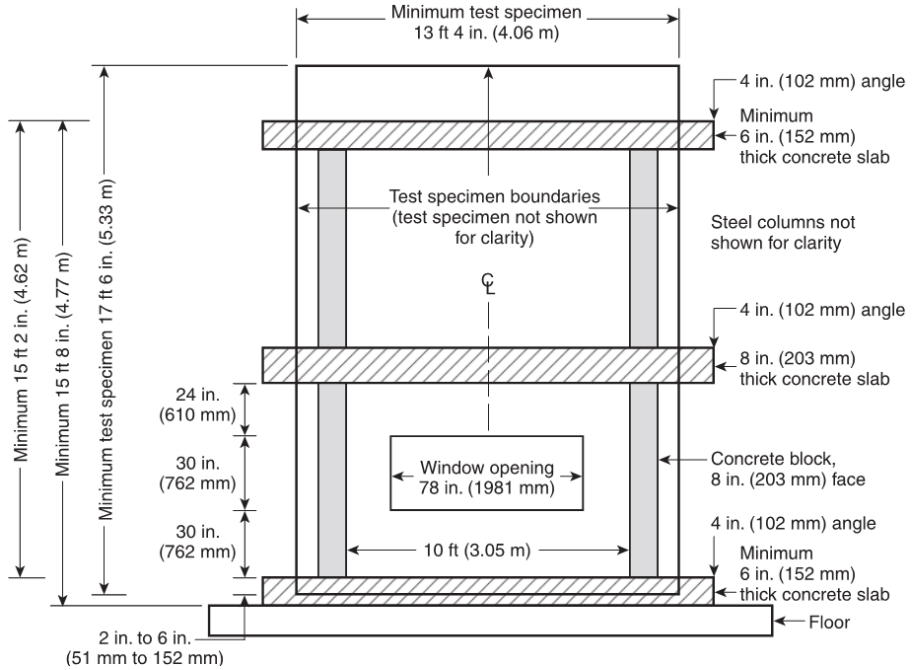
NFPA 285-12 Overview



From NFPA 285-12: Figure A.4.2.3(a)
Plan View of Test Apparatus – Both Stories (not to scale)



From NFPA 285-12: Figure 5.2(a)
Front View of Test Specimen Superimposed over Test Apparatus (not to scale)

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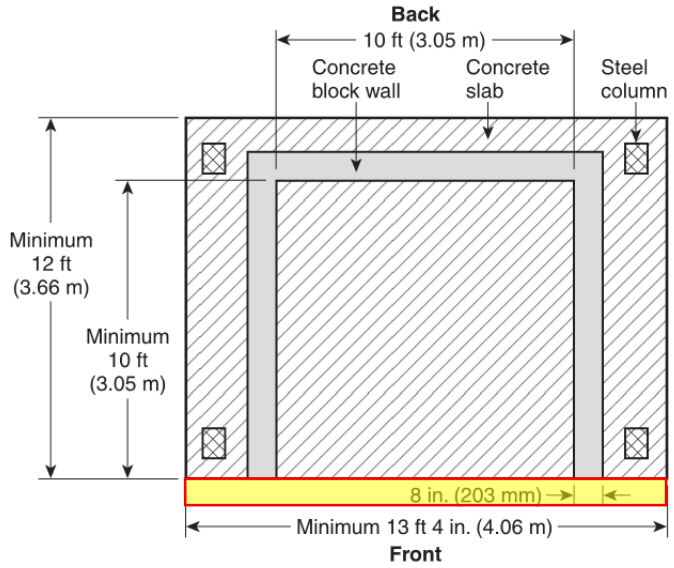
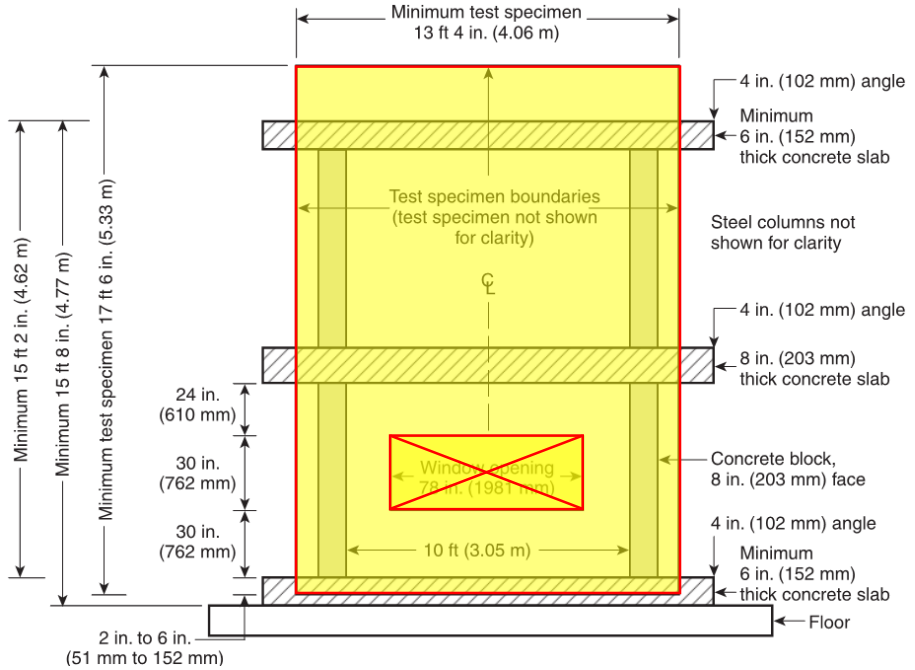
- Two-story test apparatus constructed of concrete slabs, steel columns, and concrete block walls (minimum 12’-0” x 13’-4” x 15’-2”)

NFPA 285-12 Overview



From NFPA 285-12: Figure A.4.2.3(a)
Plan View of Test Apparatus – Both Stories (not to scale)



From NFPA 285-12: Figure 5.2(a)
Front View of Test Specimen Superimposed over Test Apparatus (not to scale)

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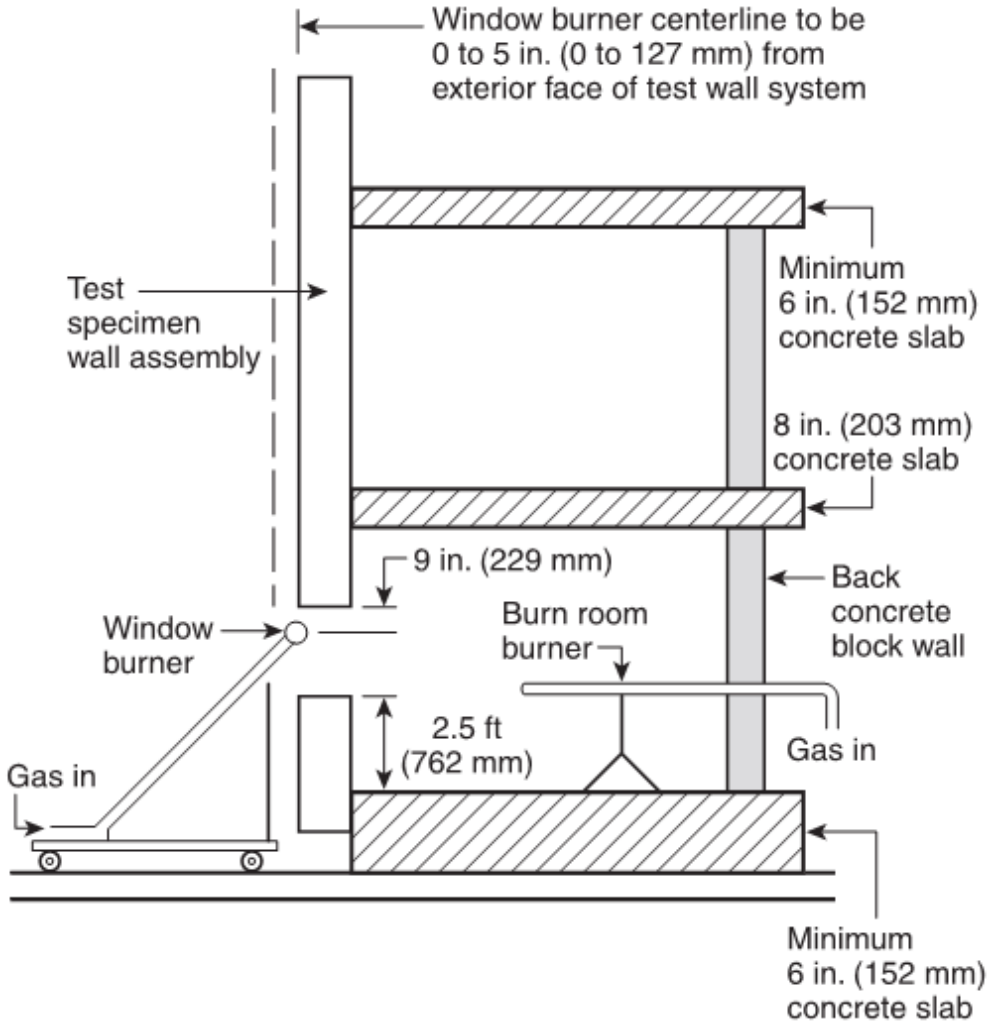
- Two-story test apparatus constructed of concrete slabs, steel columns, and concrete block walls (minimum 13’-4” wide x 12’-0” deep x 15’-8” high)
- Test specimen placed outboard of test apparatus (minimum 13’-4” wide x 17’-6” high)
- Window opening at first story (78-inch wide x 30 inch high)

NFPA 285-12 Overview

- 30-Minute Test



From NFPA 285-12: Figure A.4.4.3.6
Section View of Burner Placements for First-Story Test Room (not to scale)

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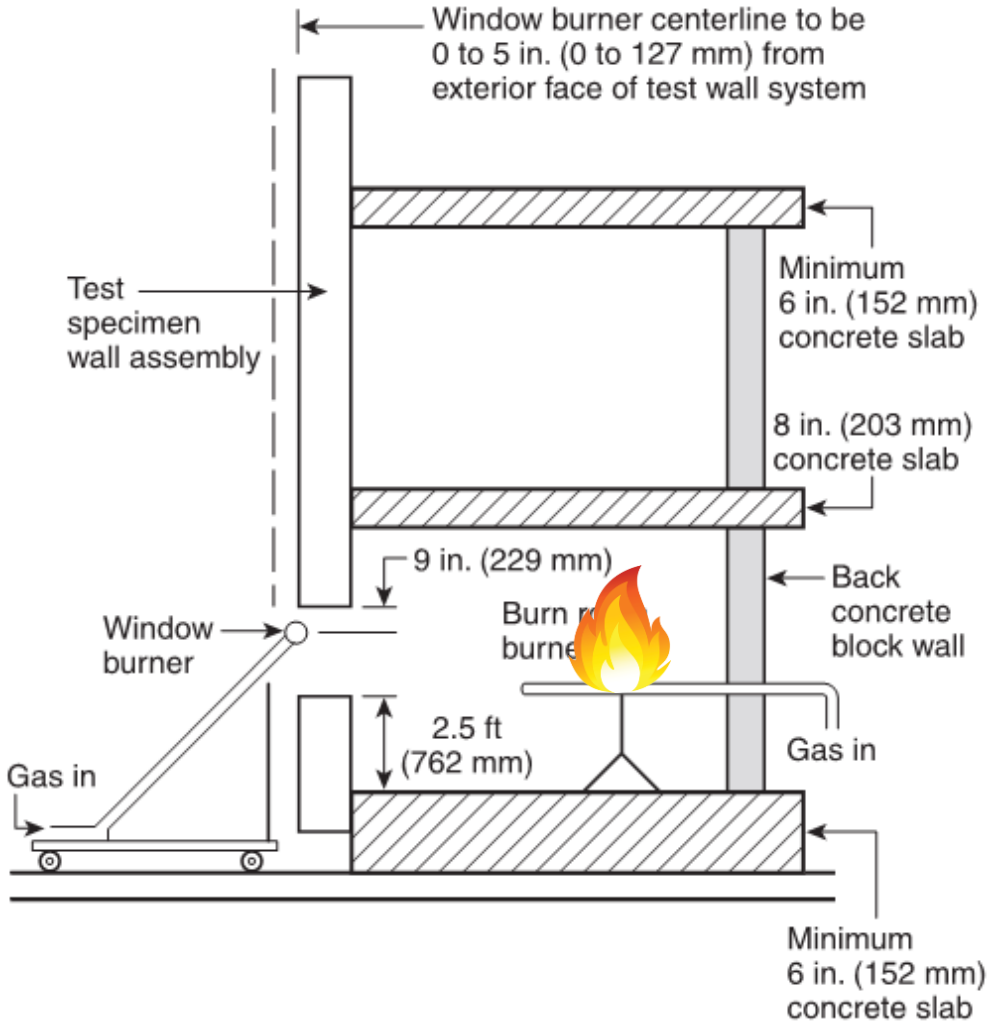
NFPA 285-12 Overview

- 30-Minute Test
  - Start:
    First Floor Room Burner Lit



From NFPA 285-12: Figure A.4.4.3.6
Section View of Burner Placements for First-Story Test Room (not to scale)

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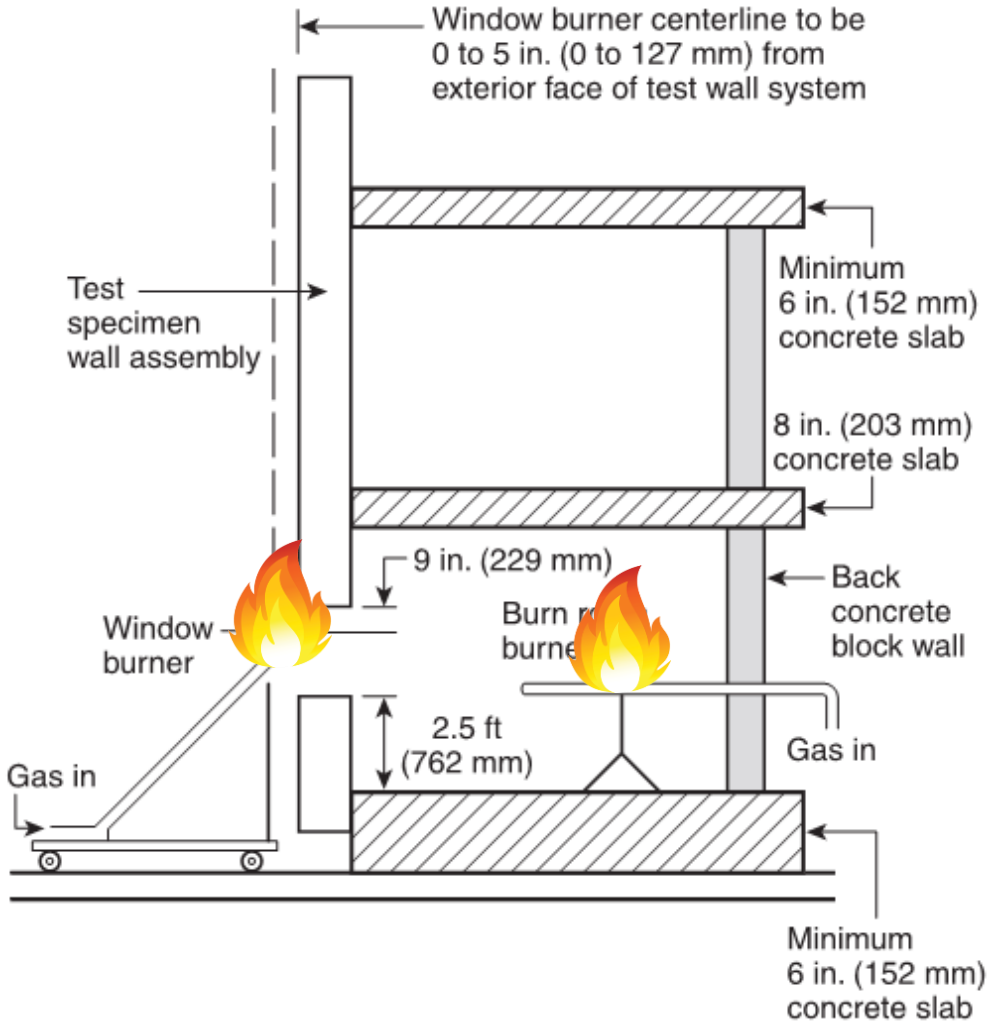
NFPA 285-12 Overview

- 30-Minute Test
  - Start:
    First Floor Room Burner Lit
  - After 5-Minutes:
    First Floor Window Burner Lit



From NFPA 285-12: Figure A.4.4.3.6
Section View of Burner Placements for First-Story Test Room (not to scale)

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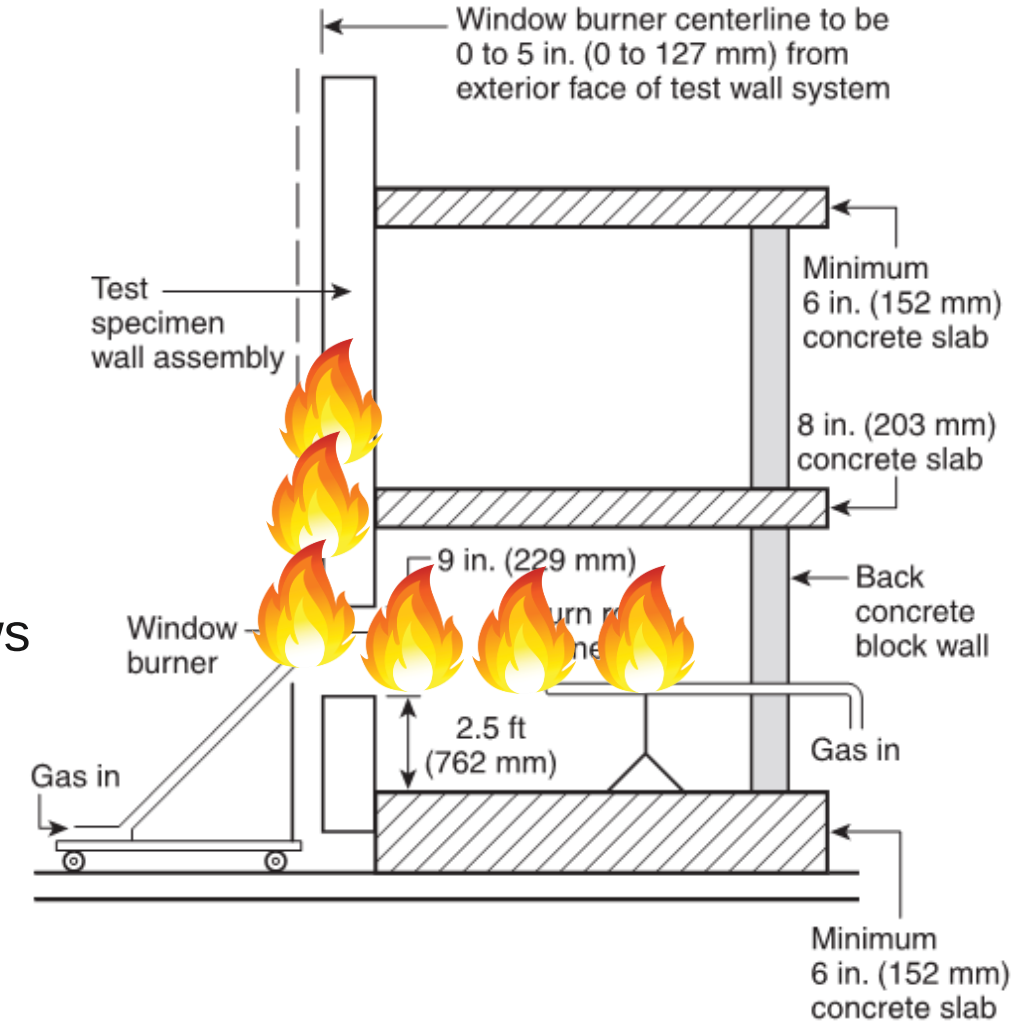
NFPA 285-12 Overview

- 30-Minute Test
  - Start:
    First Floor Room Burner Lit
  - After 5-Minutes:
    First Floor Window Burner Lit
  - Remaining 25-Minutes:
    Visual Observation of Flame Spread
    Data Recording – Thermocouples, Gas Flows



From NFPA 285-12: Figure A.4.4.3.6
Section View of Burner Placements for First-Story Test Room (not to scale)

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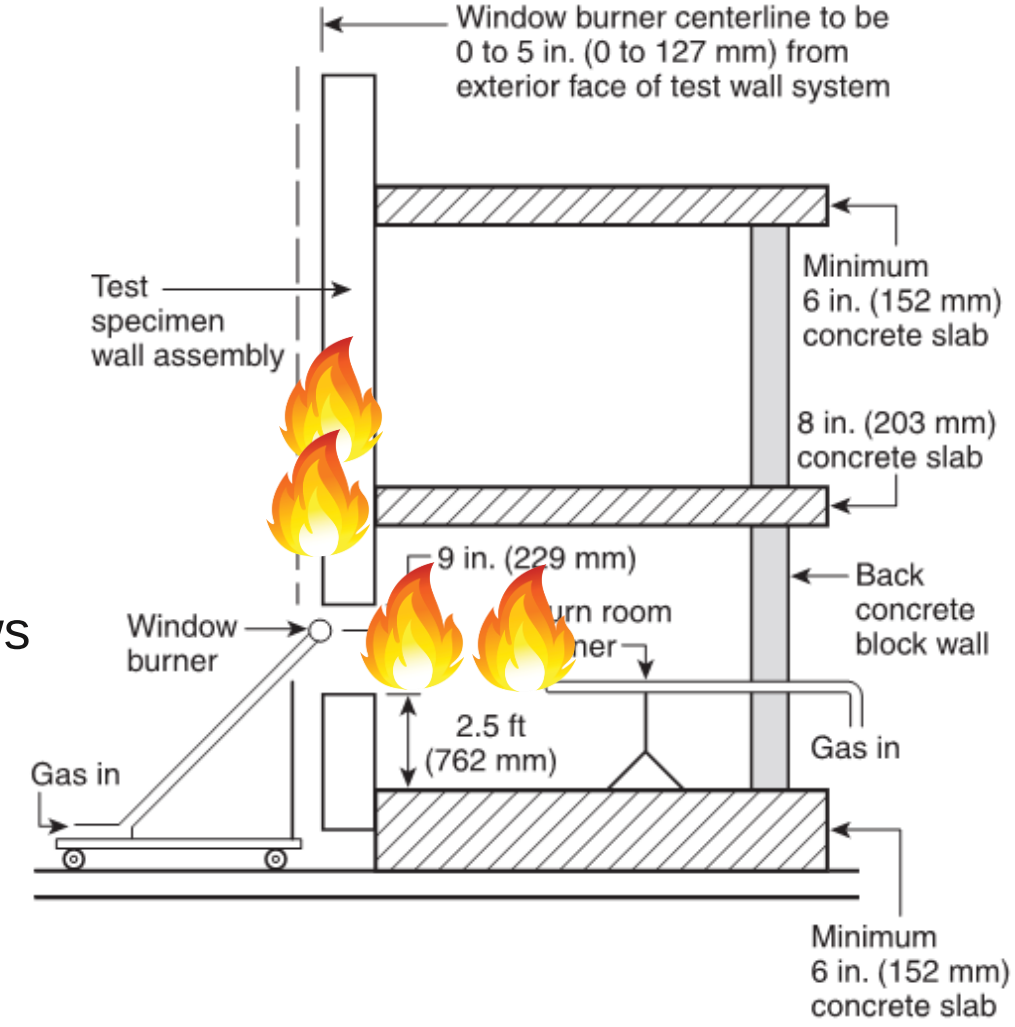
NFPA 285-12 Overview

- 30-Minute Test
  - Start:
    First Floor Room Burner Lit
  - After 5-Minutes:
    First Floor Window Burner Lit
  - Remaining 25-Minutes:
    Visual Observation of Flame Spread
    Data Recording – Thermocouples, Gas Flows
  - At 30-Minutes:
    Gas supply to both burners shut off
  - Residual burning allowed for not less than 10-minutes after gas shut off.



From NFPA 285-12: Figure A.4.4.3.6
Section View of Burner Placements for First-Story Test Room (not to scale)

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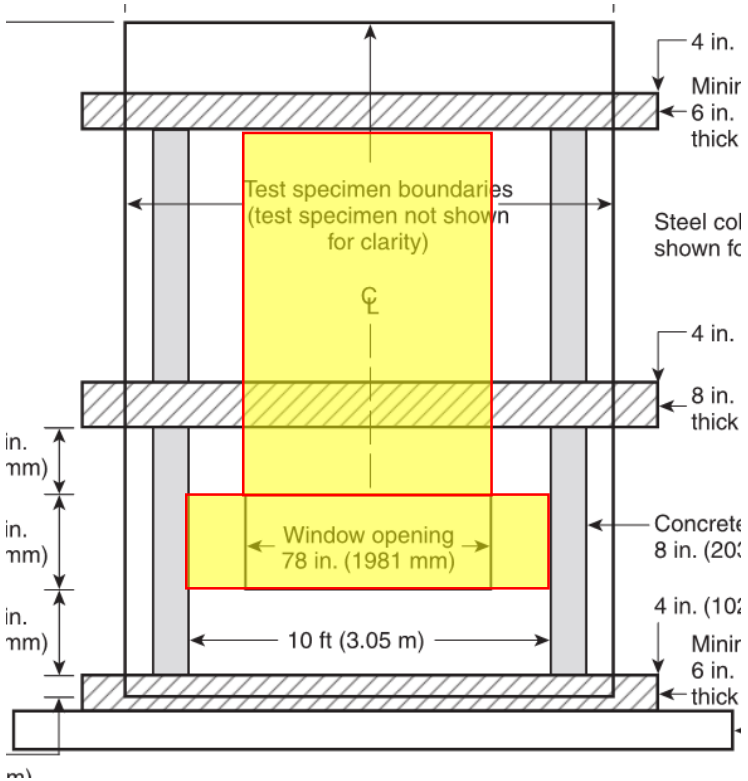
NFPA 285-12 Overview

- Flame propagation cannot:
  - Extend greater than 10-feet above window opening
  - Extend greater than 5-feet laterally from the center of the window opening.
  - Extend past side walls of test specimen/apparatus
  - No flames within second story interior space
- Thermocouple temperatures:
  - Cannot exceed 1,000°F
  - Cannot exceed 750°F above starting temperature depending upon assembly
  - Cannot exceed 500°F above ambient air temperature at second story



From NFPA 285-12: Figure 5.2(a)
Front View of Test Specimen Superimposed over Test Apparatus (not to scale)

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How does this impact my wall assembly?

Construction Type, Cladding, Insulation, Air/Weather Barrier

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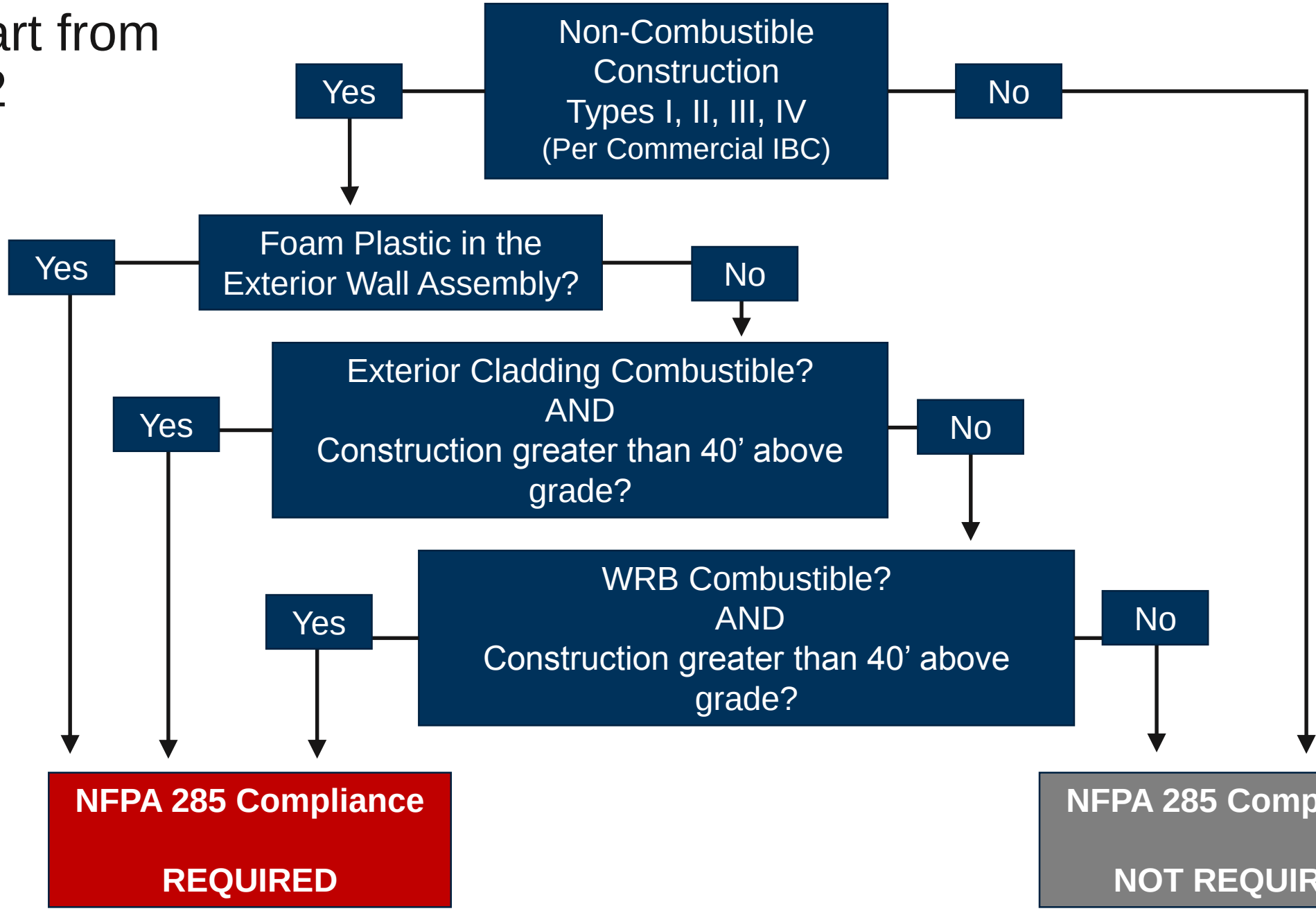
Flow Chart from IBC 2012



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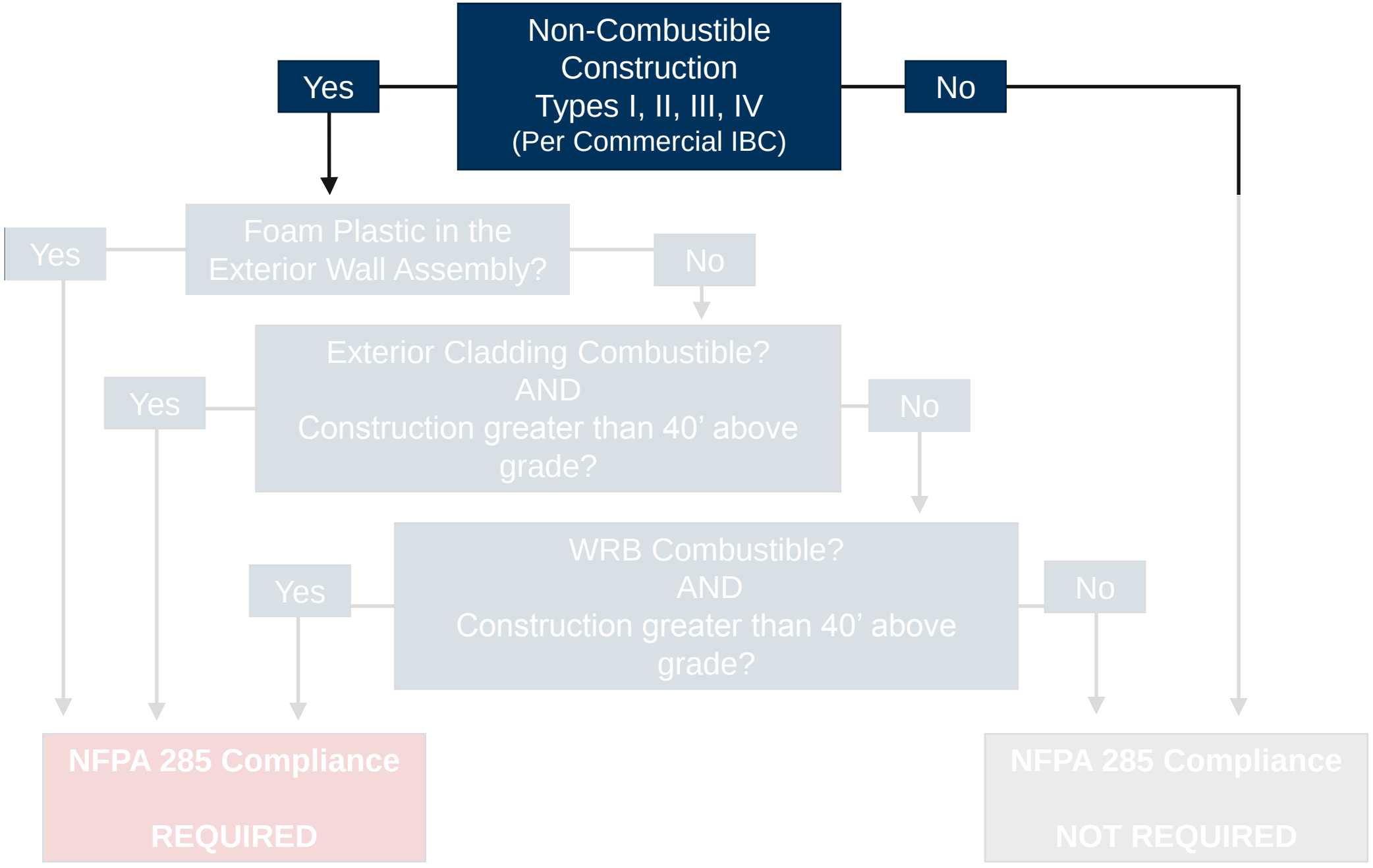

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Non-combustible Construction

- Fire resistive | Protected vs. unprotected | Combustible vs. non-combustible

- Type I – Fire resistive, Non-combustible
  - Walls and Roof are concrete and protected steel structures
- Type II – Protected + Unprotected Non-combustible
  - Walls and Roof are concrete or steel, combustible roof elements
- Type III – Protected + Unprotected Combustible
  - Walls, Floors, Structure are masonry; Roof is wood or other combustible material
- Type IV – Heavy Timber
  - Walls are masonry, Structure is exposed large dimensional lumber, Floors and roof are plank board
- Type V – Wood-Framed
  - Walls and roofs are combustible construction

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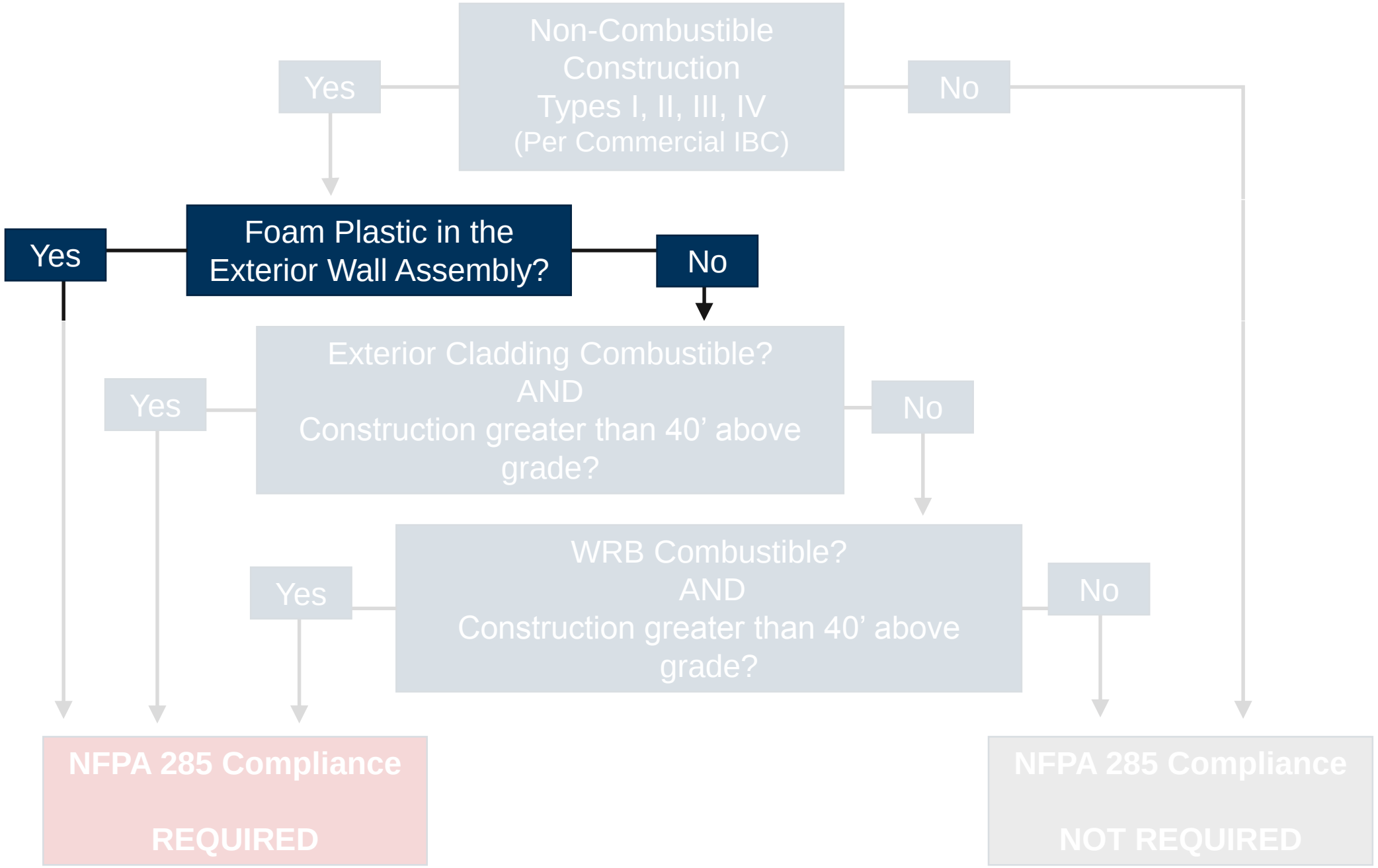

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Insulation Types and Considerations

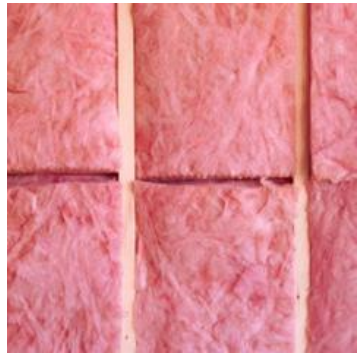
Expanded Polystyrene

Extruded Polystyrene

Polyisocyanurate

Spray Foam

Mineral Wool



Fiberglass Batt

Installation Locations
-Below-grade slab/wall
-Drainable/non-drainable wall
-Interior framing
-Above/below roof membrane

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Purpose
-Thermal barrier
-Acoustic barrier
-Vapor barrier
-Air barrier (taped)
-Thickness

Durability
-Dimensional stability
-Break apart
-Initial vs. lifetime R-value

PSI
-Horizontal/vertical
-Compressive forces
-Stable substrate

Vapor Permeability
-Rigid vs. batt
-Kraft or foil face

Water Resistance
-R-value reduction
-Dimensional stability
-Drainable channels

Heat Stability
-Dimensional stability
-Fire propagation risk

Exterior Insulation

Expanded Polystyrene

Extruded Polystyrene

Polyisocyanurate

Spray Foam

Mineral Wool

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- As of 2012 International Energy Conservation Code (IECC), continuous insulation required in all climate zones.

Foam Plastic in Exterior Wall Assembly

Expanded Polystyrene

Extruded Polystyrene

Polyisocyanurate

Spray Foam

- NFPA 285 Compliance required where foam plastic is installed in exterior wall assembly.

- Thermoplastic – Expanded Polystyrene, Extruded Polystyrene
  - Combustible - material can be melted and reformed.
- Thermoset – Polyisocyanurate, Foamed Polyurethane
  - Combustible - material will burn and degrade when heated; cannot be melted and reformed

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Non-Combustible Insulation

Mineral
Wool

- Mineral wool insulation is comprised of mineral particulates bonded together.
- Although non-combustible NFPA 285 compliance may still be required!

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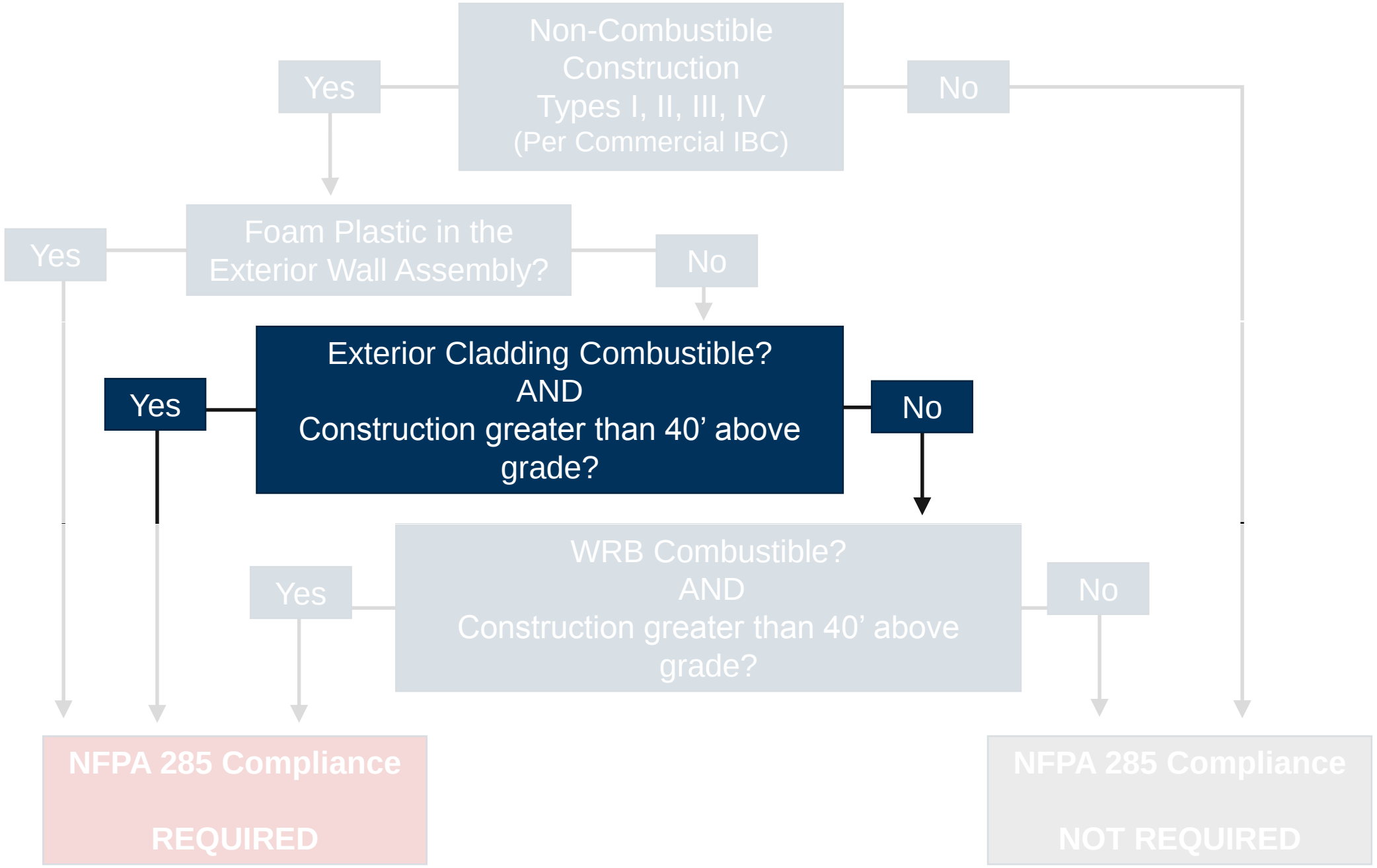

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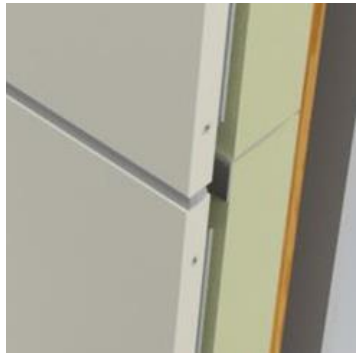
Combustible Cladding

High-pressure Laminates

Fiber-reinforced Plastics



Metal Composite Materials

Exterior Insulation Finishing Systems

Installation Locations
-Above 40-feet
-Below 40-feet
-Assembly components

Purpose
-Thermal barrier
-Water barrier
-Vapor barrier (closed joints)
-Air barrier (closed joints)

Durability
-Dimensional stability
-UV degradation
-Exposed edges

Vapor Permeability
-Impermeable materials
-Open or Closed joints

Water Resistance
-Dimensional stability
-Primary shedding

Heat Stability
-Thermal movement
-Flame propagation risk

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Non-combustible Cladding


Stucco


Brick Masonry


Stone Masonry


Precast Concrete


Terra Cotta

Installation Locations
-Above 40-feet
-Below 40-feet
-Assembly components

Purpose
-Thermal barrier
-Water barrier
-Vapor retarder
-Air barrier
(closed joints)

Durability
-Dimensional stability
-UV degradation
-Exposed edges

Vapor Permeability
-Material permeability
-Open or Closed joints

Water Resistance
-Dimensional stability
-Drainage plane

Heat Stability
-Thermal movement
-Flame propagation risk

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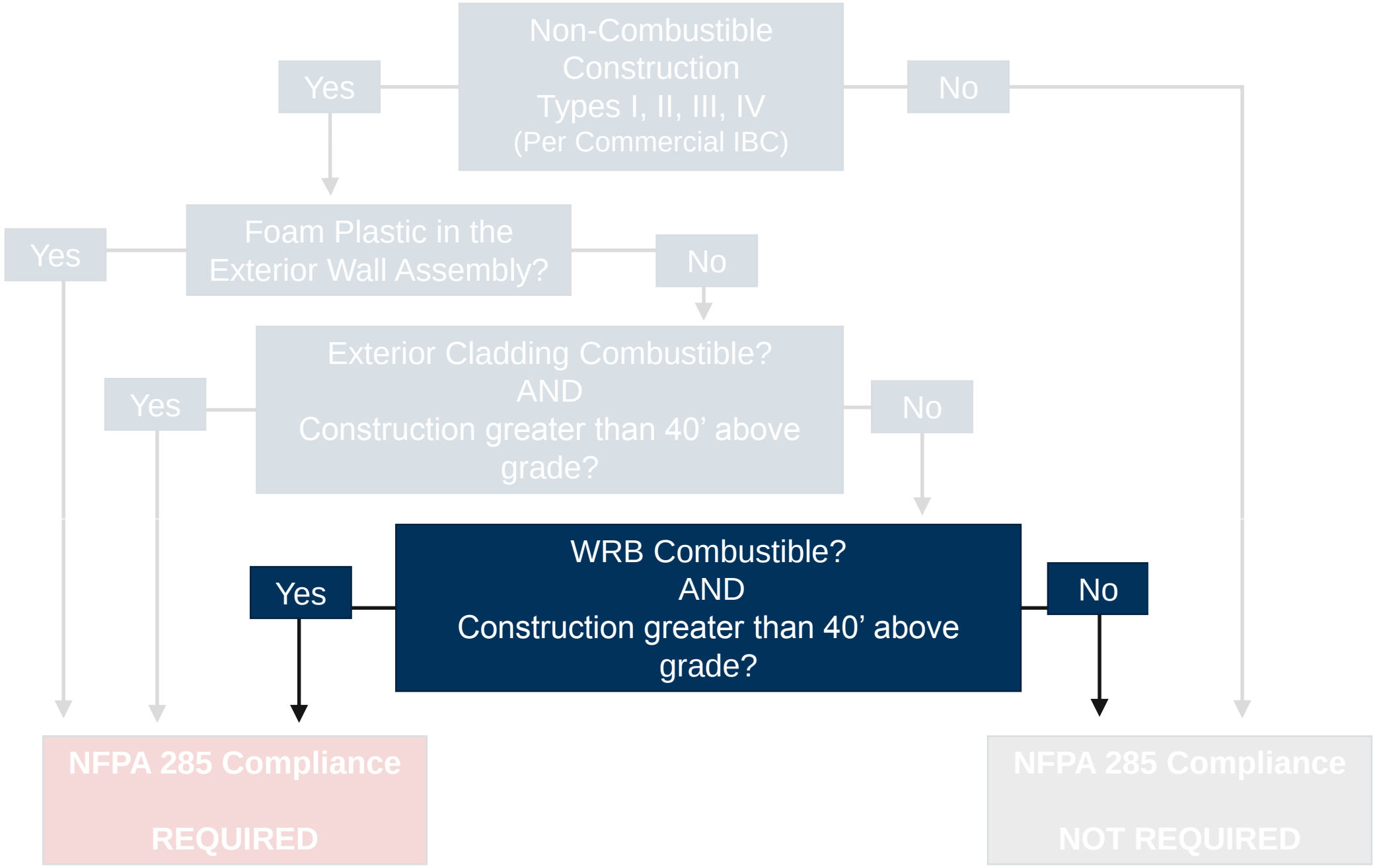

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WRB, AVB, AWB…

Application

- Sheet
  - Self-Adhered
  - Adhesive
- Fluid
  - Spray Applied
  - Brush Applied
  - Roller Applied
- Joints and Detailing

Performance

- Air
  - Air Barrier
- Water
  - Drainage Plane
  - Waterproofing
- Vapor
  - Permeable
  - Impermeable
- Heat
  - Low Temperature (Installation)
  - Average Temperature
  - High Temperature (In-Service)
  - Flame Propagation Risk

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Now What?

NFPA 285 Compliance is Required

- Manufacturer Resources for NFPA Compliant Assemblies and Detailing

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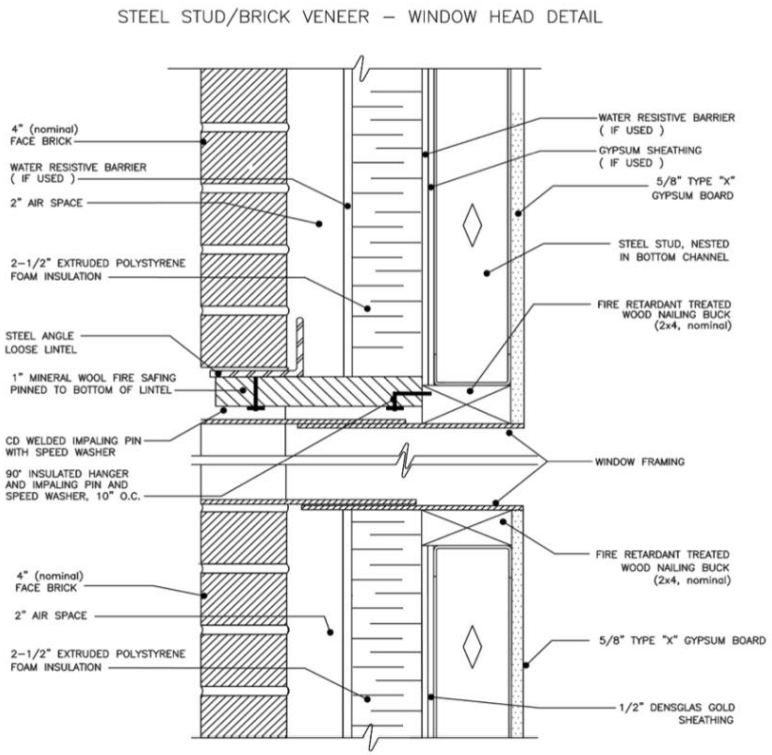
NFPA 285 Compliance is Required

- Manufacturer Resources for NFPA Compliant Assemblies and Detailing

Figure 1 – Window/door opening detail



Moisture analysis	
Wall component	**Materials**
Base wall system *Use either 1, 2 or 3*	1. Concrete wall 2. Concrete masonry wall 3. 1 layer – ⅝-inch thick, Type X, gypsum wallboard on interior, installed over steel studs: minimum 3⅝-inch depth, minimum 20-gauge at a maximum of 24-inch OC with lateral bracing every 4-ft. vertically
Floorline Firestopping	4 lb/cu ft. mineral wool (e.g. Thermafiber or Roxul) in each stud cavity at each floorline – attached with Z-clips or equivalent
Cavity insulation *Use either 1, 2, 3, 4 or 6*	1. None 2. Any noncombustible insulation (faced or unfaced) per ASTM E136 3. Any mineral fiber (Board type Class A, ASTM E84 faced or unfaced) 4. Any fiberglass (Batt type Class A, ASTM E84 faced or unfaced) 5. Items 2-4 may incorporate a Class A vapor barrier film 6. Henry Permax™ SPF maximum thickness 6-inch
Interior vapor membrane (optional) *Use either 1 or 2*	1. None 2. One layer of maximum 6-mil thick polyethylene film
Exterior sheathing *Use either 1 or 2*	1. ½-inch thick, exterior type gypsum sheathing 2. ⅝-inch thick, Type X, exterior type gypsum sheathing
Air barrier membrane applied to gypsum sheathing *Select from list*	1. None 2. Air-Bloc® 16MR 3. Air-Bloc® 17MR 4. Air-Bloc® 21FR or 21S 5. Air-Bloc® 31MR 6. Air-Bloc® 32MR 7. Air-Bloc® 33MR 8. Blueskin® VP160 9. Blueskin® SA or SA LT 10. Metal Clad™ 11. FoilSkin®
Exterior insulation	Extruded Polystyrene Foam Insulation (XPS) - Type IV per ASTM C578 – Maximum of 3-inch thickness on insulation joints, flashing tape such as Henry® Blueskin® SA or Butyl Flash – max. 12-inch width can be used.
Exterior veneer *Use either 1, 2, 3, 4, 5 or 6*	1. Brick – Standard nominal 4-inch thick, clay brick. Brick installed with standard type veneer anchors at maximum 24-inch OC vertically on each stud. Maximum 2-inch air gap between exterior insulation and brick 2. Concrete – 2-inch thick or greater. Maximum 2-inch air gap between exterior insulation and concrete. 3. Concrete masonry units – 4-inch thick or greater. Maximum 2-inch air gap between exterior insulation and CMU. 4. Stone veneer – Minimum 2-inch thick, limestone or natural stone veneer or minimum 1½-inch thick cast artificial stone veneer. Any standard non-open-joint installation technique such as ship-lap, etc. can be used. 5. Terracotta cladding – Use any terracotta cladding system in which terracotta is minimum 1¼-inch thick. Any non-open-joint installation technique such as ship-lap, etc. can be used. 6. Stucco – Minimum ¾-inch thick, exterior cement plaster and lath. This exterior veneer cannot be used with the exterior insulation described above.
Special conditions	Use header treatment shown in figure 1, 2 or 3 for all window and door openings in walls utilizing XPS insulation.
Flashing of window, door and other exterior wall penetrations	As an option, flash window, door and other exterior penetrations with Henry® Blueskin® SA, Butyl Flash or Air-Bloc® LF – max. 12-inch width.

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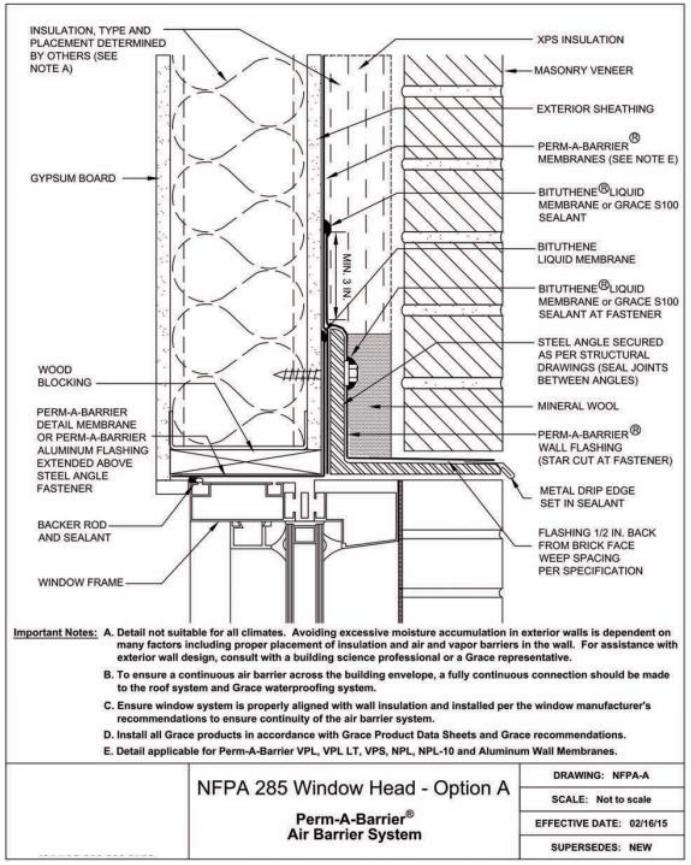
Source: Henry Tech-Talk Bulletin
NFPA 285 Assemblies, Effective 09/15/2018

NFPA 285 Compliance is Required

- Manufacturer Resources for NFPA Compliant Assemblies and Detailing



Source: GCP Applied Technologies
NFPA 285 Compliant Wall Assemblies
Perm-A-Barrier Air Barriers Version 12.19.16

Walls Containing XPS Insulation

Wall Component	Materials
Base wall system – Use either 1, 2, or 3	1. Concrete wall 2. Concrete Masonry wall 3. 1 layer – ⅝-inch thick, Type X, Gypsum wallboard on interior, installed over steel studs: minimum 3⅝-inch depth, minimum 20-gauge at a maximum of 16-inch OC with lateral bracing every 4 ft. vertically
Floorline Firestopping	4 lb/ft³ mineral wool in each stud cavity at each floorline – at- tached with Z-clips or equivalent
Cavity Insulation – Use either 1, 2 or 3	1. None 2. Fiberglass batt insulation (faced or unfaced) 3. Any noncombustible insulation
Exterior sheathing – Use either 1, 2 or 3	1. None 2. ½-inch thick, exterior type gypsum sheathing 3. ⅝-inch thick, Type X, exterior type gypsum sheathing
Air and water barrier applied to gypsum sheathing – Use either 1, 2, 3, 4 ,5, 6 or 7	1. Perm-A-Barrier Liquid 2. Perm-A-Barrier NPL 3. Perm-A-Barrier NPL 10 4. Perm-A-Barrier VPO 5. Perm-A-Barrier VPL 6. Perm-A-Barrier VPL LT 7. Perm-A-Barrier NPS
Exterior insulation	Extruded Polystyrene Foam Insulation (XPS) – Type IV per ASTM C578 – Total thickness to be a minimum of ½ inch to maximum of 3 inches. On insulation joints, 4" Perm-A-Barrier Detail Membrane or Perm-A-Barrier Aluminum Flashing can be used.
Exterior Veneer – Use either 1,2,3,4 or 5	1. Brick - Standard nominal 4-inch thick, clay brick. Brick installed with standard type veneer anchors at maximum 24 inches OC vertically on each stud. Maximum 2-inch air gap between exterior insulation and brick 2. Concrete – 2 inches thick or greater. Maximum 2-inch air gap between exterior insulation and concrete. 3. Concrete masonry units – 4 inches thick or greater. Maximum 2-inch air gap between exterior insulation and CMU. 4. Stone veneer – Minimum 2-inch thick, Limestone or natural stone veneer or minimum 1-½ inch thick cast artificial stone veneer. Any standard non-open-joint installation technique such as ship-lap, etc. can be used. 5. Terracotta cladding – Use any terracotta cladding system in which terracotta is minimum 1-¼ inch thick. Any non- open-joint installation technique such as ship-lap, etc. can be used.
Flashing of window, door and other exterior wall penetrations – Use either 1 or 2	1. Perm-A-Barrier Detail Membrane 2. Perm-A-Barrier Aluminum Flashing

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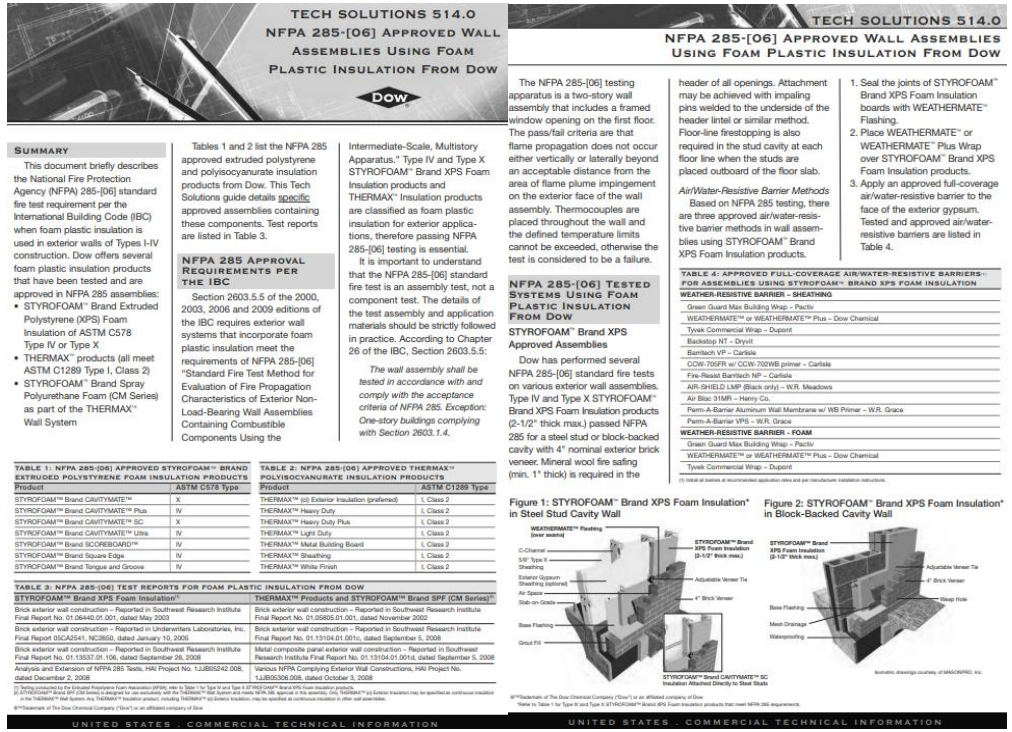
NFPA 285 Compliance is Required

- Manufacturer Resources for NFPA Compliant Assemblies and Detailing



TECH SOLUTIONS 514.0
NFPA 285-[06] Approved Wall Assemblies Using Foam Plastic Insulation From Dow

Summary

This document briefly describes the National Fire Protection Agency (NFPA) 285-[06] standard fire test requirement per the International Building Code (IBC) when foam plastic insulation is used in exterior walls of Types I-IV construction. Dow offers several foam plastic insulation products that have been tested and are approved in NFPA 285 assemblies:

- STYROFOAM™ Brand Extruded Polystyrene (XPS) Foam Insulation of ASTM C578 Type IV or Type X
- THERMAX™ products (all meet ASTM C1289 Type I, Class 2)
- STYROFOAM™ Brand Spray Polyurethane Foam (CM Series) as part of the THERMAX™ Wall System

Tables 1 and 2 list the NFPA 285 approved extruded polystyrene and polyisocyanurate insulation products from Dow. This Tech Solutions guide details specific approved assemblies containing these components. Test reports are listed in Table 3.

NFPA 285 Approval Requirements per the IBC

Section 2603.5.5 of the 2000, 2003, 2006 and 2009 editions of the IBC requires exterior wall systems that incorporate foam plastic insulation meet the requirements of NFPA 285-[06] "Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Apparatus." Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products and THERMAX™ insulation products are classified as foam plastic insulation for exterior applications, therefore passing NFPA 285-[06] testing is essential.

It is important to understand that the NFPA 285-[06] standard fire test is an assembly test, not a component test. The details of the test assembly and application materials should be strictly followed in practice. According to Chapter 26 of the IBC, Section 2603.5.5:

The wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. Exception: One-story buildings complying with Section 2603.1.4.

TABLE 1: NFPA 285-[06] APPROVED STYROFOAM™ BRAND EXTRUDED POLYSTYRENE FOAM INSULATION PRODUCTS

Product	ASTM C578 Type
STYROFOAM™ Brand CAVITYMATE™	X
STYROFOAM™ Brand CAVITYMATE™ Plus	IV
STYROFOAM™ Brand CAVITYMATE™ SC	X
STYROFOAM™ Brand CAVITYMATE™ Ultra	IV
STYROFOAM™ Brand SCOREBOARD™	IV
STYROFOAM™ Brand Square Edge	IV
STYROFOAM™ Brand Tongue and Groove	IV

TABLE 2: NFPA 285-[06] APPROVED THERMAX™ POLYISOCYANURATE INSULATION PRODUCTS

Product	ASTM C1289 Type
THERMAX™ (ci) Exterior Insulation (preferred)	I, Class 2
THERMAX™ Heavy Duty	I, Class 2
THERMAX™ Heavy Duty Plus	I, Class 2
THERMAX™ Light Duty	I, Class 2
THERMAX™ Metal Building Board	I, Class 2
THERMAX™ Sheathing	I, Class 2
THERMAX™ White Finish	I, Class 2

TABLE 3: NFPA 285-[06] TEST REPORTS FOR FOAM PLASTIC INSULATION FROM DOW

STYROFOAM™ Brand XPS Foam Insulation[1][2]	THERMAX™ Products and STYROFOAM™ Brand SPF (CM Series)[1][2]
Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.06440.01.001, dated May 2003	Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.05805.01.001, dated November 2002
Brick exterior wall construction – Reported in Underwriters Laboratories, Inc. Final Report 05CA2541, NC2650, dated January 10, 2005	Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13104.01.001c, dated September 5, 2008
Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13537.01.109, dated September 26, 2008	Metal composite panel exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13104.01.001d, dated September 5, 2008
Analysis and Extension of NFPA 285 Tests, HAI Project No. 1JJB05242.008, dated December 2, 2008	Various NFPA Complying Exterior Wall Constructions, HAI Project No. 1JJB05306.008, dated October 3, 2008

[1] Testing conducted by the Extruded Polystyrene Foam Association (XPSA), refer to Table 1 for Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products.
[2] STYROFOAM™ Brand SPF (CM Series) is designed for use exclusively with the THERMAX™ Wall System and meets NFPA 285 approval in this assembly. Only THERMAX™ (ci) Exterior Insulation may be specified as continuous insulation in the THERMAX™ Wall System. Any THERMAX™ Insulation product, including THERMAX™ (ci) Exterior Insulation, may be specified as continuous insulation in other wall assemblies.
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TECH SOLUTIONS 514.0
NFPA 285-[06] Approved Wall Assemblies Using Foam Plastic Insulation From Dow

The NFPA 285-[06] testing apparatus is a two-story wall assembly that includes a framed window opening on the first floor. The pass/fail criteria are that flame propagation does not occur either vertically or laterally beyond an acceptable distance from the area of flame plume impingement on the exterior face of the wall assembly. Thermocouples are placed throughout the wall and the defined temperature limits cannot be exceeded, otherwise the test is considered to be a failure.

NFPA 285-[06] Tested Systems Using Foam Plastic Insulation From Dow

STYROFOAM™ Brand XPS Approved Assemblies

Dow has performed several NFPA 285-[06] standard fire tests on various exterior wall assemblies. Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products (2-1/2" thick max.) passed NFPA 285 for a steel stud or block-backed cavity with 4" nominal exterior brick veneer. Mineral wool fire safing (min. 1" thick) is required in the header of all openings. Attachment may be achieved with impaling pins welded to the underside of the header lintel or similar method. Floor-line firestopping is also required in the stud cavity at each floor line when the studs are placed outboard of the floor slab.

Air/Water-Resistive Barrier Methods

Based on NFPA 285 testing, there are three approved air/water-resistive barrier methods in wall assemblies using STYROFOAM™ Brand XPS Foam Insulation products.

1. Seal the joints of STYROFOAM™ Brand XPS Foam Insulation boards with WEATHERMATE™ Flashing.
2. Place WEATHERMATE™ or WEATHERMATE™ Plus Wrap over STYROFOAM™ Brand XPS Foam Insulation products.
3. Apply an approved full-coverage air/water-resistive barrier to the face of the exterior gypsum. Tested and approved air/water-resistive barriers are listed in Table 4.

TABLE 4: APPROVED FULL-COVERAGE AIR/WATER-RESISTIVE BARRIERS[1] FOR ASSEMBLIES USING STYROFOAM™ BRAND XPS FOAM INSULATION

WEATHER-RESISTIVE BARRIER – SHEATHING
Green Guard Max Building Wrap – Pactiv
WEATHERMATE™ or WEATHERMATE™ Plus – Dow Chemical
Tyvek Commercial Wrap – Dupont
Backstop NT – Dryvit
Barritech VP – Carlisle
CCW-705FR w/ CCW-702WB primer – Carlisle
Fire-Resist Barritech NP – Carlisle
AIR-SHIELD LMP (Black only) – W.R. Meadows
Air Bloc 31MR – Henry Co.
Perm-A-Barrier Aluminum Wall Membrane w/ WB Primer – W.R. Grace
Perm-A-Barrier VPS – W.R. Grace
WEATHER-RESISTIVE BARRIER - FOAM
Green Guard Max Building Wrap – Pactiv
WEATHERMATE™ or WEATHERMATE™ Plus – Dow Chemical
Tyvek Commercial Wrap – Dupont

[1] Install all barriers at recommended application rates and per manufacturer installation instructions.

Figure 1: STYROFOAM™ Brand XPS Foam Insulation* in Steel Stud Cavity Wall

Figure 2: STYROFOAM™ Brand XPS Foam Insulation* in Block-Backed Cavity Wall

Isometric drawings courtesy of MASONRY®, Inc.

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[1] Refer to Table 1 for Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products that meet NFPA 285 requirements.

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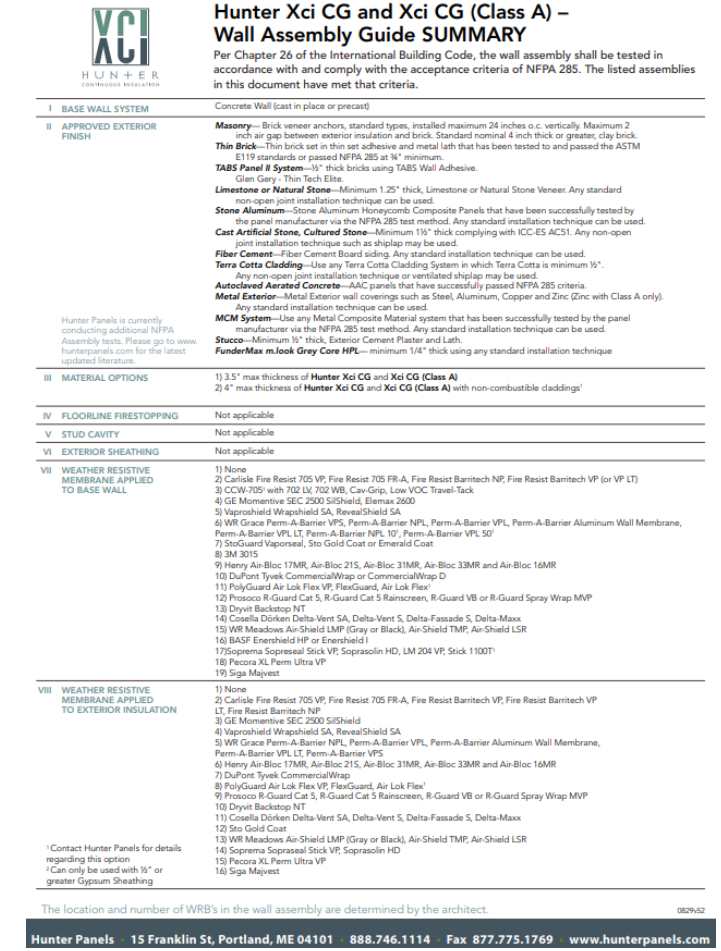
Source: Tech Solutions 514.0:
NFPA 285-2006 Approved Wall Assemblies Using Foam Plastic Insulation From Dow



HUNTER CONTINUOUS INSULATION

Hunter Xci CG and Xci CG (Class A) – Wall Assembly Guide SUMMARY

Per Chapter 26 of the International Building Code, the wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. The listed assemblies in this document have met that criteria.

I BASE WALL SYSTEM	Concrete Wall (cast in place or precast)
II APPROVED EXTERIOR FINISH	***Masonry***—Brick veneer anchors, standard types, installed maximum 24 inches o.c. vertically. Maximum 2 inch air gap between exterior insulation and brick. Standard nominal 4 inch thick or greater, clay brick. ***Thin Brick***—Thin brick set in thin set adhesive and metal lath that has been tested to and passed the ASTM E119 standards or passed NFPA 285 at ¾" minimum. ***TABS Panel II System***—½" thick bricks using TABS Wall Adhesive. Glen Gery - Thin Tech Elite. ***Limestone or Natural Stone***—Minimum 1.25" thick, Limestone or Natural Stone Veneer. Any standard non-open joint installation technique can be used. ***Stone Aluminum***—Stone Aluminum Honeycomb Composite Panels that have been successfully tested by the panel manufacturer via the NFPA 285 test method. Any standard installation technique can be used. ***Cast Artificial Stone, Cultured Stone***—Minimum 1½" thick complying with ICC-ES AC51. Any non-open joint installation technique such as shiplap may be used. ***Fiber Cement***—Fiber Cement Board siding. Any standard installation technique can be used. ***Terra Cotta Cladding***—Use any Terra Cotta Cladding System in which Terra Cotta is minimum ½". Any non-open joint installation technique or ventilated shiplap may be used. ***Autoclaved Aerated Concrete***—AAC panels that have successfully passed NFPA 285 criteria. ***Metal Exterior***—Metal Exterior wall coverings such as Steel, Aluminum, Copper and Zinc (Zinc with Class A only). Any standard installation technique can be used. ***MCM System***—Use any Metal Composite Material system that has been successfully tested by the panel manufacturer via the NFPA 285 test method. Any standard installation technique can be used. ***Stucco***—Minimum ½" thick, Exterior Cement Plaster and Lath. ***FunderMax m.look Grey Core HPL***— minimum 1/4" thick using any standard installation technique Hunter Panels is currently conducting additional NFPA Assembly tests. Please go to www.hunterpanels.com for the latest updated literature.
III MATERIAL OPTIONS	1) 3.5" max thickness of **Hunter Xci CG** and **Xci CG (Class A)** 2) 4" max thickness of **Hunter Xci CG** and **Xci CG (Class A)** with non-combustible claddings[1]
IV FLOORLINE FIRESTOPPING	Not applicable
V STUD CAVITY	Not applicable
VI EXTERIOR SHEATHING	Not applicable
VII WEATHER RESISTIVE MEMBRANE APPLIED TO BASE WALL	1) None 2) Carlisle Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech NP, Fire Resist Barritech VP (or VP LT) 3) CCW-705[1] with 702 LV, 702 WB, Cav-Grip, Low VOC Travel-Tack 4) GE Momentive SEC 2500 SilShield, Elemax 2600 5) Vaproshield Wrapshield SA, RevealShield SA 6) WR Grace Perm-A-Barrier VPS, Perm-A-Barrier NPL, Perm-A-Barrier VPL, Perm-A-Barrier Aluminum Wall Membrane, Perm-A-Barrier VPL LT, Perm-A-Barrier NPL 10[1], Perm-A-Barrier VPL 50[1] 7) StoGuard Vaporseal, Sto Gold Coat or Emerald Coat 8) 3M 3015 9) Henry Air-Bloc 17MR, Air-Bloc 21S, Air-Bloc 31MR, Air-Bloc 33MR and Air-Bloc 16MR 10) DuPont Tyvek CommercialWrap or CommercialWrap D 11) PolyGuard Air Lok Flex VP, FlexGuard, Air Lok Flex[1] 12) Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 13) Dryvit Backstop NT 14) Cosella Dörken Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta-Maxx 15) WR Meadows Air-Shield LMP (Gray or Black), Air-Shield TMP, Air-Shield LSR 16) BASF Enershield HP or Enershield I 17)Sopremа Sopreseal Stick VP, Soprasolin HD, LM 204 VP, Stick 1100T[1] 18) Pecora XL Perm Ultra VP 19) Siga Majvest
VIII WEATHER RESISTIVE MEMBRANE APPLIED TO EXTERIOR INSULATION	1) None 2) Carlisle Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech VP, Fire Resist Barritech VP LT, Fire Resist Barritech NP 3) GE Momentive SEC 2500 SilShield 4) Vaproshield Wrapshield SA, RevealShield SA 5) WR Grace Perm-A-Barrier NPL, Perm-A-Barrier VPL, Perm-A-Barrier Aluminum Wall Membrane, Perm-A-Barrier VPL LT, Perm-A-Barrier VPS 6) Henry Air-Bloc 17MR, Air-Bloc 21S, Air-Bloc 31MR, Air-Bloc 33MR and Air-Bloc 16MR 7) DuPont Tyvek CommercialWrap 8) PolyGuard Air Lok Flex VP, FlexGuard, Air Lok Flex[1] 9) Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10) Dryvit Backstop NT 11) Cosella Dörken Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta-Maxx 12) Sto Gold Coat 13) WR Meadows Air-Shield LMP (Gray or Black), Air-Shield TMP, Air-Shield LSR 14) Sopremа Sopraseal Stick VP, Soprasolin HD 15) Pecora XL Perm Ultra VP 16) Siga Majvest

[1] Contact Hunter Panels for details regarding this option
[2] Can only be used with ½" or greater Gypsum Sheathing

The location and number of WRB's in the wall assembly are determined by the architect.

0829v52

Hunter Panels • 15 Franklin St, Portland, ME 04101 • 888.746.1114 • Fax 877.775.1769 • www.hunterpanels.com

Source: Hunter Xci CG and Xci CG (Class A) – Wall Assembly Guide Summary

NFPA 285 Compliance is Required

- Manufacturer Resources for NFPA 285 Compliant Assemblies and Detailing
  - Verify assembly is compliant, not just the material
  - May require additional detailing at window/door head, jamb, sill conditions and floor lines
- Perform a new test – Pricey $$$
- Engineering Judgements
  - Verify Authority Having Jurisdiction is open to reviewing judgements
  - Flame propagation risk is equal to or less than tested assembly
- ‘All you need to do is choose from a prescribed list’ –
  It may satisfy NFPA 285 Compliance, but how does it perform?

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Hygrothermal Impact

Comparative Example

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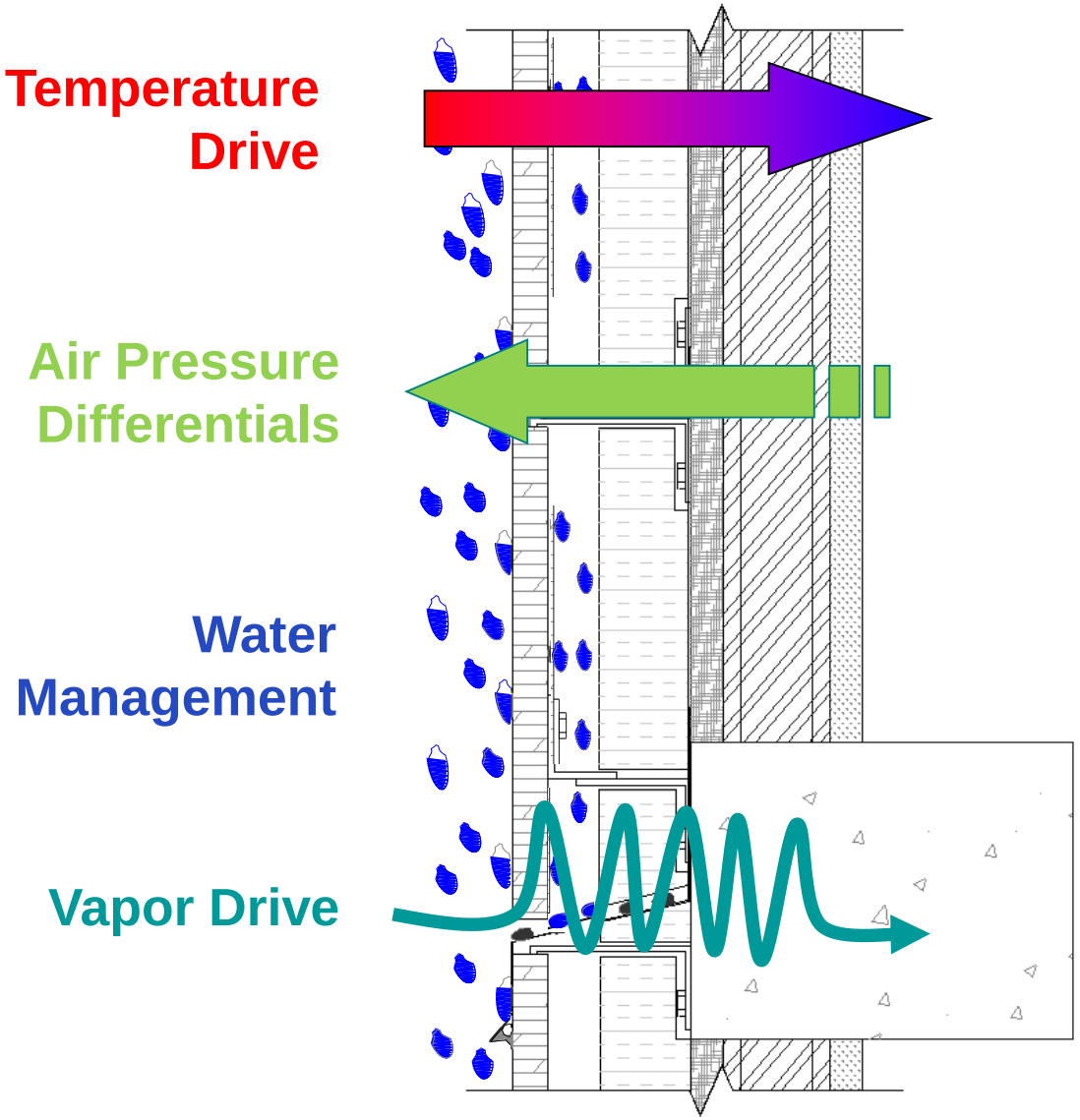
Heat, Air, & Moisture Transfer Principles



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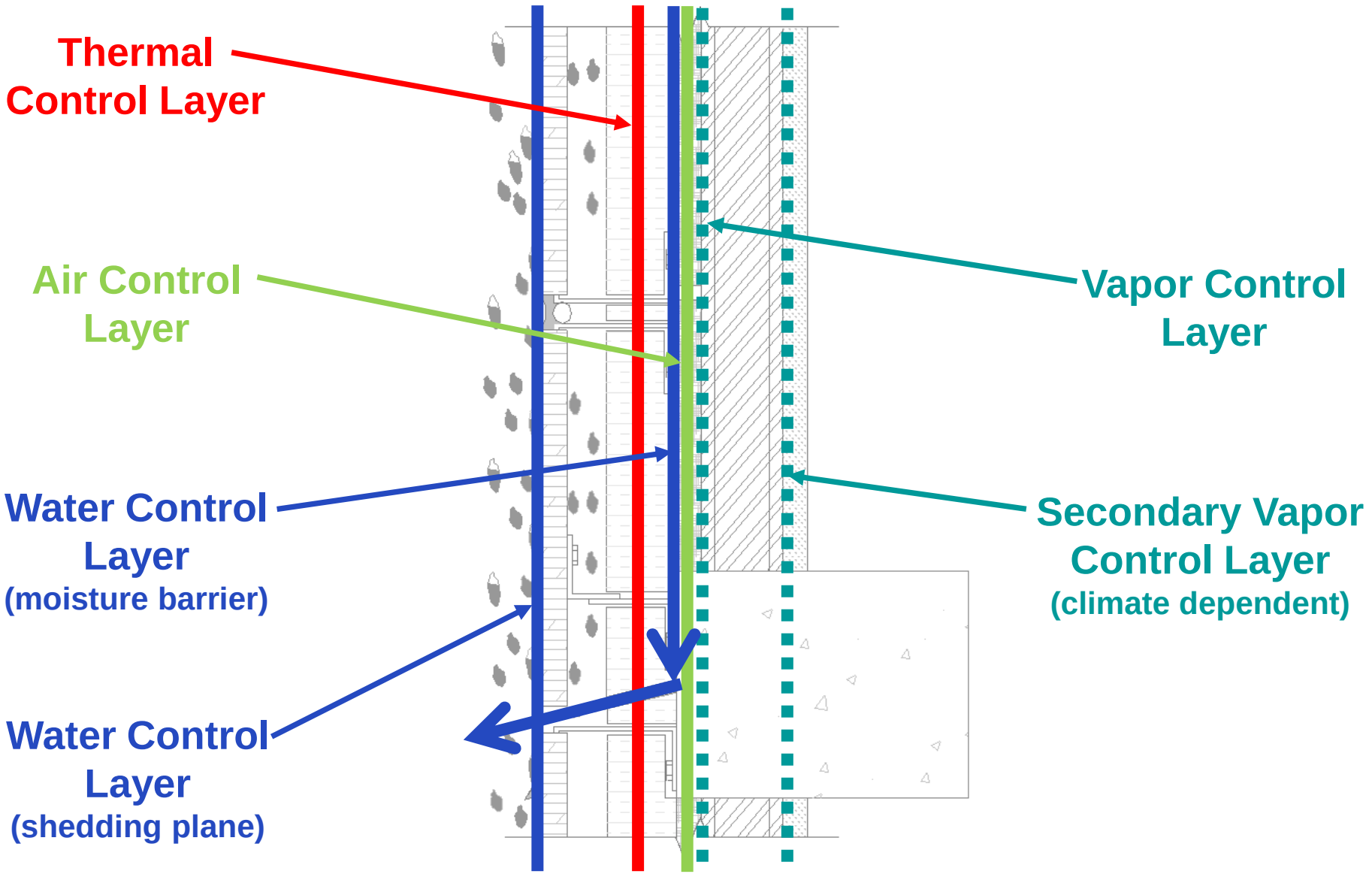
Enclosure Control Layers



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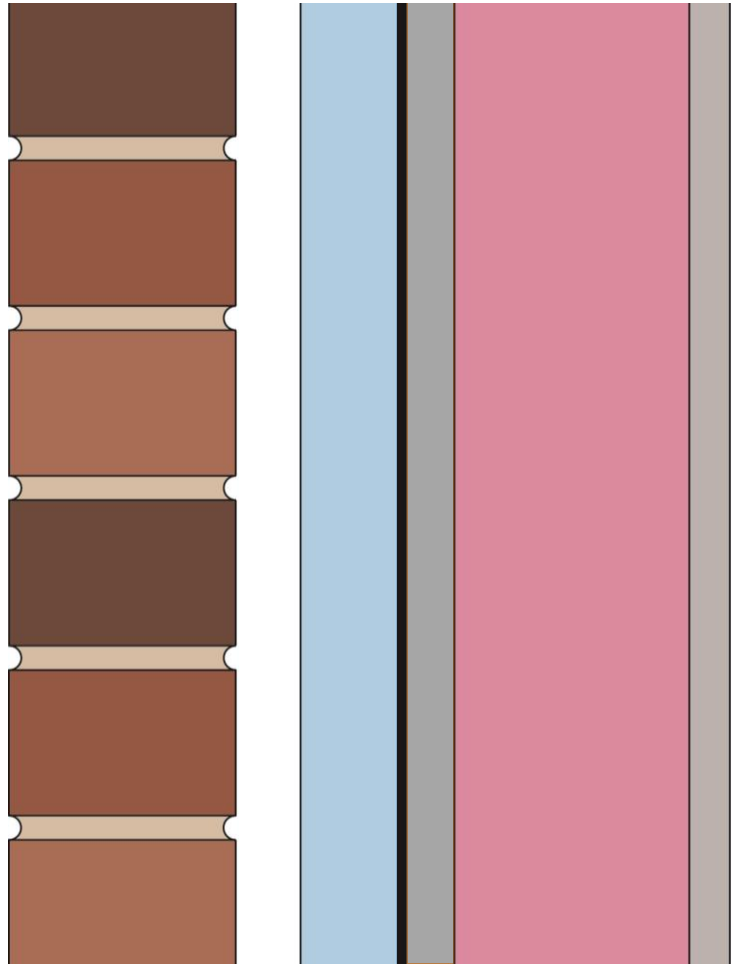
Wall Type 1

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- 1-1/2-inch Extruded Polystyrene Insulation
- varies Vapor Permeable Air/Weather Barrier
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish



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Wall Type 1

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- 1-1/2-inch Extruded Polystyrene Insulation
- varies Vapor Permeable Air/Weather Barrier
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish

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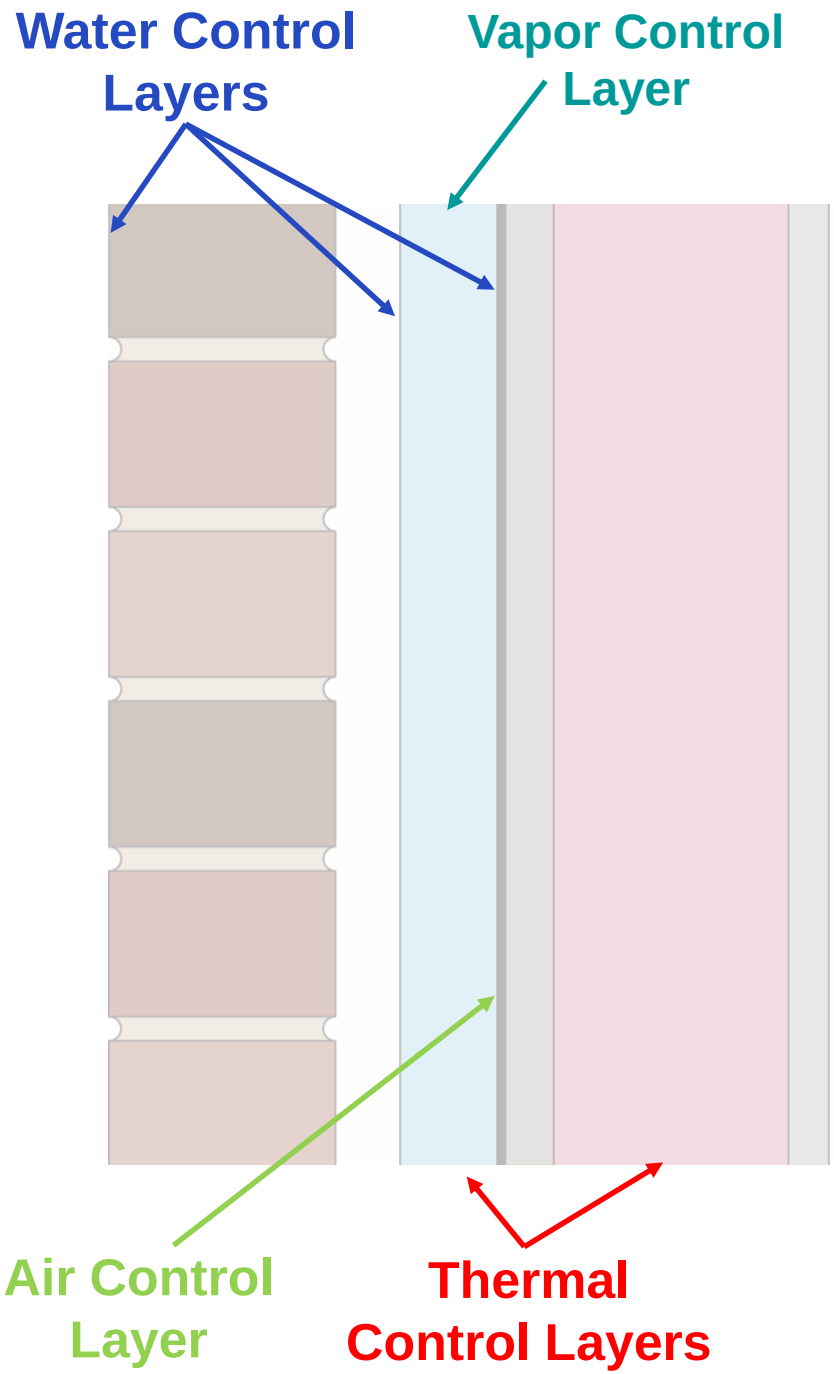
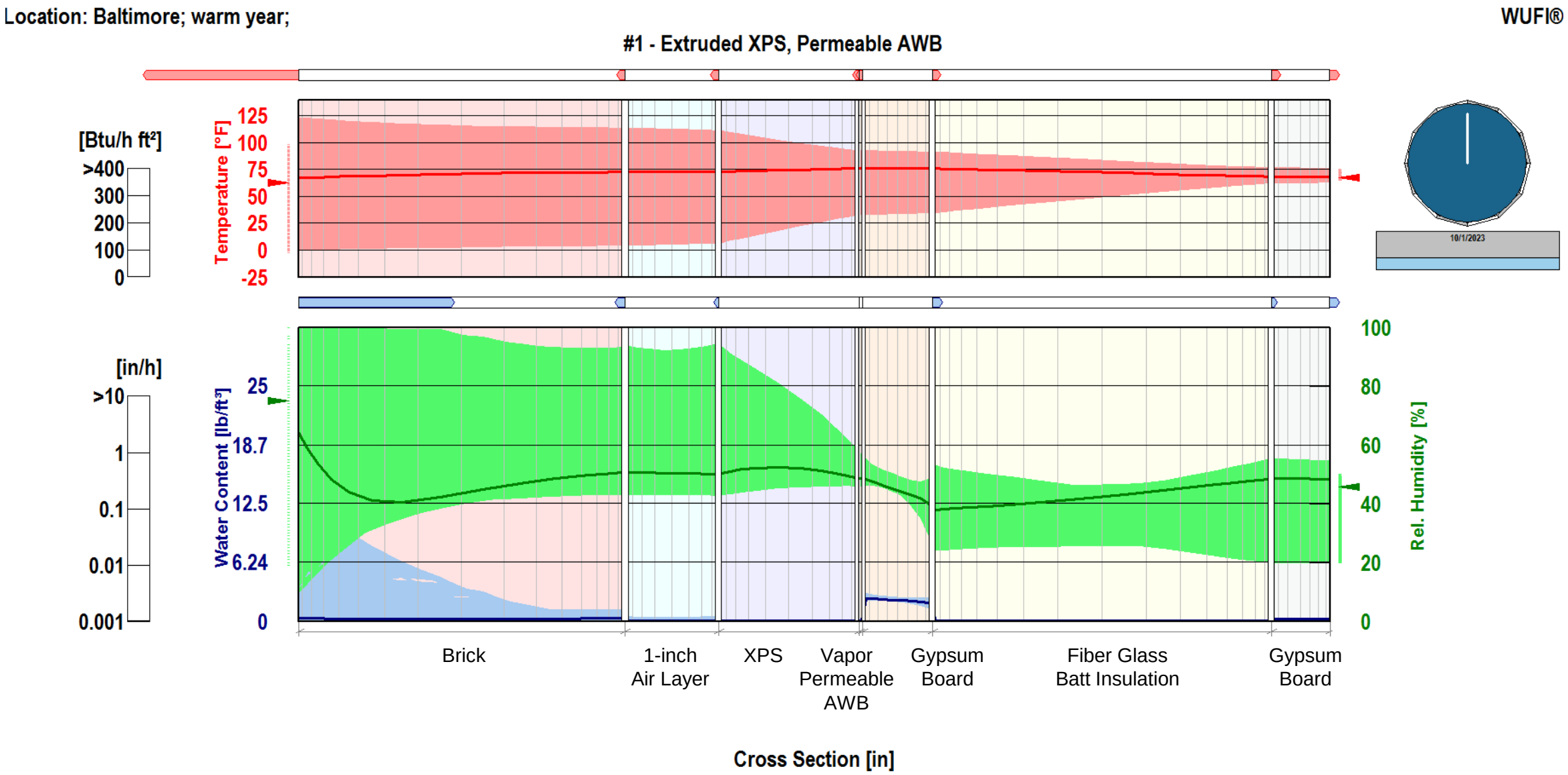
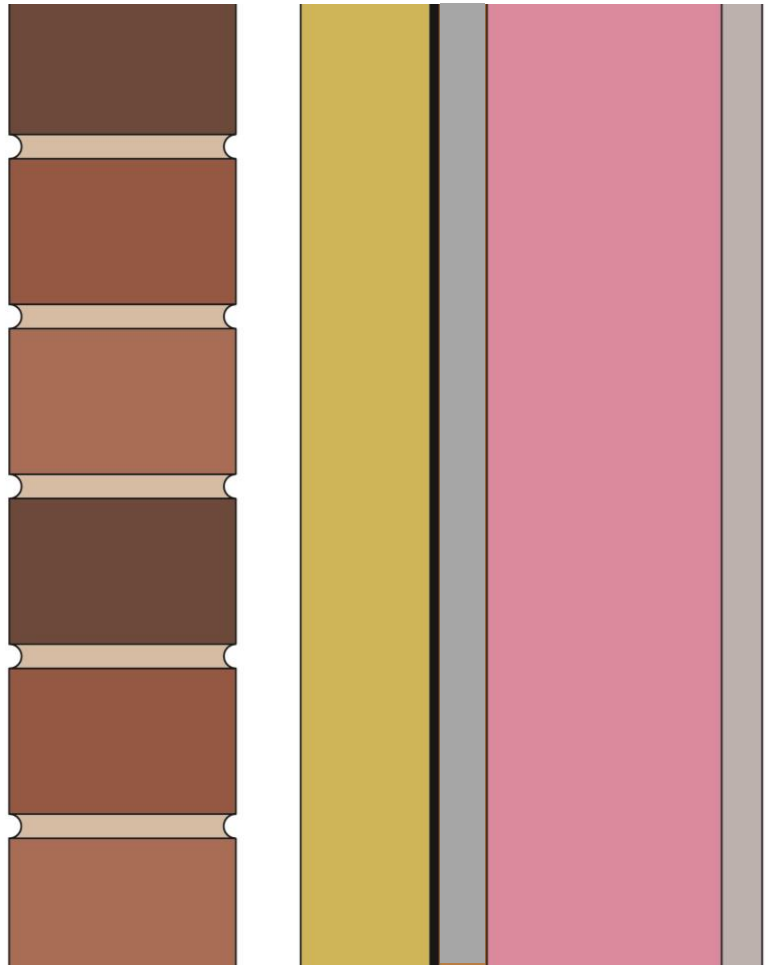


Wall Type 1 – Hygrothermal Analysis



Wall Type 2

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- **2-inches Mineral Wool Insulation**
- varies Vapor Permeable Air/Weather Barrier
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish



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Wall Type 2

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- **2-inches** **Mineral Wool Insulation**
- varies Vapor Permeable Air/Weather Barrier
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish

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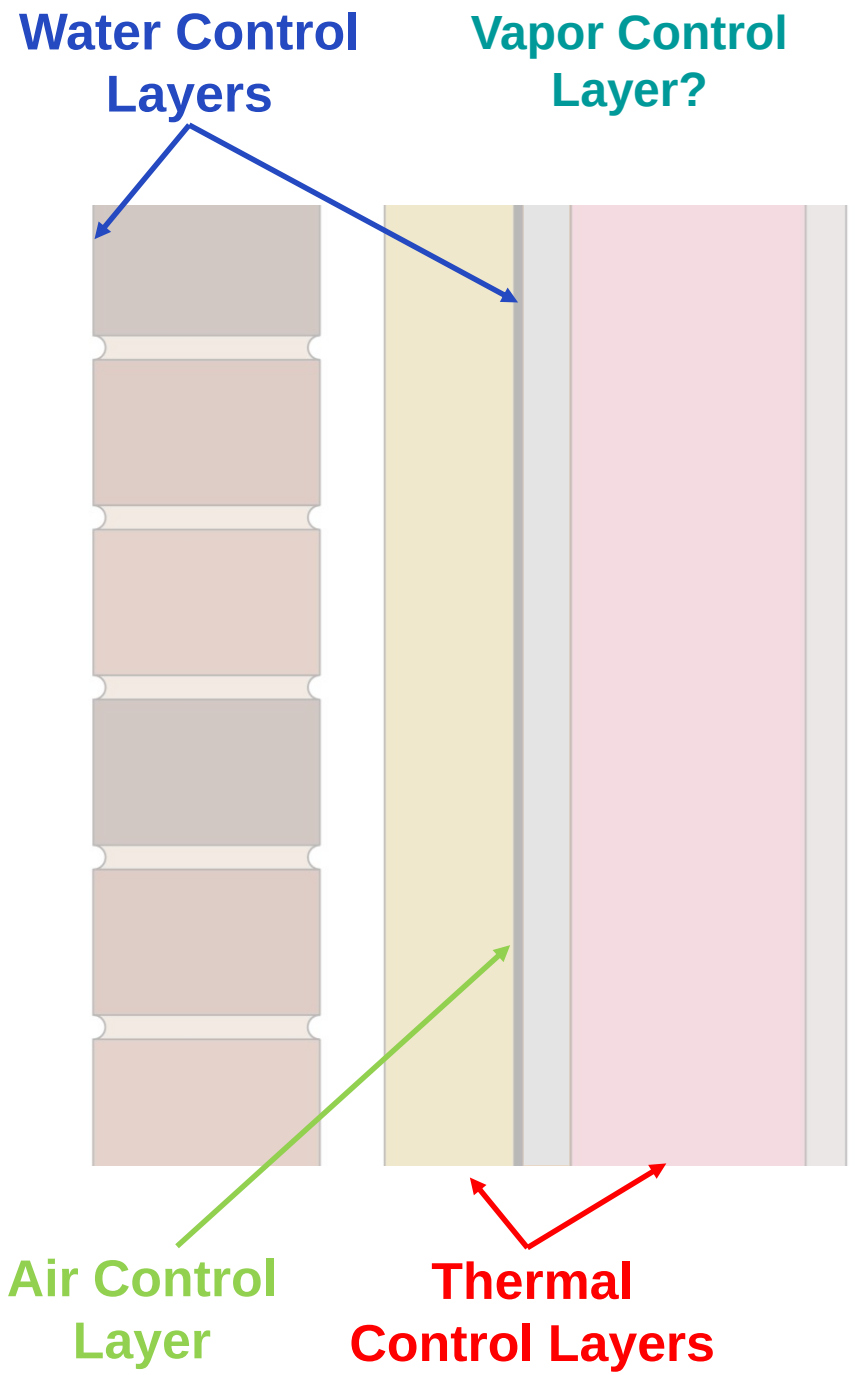
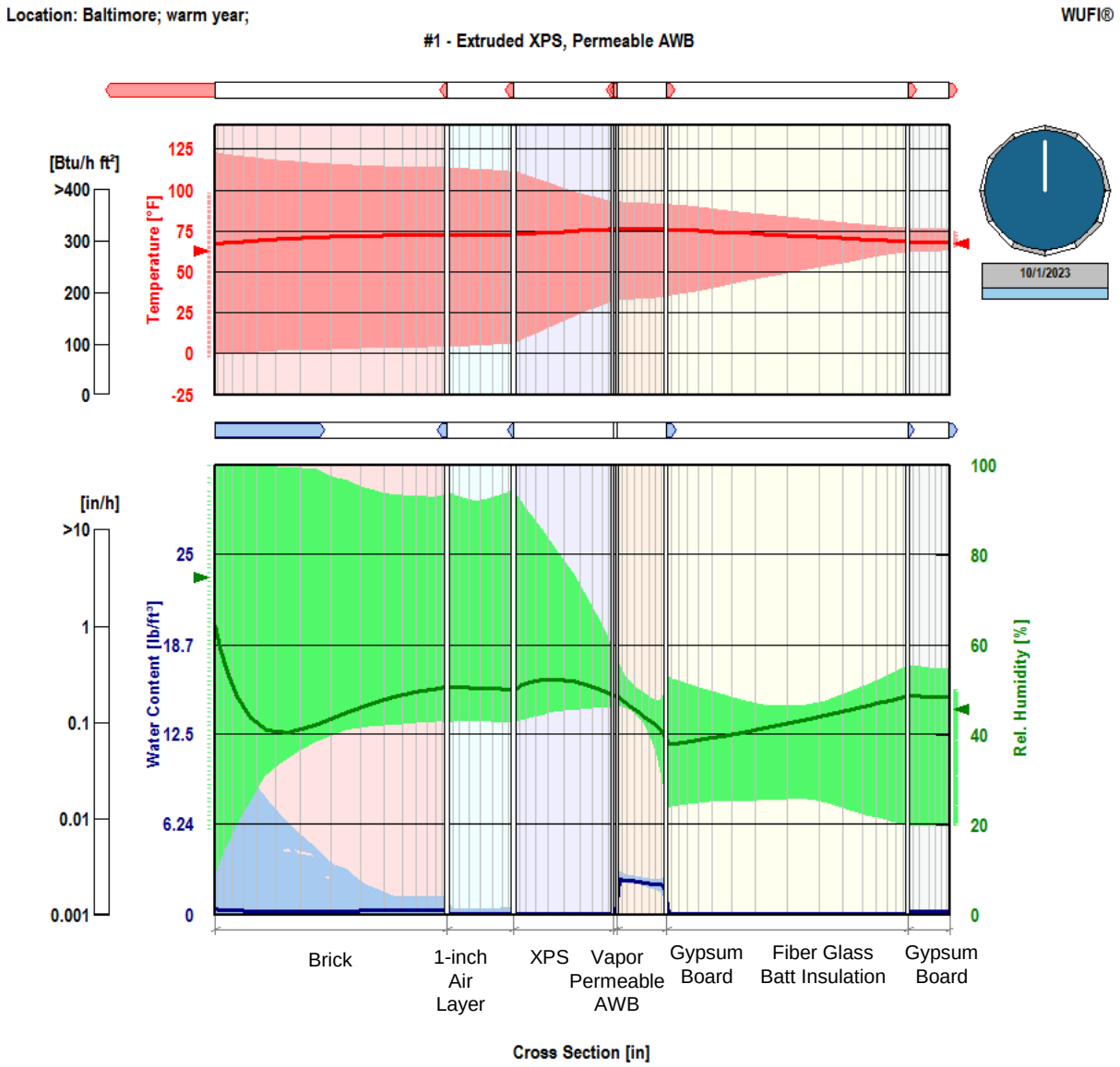
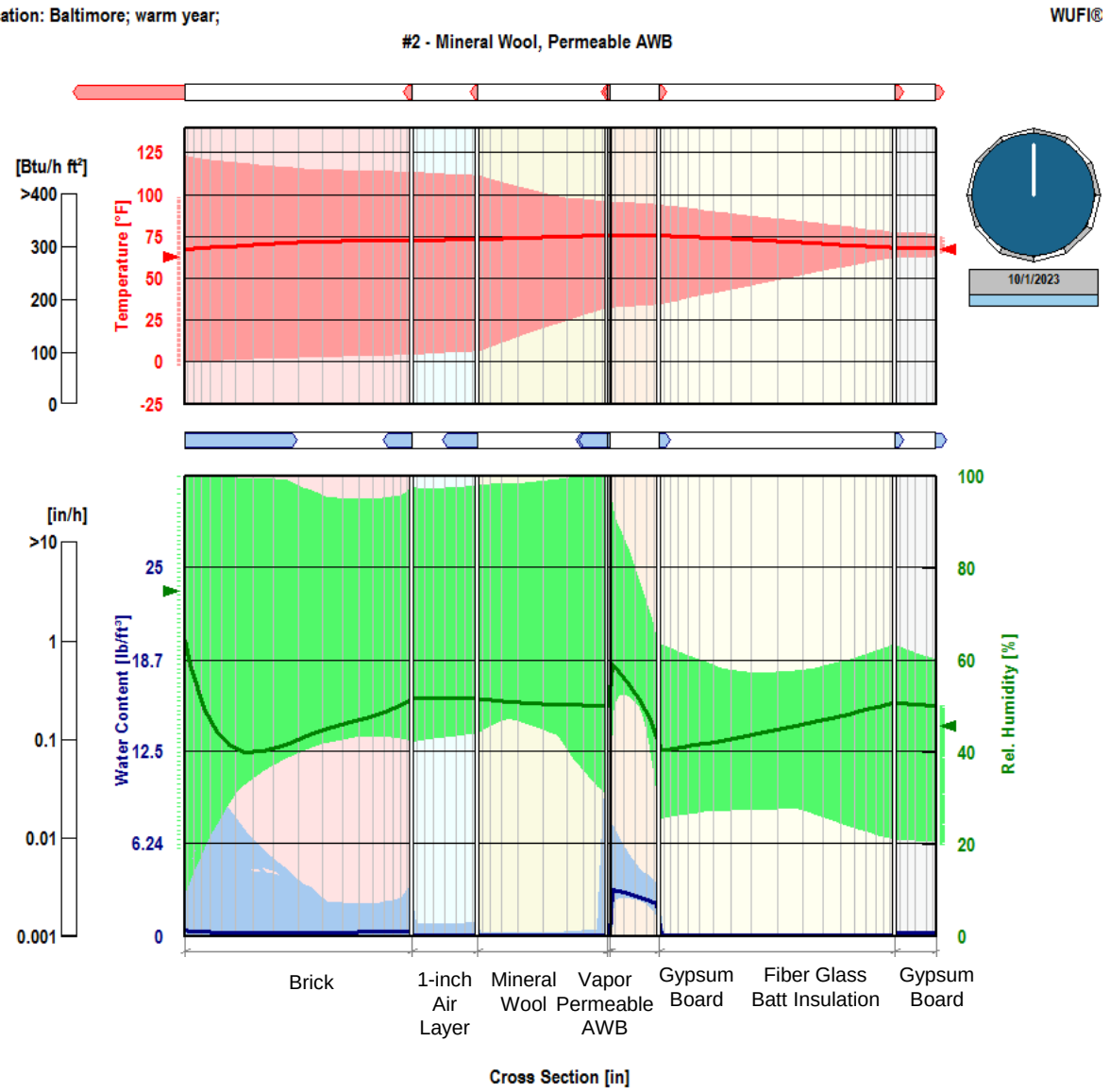


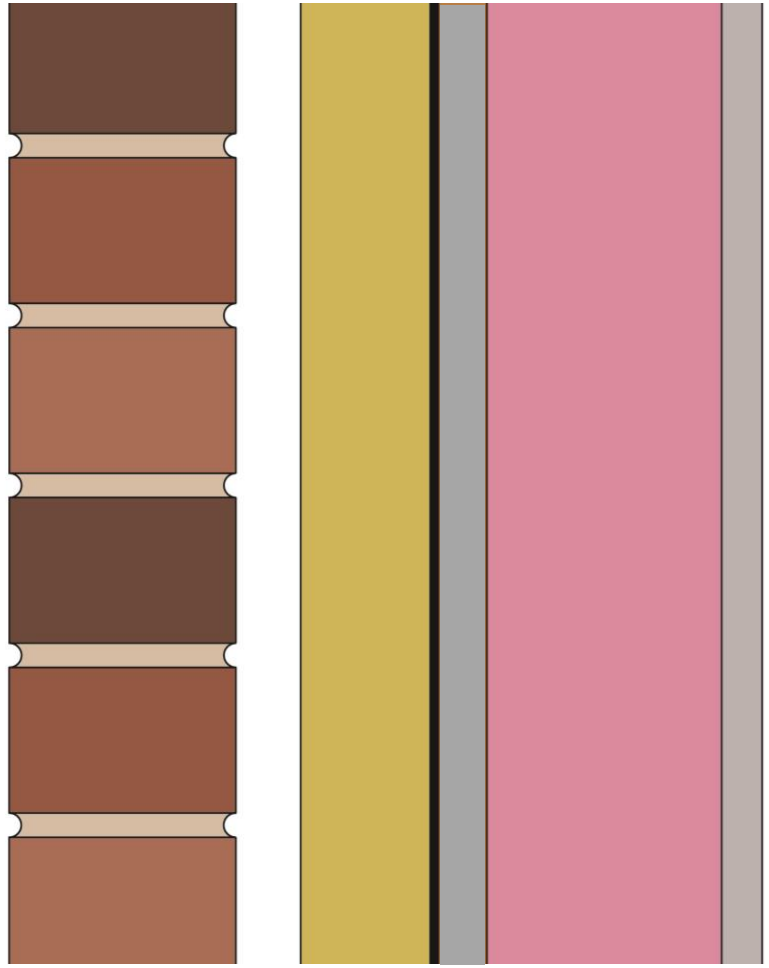
Wall Type 1 & 2 – Hygrothermal Analyses





Wall Type 3

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- 2-inches Mineral Wool Insulation
- **varies** **Vapor <u>Impermeable</u> Air/Weather Barrier**
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish



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Wall Type 3

- 3-1/2-inch Brick Masonry Cladding
- 1-inch Air Space
- 2-inches Mineral Wool Insulation
- **varies** **Vapor <u>Impermeable</u> Air/Weather Barrier**
- 5/8-inch Gypsum Board
- 3-5/8-inch Metal Stud, Fiberglass Batt Insulation
- 5/8-inch Gypsum Board with Paint Finish

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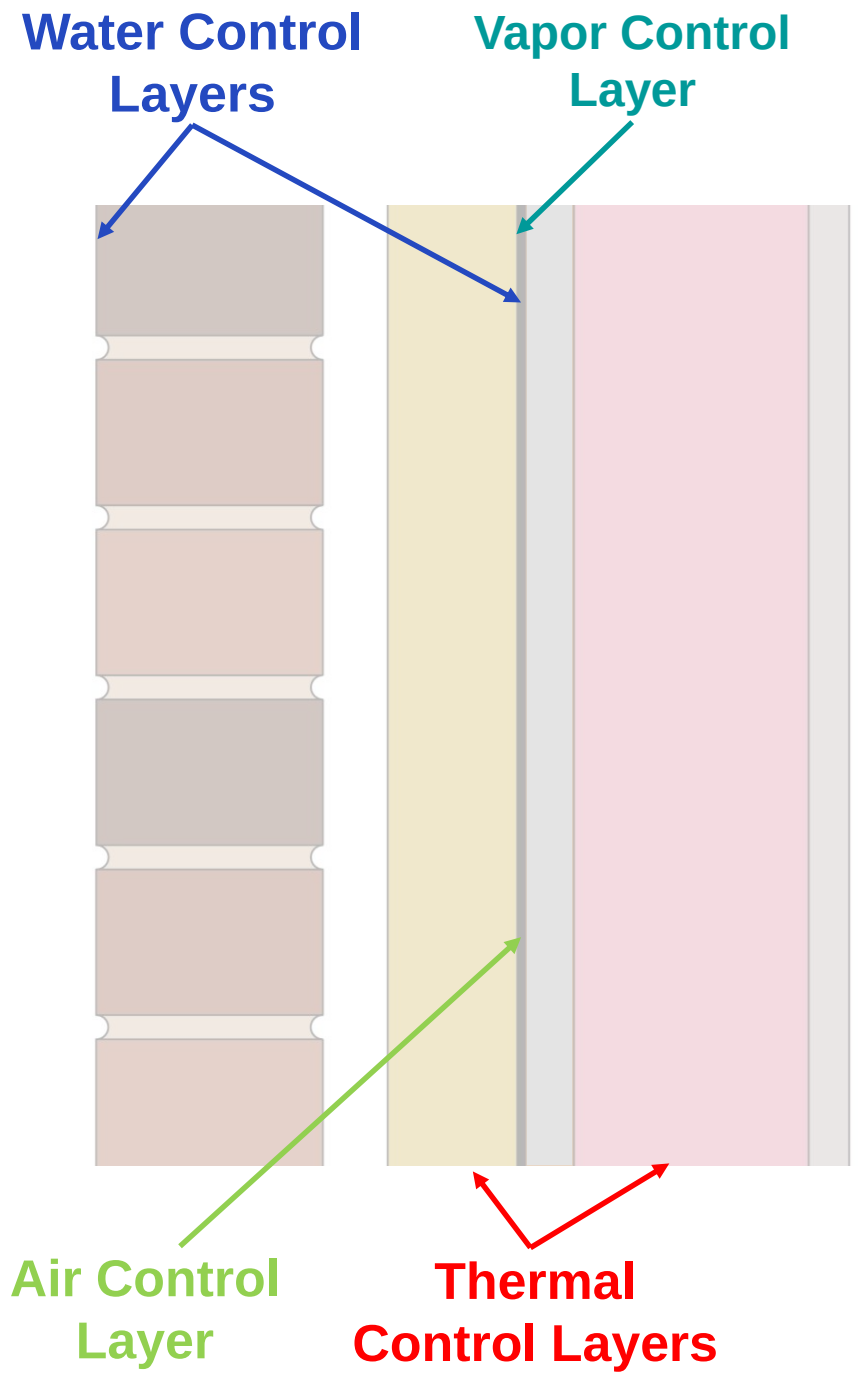
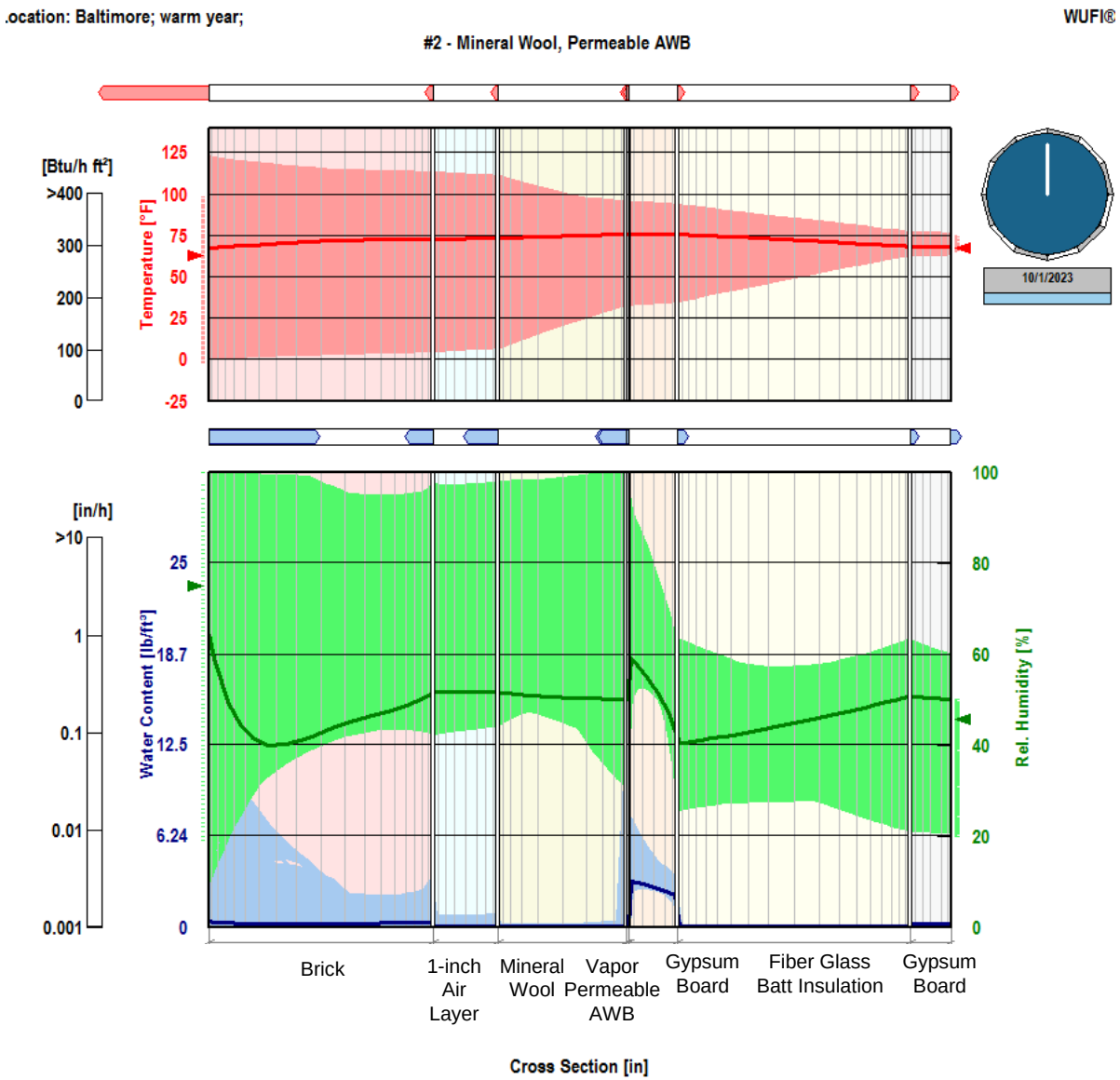
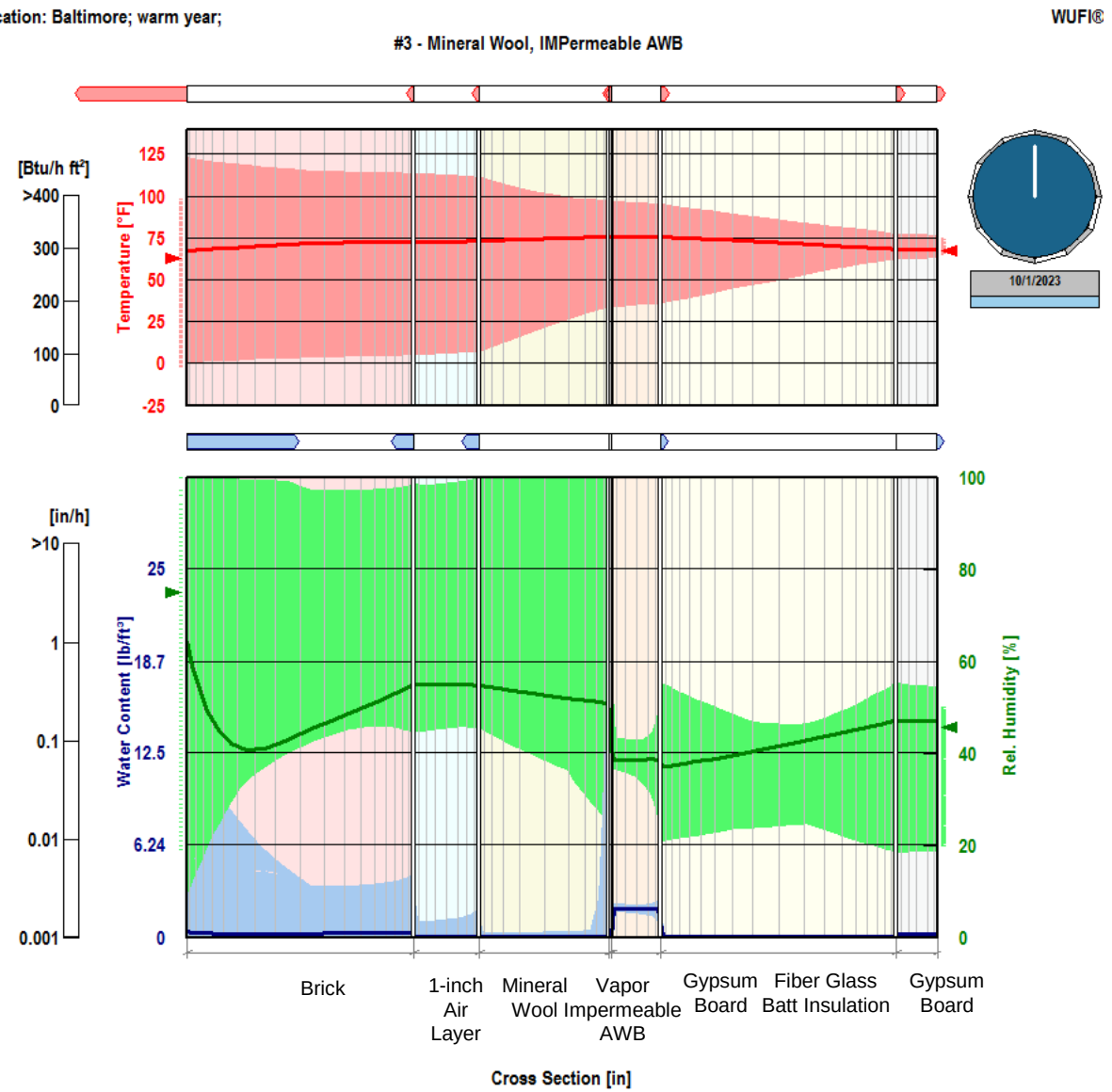


Wall Type 2 & 3 – Hygrothermal Analyses





Summary

- Goals of an exterior wall:
  - Rainwater/groundwater control
  - Condensation control
  - Energy consumption
  - Aesthetic appearance
- Meeting one performance criteria affects another
- Identify when NFPA 285 is required
- Meet NFPA 285 requirements and performance goals/requirements
- NFPA 285 impacts on component specifications and performance

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