**PROJECT ENGINEER RESPONSIBILITY:** This is a general specification guide, intended to be used by experienced construction professionals, in conjunction with good construction practice and professional judgment. This guide is to aid in the creation of a complete building specification that is to be fully reviewed and edited by the engineer. Sections of this guide should be included, edited, or omitted based on the requirements of a specific project. It is the responsibility of both the specifier and the purchaser to determine if a product or system is suitable for its intended use. Neither Owens Corning, nor any of its subsidiary or affiliated companies, assume any responsibility for the content of this specification guide relative to actual projects and specifically disclaim any and all liability for any errors or omissions in design, detail, structural capability, attachment details, shop drawings or other construction related details, whether based upon the information provided by Owens Corning or otherwise.

SECTION 07 21 13

FOAM BOARD AND BATT INSULATION

1. GENERAL
	* + 1. SUMMARY
				1. Section includes: Thermal, air and water resistive barrier wall system for cold-formed metal exterior wall assemblies:

Exterior wall steel stud cavity batt insulation.

Exterior wall insulating sheathing.

[Taped joint seal on insulating sheathing].

* + - * 1. Related Sections:

Section 05 41 00, Structural Metal Stud Framing.

Section 09 21 16, Gypsum Board Assemblies.

Section 07 26 13, Above Grade Vapor Retarders.

Section 07 27 23, Board Product Air Barriers.

* + - 1. REFERENCES
				1. Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:

American Society for Testing of Materials (ASTM):

ASTM C 272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.

ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

ASTM C 578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.

ASTM C 665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

ASTM D 1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.

ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials.

ASTM E 119: Standard Test Methods for Fire Tests of Building Constructions and Materials.

ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference.

ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.

National Fire Protection Association (NFPA):

NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

International Code Council Evaluation Service (ICC-ES):

AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.

AC 148: Acceptance Criteria for Flexible Flashing Materials.

American Architectural Manufacturers Association (AAMA):

AAMA 711: Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

* + - 1. SYSTEM DESCRIPTION
				1. Provide and install cold formed steel stud exterior wall framing [ load-bearing, non-load bearing ], [ fire resistance rated, non-rated ] system, [ with or without exterior gypsum sheathing ] [ with or without sheet or spray applied air and water resistive barrier layer over the exterior gypsum ], with continuous insulation sheathing [ foam board joints sealed or unsealed ], [ with or without fiberglass batt insulation ] in the stud cavity [ with or without a vapor retarding facer on the fiberglass ], that effectively controls thermal, air and water performance and provides continuous insulation and continuity of the building envelope. The system shall include the following:

Steel stud framing independently braced to resist vertical and transverse structural loading.

Insulating foam plastic sheathing secured to the exterior of the steel stud wall framing.

[Fiberglass batt insulation in the steel stud framing cavity].

[Joint sealing tape over the insulating sheathing joints and penetrations].

* + - * 1. All joints, penetrations and gaps of the insulating [and air barrier] wall system shall be made water [and air] tight.
				2. Code Compliance: Exterior wall system and component materials shall comply with the following requirements:

The complete exterior wall assembly shall comply with the passing criteria defined in NFPA 285 for exterior wall limited fire spread performance.

Wall and floor joints shall be fire stopped as required in International Building Code Section 714.

Insulating sheathing and foam joint sealing tape shall comply with ASTM E 2178, AC71 and AC148 for exterior wall products sealed against air and water penetration.

* + - 1. SUBMITTALS
				1. Product Data: Submit data on product characteristics, performance criteria, and limitations, including installation instructions.
				2. Sustainable Design: Submit manufacturer’s sustainable design certifications as indicated.
				3. Warranty: Submit documentation for limited product warranty. [\_\_\_ years or lifetime].
			2. QUALITY ASSURANCE
				1. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third party inspection agency used for building code qualification.
			3. DELIVERY, STORAGE, AND HANDLING
				1. Deliver materials in manufacturer’s original packaging.
				2. Store and protect products in accordance with manufacturer’s instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources. Do not install insulation that has been damaged or wet.

In the event the board insulation becomes wet, wipe dry prior to installation.

In the event the batt or blanket insulation becomes wet, remove it from jobsite.

An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

Note to Specifier: For proper fire protection of plastic foam in storage, consult the National Fire Protection Association (NFPA) standards or the authority having jurisdiction.

1. PRODUCTS
	* + 1. MANUFACTURER
				1. Owens Corning Insulating Systems, LLC, Toledo, OH 43659; [www.owenscorning.com](http://www.owenscorning.com).
			2. EXTRUDED POLYSTYRENE INSULATION
				1. Insulating Sheathing: Extruded polystyrene foam plastic insulation, unfaced, complying with ASTM C 578 and meeting the following criteria:

ASTM C 578 type [X, IV], certified by independent third party such as RADCO.

Blowing Agent Formulation: Zero ozone depleting.

Compressive Strength (ASTM D 1621): [15, 25] psi, minimum.

Edge condition: [square, tongue & groove, ship-lap].

Thermal Resistance (180 day real-time aging as mandated by ASTM C 578, measured per ASTM C 518 at mean temperature of 75F): [ R-5.0, 5.6 ] per inch of thickness, with 90% lifetime limited warranty on thermal resistance.

Water Absorption (ASTM C272): Maximum.0.10 percent by volume.

Surface Burning Characteristics (ASTM E 84): Flame spread less than 25; smoke developed less than 450, certified by independent third party such as Underwriters Laboratories.

Indoor Air Quality: Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD Children and Schools Certified℠.

Recycle Content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.

Warranty: Limited lifetime warranty covering all ASTM C578 physical properties.

* + - * 1. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:

DiversiFoam Products.

Dow Chemical Company.

Owens Corning.

Pactiv Corporation.

* + - * 1. Acceptable Products: Subject to compliance with product criteria, the products that may be incorporated into the work include but are not limited to:

[ FOAMULAR® 250; ASTM C 578 Type IV; R-5 per inch of thickness; [ 3/4”, 1”, 1-1/2”, 2”, 2-1/2”, 3”, 4” ]; [ 48”x96” or 24”x96” ]; square edge or tongue & groove up to 2” only ].

* + - * 1. Fasteners: Provide preassembled screw/stress plate fasteners recommended by their manufacturer for securing foam plastic insulating sheathing. Polymer or other corrosion-protected, coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness and fastener manufacturer recommendation.
			1. FIBERGLASS BATT INSULATION
				1. Stud Cavity Batts: Fiberglass batt insulation [faced, unfaced], complying with ASTM C665 and meeting the following criteria:

ASTM C 665 type [I (batt without facing), or II Class A (batt with nonreflective facing, flame spread 25 or less), or III Class A (batt with reflective facing, flame spread 25 or less].

Full width batt for use with steel studs spaced [16”, 24”] on center.

Thermal Resistance: Measured in accordance with ASTM C 518, R-value [11, 13, 15, 19, 21, 30]

[Factory-applied facing or Unfaced]: (If faced, choose from the following options):

[FSK (foil-scrim-kraft, Type III Class A, Category 1, facer is a vapor retarder with 0.02 water vapor permeance)]

[PSK (light-reflective white polypropylene-scrim-kraft, Type II Class A, Category 1, facer is a vapor retarder with 0.02 water vapor permeance)].

[Surface burning characteristics, ASTM E 84, flame spread 25 or less.]

[Water Vapor Permeance: Permeance of vapor retarding facings measured in accordance with ASTM E 96.]

Indoor Air Quality: Verified to be formaldehyde free by independent third party such as GreenGuard Environmental Institute, Indoor Air Quality and/or GreenGuard Children and Schools Certified

Recycle Content: Minimum 50%, certified by independent third party such as Scientific Certification Systems

Sustainable Product Certification: Verified to comply with EcoLogo Certification Criteria Document 016 for Thermal Insulation Materials (CCD-016) for environmentally preferable products

Renewable Materials: Verified to contain renewable ingredients to meet or exceed the biobased content criteria for the USDA Certified Biobased Product Label

* + - * 1. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:

CertainTeed Corporation.

Guardian Building Products.

Johns Manville.

Owens Corning.

* + - * 1. Acceptable Products: Subject to compliance with product criteria, the products that may be incorporated into the work include but are not limited to:

[EcoTouch™ Thermal Batt, unfaced;

ASTM C 665 Type I; thickness [ 3-1/2” R-11, 3-1/2” R-13, 6-1/4” R-19 ]; full width for steel stud framing 16” or 24” on center; 48” or 96” long ]

[EcoTouch™ Flame Spread 25, FSK faced;

ASTM C 665 Type III, Class A, reflective FSK faced, flame spread 25, 0.02 perm; thickness [ 3-1/2” R-11, 3-1/2” R-13, 6-1/4” R-19, 9-1/2” R-30 ]; full width for steel stud framing 16” or 24” on center; 48” or 96” long ]

[EcoTouch™ Flame Spread 25, PSK faced;

ASTM C 665 Type II, Class A, white PSK faced, flame spread 25, 0.02 perm; thickness [ 3-1/2” R-11, 3-1/2” R-13, 6-1/4” R-19, 9-1/2” R-30 ]; full width for steel stud framing 16” or 24” on center; 48” or 96” long ]

* + - 1. [TAPE]
				1. [Joint Sealing Tape: Pressure sensitive, self adhering, acrylic adhesive joint sealing tape, complying with AAMA 711, and, meeting the following criteria:]

Recommended by its manufacturer for sealing the joints of extruded polystyrene insulation board in vertical cavity wall construction

Peel Adhesion Strength: Compliant with ICC-ES AC 148 and AAMA 711

Water Resistance and Joint Sealing: Compliant with ICC-ES AC 71

Air Permeance: Air permeance less than or equal to 0.02 L/s/m2, tested in accordance with ASTM E 2178

Service Temperature: Service temperature range shall be at least 0oF to 120oF maximum

Width: Minimum 3.5 inches.

* + - * 1. [Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:

Owens Corning.]

* + - * 1. [Acceptable Products: Subject to compliance with product criteria, the products that may be incorporated into the work include but are not limited to:

JointSealR™ Foam Joint Tape; 3.5” wide, 90’ long, supplied in rolls.]

1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that steel wall studs, opening framing, bridging and structural bracing and other framing support members and anchorage have been installed in accordance with good construction practice and are compliant with this specification.
				2. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within walls have been tested and inspected.
				3. Report unacceptable conditions in writing. Do not proceed with work until unsatisfactory conditions have been corrected.
				4. Installation of products specified in this section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
			2. INSTALLATION OF EXTRUDED POLYSTYRENE INSULATING SHEATHING
				1. Install extruded polystyrene (XPS) insulation boards over [the exterior face of the steel stud framing, or exterior gypsum board sheathing, or exterior air/weather resistive barrier layer] in accordance with manufacturer's recommendations.
				2. Install XPS insulation board in maximum sizes to minimize joints. Locate joints square to framing members. Center end joints over framing. Provide additional framing as necessary.
				3. Stagger end joints a minimum of one stud space from adjacent joints.
				4. Insulation board edges shall be butted together tightly, and fit around openings and penetrations. [Install square edges to fit square and tight.] [Install horizontal ship-lap joints to fit square and tight, in shingle configuration, with the outer lap extending down and the inner lap extending up.] [Install horizontal tongue and groove joints to fit square and tight with the tongue pointing up.]
				5. Fasten the insulation board to the exterior face of the steel stud wall framing using preassembled screw/stress plate fasteners, type and length as recommended by their manufacturer for securing foam plastic insulating sheathing. Spacing shall be minimum 16” on center at the board perimeter and 24” on center in the field of the board. Drive fasteners so the stress plate is tight and flush with the board surface but do not countersink. Stress plates can bridge between adjoining board edges if the plate is a minimum of 1-3/4” diameter. Do not fasten more than two board edges with one stress plate. [Fastening requirements can be revised to suit job site conditions if the insulation board is being installed at the same time as the base units for masonry ties that will serve to secure the insulation board to the framing. Contractor must receive written confirmation from the architect before altering fastener requirements. ]
				6. [For extruded polystyrene insulation installed over spray applied or sheet applied air/water resistive barrier, verify chemical compatibility of the polystyrene board and the barrier material.] [For spray applied air/water resistive barrier material, verify manufacturer recommended cure time before installing extruded polystyrene insulation board.]
				7. Install exterior brick veneer as soon as possible, best within 60 days, to avoid possible discoloration of the foam from UV exposure. If black tape or coatings are installed over the insulation board, cover the black surfaces as soon as possible to avoid foam damage due to potential solar heat build-up on the black surface.
				8. Do not permit the extruded polystyrene insulation board to come in contact with surfaces or temperatures in excess of 165oF.
			3. [INSTALLATION OF JOINT SEALING TAPE JOINT TAPE]
				1. Install foam board joint sealing tape in accordance with manufacturer's recommendations.
				2. Insure that the extruded polystyrene board surface is smooth, clean, dry and free of contaminates. To insure best adhesion, install insulation board joint sealing tape at the same time that the panels are installed.
				3. Only install the tape when the outdoor temperatures are above 0oF, and below 120oF.
				4. Remove the release liner backing material and center the adhesive side of the tape over the joint to be sealed. Continue to remove the liner and press the tape firmly in place over the joint. CAUTION: The paper release liner is slippery and should not be walked on at any time. Dispose of the liner paper safely away from scaffolding and in a receptacle.
				5. Lap intersections or joined tapes a minimum of 3.5”.
				6. Use a J-roller or laminate roller to roll the tape firmly in place to ensure intimate contact between the tape and substrate and to eliminate trapped air between the tape and substrate.
				7. Cover tape within 60 days of application to minimize degradation due to exposure to ultraviolet sun light.
			4. INSTALLATION OF FIBERGLASS BATT STEEL STUD CAVITY INSULATION
				1. Install fiberglass batt insulation in accordance with manufacturer's recommendations and not before the exterior sheathing has been installed on one side of the stud cavity and sealed to be water resistant.
				2. Protect insulation from damage due to weather and physical abuse until protected by permanent construction.
				3. Fit batt insulation tightly into exterior wall steel stud cavity spaces and framing voids to create a continuous insulation layer without gaps. Trim to fill spaces and voids neatly. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation.
				4. Within exterior wall framing, install insulation between pipes, mechanical services, electrical boxes, and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing.
				5. [Install factory applied facing with vapor retarder membrane facing warm side of building spaces. Facing flanges (tabs) may be left unfolded for friction fit installation, or they may be unfolded and lapped over or between framing members. ]
				6. [Maintain vapor retarder integrity by tightly abutting adjacent insulation. Repair punctures or tears in vapor retarder facing by taping with a vapor retarding tape. Follow tape manufacturer's application recommendations. ]
				7. Fiberglass batt support in steel stud cavities:

[ Unfaced and faced batt ]: Tightly friction fit full width 16”, or full width 24”, batt insulation to fill the interior of the cavities between steel studs, and to completely fill the voids inside the steel stud flanges.

[Factory faced batt insulation]: Support by taping or adhering the facing flanges to the face of the steel stud. Gypsum board wall finish is applied after the facing is secured. No additional support is required.

[Unfaced batt insulation, completely filled cavity depth, both sides of the stud cavity closed]: Friction fit is adequate if the insulation completely fills the depth of the stud cavity, and the cavity is enclosed on both sides. No additional support is required

[ Unfaced batt insulation, completely filled cavity depth, one side of the stud cavity open ]: Friction fit, supplement with straps or wires, described below, installed starting 4’ above the floor and every 2’ on center above 4’.

[ Unfaced batt insulation, does not completely fill depth of stud cavity ]: Friction fit, supplement with straps or wires, described below, installed starting 4’ above the floor and every 2’ on center above 4’.

[Supplemental wire or strap supporting devices]: Multiple types of support devices may be used. Wires can be inserted through the batts extending from stud to stud. The wires may be installed continuously through the punch outs of the steel stud framing. Or, heavy gauge wire may be cut slightly larger than each stud space and wedged into place between studs. When the insulation is less than the depth of the stud cavity, the wires should be positioned to hold the batt against the sheathing (gypsum of foam plastic) on the opposite side of the cavity. Another option is the use of punched metal straps attached to the face of the framing. The punched pronged tabs are bent 90 degrees pointing into the stud cavity and are pushed into the insulation after installation. The punched prongs impale the insulation batt and hold it in place.

END OF SECTION

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