STYROFOAM™ BRAND ULTRA SL

Air Barrier Wall System w/ Flashing Tape
Installation of Rigid Foam on CMU Backup

May 2013

SPEC NOTE: Insert the required paragraphs into the Section under the noted Articles, and make any required selections. Where selection is indicated with an [OR] statement, select the appropriate paragraph and delete the inappropriate statement. Delete all SPEC NOTEs and [OR] statements prior to final printing

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes
   1. Foam-plastic board insulation for cavity wall, and concealed building insulation.

B. Related Sections
   1. Division 04 "Unit Masonry": for insulation in cavity walls.
   2. Division 06 "Sheathing" for foam-plastic board sheathing over CMU substrate.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Potential LEED Prerequisites & Credits:
   1. EA Prerequisite 2: Minimum Energy Performance, Insulation products such as STYROFOAM™ extruded polystyrene foam insulation from Dow Building Solutions helps satisfy the insulation requirements for the walls, roofs, foundations and reduce air infiltration through the building envelope for compliance options 1 (ASHRAE 90.1 2007), 2 (ASHRAE Advanced Design Guides), or 3 (Advanced Buildings™ Core Performance™ Guide).
   2. EA Credit 1: Optimize Energy Performance, 1-19 Points (Core & Shell, 3-21 Points). Insulation products such as STYROFOAM™ extruded polystyrene foam insulation from Dow Building Solutions helps satisfy or exceed the insulation requirements for the walls, roofs, foundations and reduce air infiltration through the building envelope for compliance options 1 (ASHRAE 90.1 2007), 2 (ASHRAE Advanced Design Guides), or 3 (Advance Buildings™ Core Performance™ Guide).
   3. MR Credit 3: Material Reuse, 1-2 Points.

STYROFOAM™ extruded polystyrene foam insulation is reusable. Walls, roofs and foundations consisting of STYROFOAM™ extruded polystyrene foam insulation products from Dow Building Solutions is long lasting and can often be reused when designed and installed properly.

4. MR Credit 5: Regional Materials, 1-2 Points.
   Dow Building Solutions products are manufactured in locations throughout North America. Depending on the location of the project, products from Dow may satisfy the requirement of using products within 500 miles of the project site.
5. IEQ Credit 2: Increased Ventilation, 1 Point.
   Indoor air quality is directly related to managing air flow and removing uncontrolled air leakage, which optimizes HVAC systems. STYROFOAM™ extruded polystyrene insulation from Dow helps reduce the uncontrolled air infiltration needed to meet ASHRAE 62.1-2007 requirements.
6. IEQ Credit 7: Thermal Comfort Design, 1 Point.
   Insulation products such as STYROFOAM™ extruded polystyrene foam insulation from Dow Building Solutions helps satisfy the insulation requirements for the walls, roofs, foundations and reduce air infiltration around the building envelope. The well insulated and sealed building envelope can help meet the ASHRAE 55.2 Thermal Environmental Design standards to provide comfort for building occupants.
7. IEQ Credit 10: Mold Prevention, 1 Point (Schools only).
   STYROFOAM™ extruded polystyrene foam insulation from Dow Building Solutions can be used as continuous or cavity insulation and as a water resistive barrier with joints sealed to meet ASHRAE 90.1-2007 building envelope insulation requirements and manage the dew point potential in the wall and roof assembly to minimize the potential for mold indoors and within the building assembly. The insulation products from Dow Building Solutions are not known nutrient sources to support mold growth.
8. ID Credit 1: Innovation in Design, 1-5 Points.
   Cradle to Cradle Life cycle certification has been achieved for STYROFOAM™ extruded polystyrene foam insulation from Dow Building Solutions. Projects with certified products have the potential to earn 1 Innovation in Design Point.

C. Manufacturer's product literature, including specified physical properties.

D. Installation instructions.

E. Certification that product complies with specification requirements and is suitable for the use indicated.

1.4 QUALITY ASSURANCE

A. Cavity Wall Insulation shall not be produced with, or contain, any of the United States EPA regulated CFC Compounds listed in the Montreal Protocol of the United Nations Environmental Program.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Indentify products with appropriate markings of applicable testing agency.

C. Air Barrier Performance: Provide insulation and related materials with information from manufacturer indicating insulation has passed testing with ASTM E2178-13 "Standard Test Method for determining Air Leakage for building materials and/or the assembly has passed testing in accordance with ASTM E2357-05, "Standard Test Method for Determining Air Leakage of Air Barrier Assemblies".

D. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

1.5 SYSTEM DESCRIPTION

A. Furnish and install an exterior wall system that effectively controls thermal, air and water performance and provides continuity of the building envelope enclosure. The system shall include the following:
   1. Insulated sheathing secured to the exterior of the CMU wall substrate.
   2. Joint, penetration and gap sealing material for sealing component joints, penetrations through the wall system and gaps between the building envelope enclosure components and wall opening frames.
   3. Exterior veneer to be a concrete based veneer to include 4" brick, 2" concrete, 4" concrete masonry units (max. 2" air gap), 2" stone veneer and 1-1/4" terracotta cladding.

B. Performance Characteristics:
   1. Air barrier performance: When tested in accordance with ASTM E2357, at a test pressure of not less than 6.24 psf, air infiltration shall not exceed 0.04 cfm per square foot (0.2 L/s*m2) of fixed wall area. Testing should be conducted at positive and negative sustained wind loading of 12.5psf (600Pa) for one-hour duration in each direction, pressure cycling of the wall at 2000 cycles in both the positive and negative direction, ending with wind gust loading at 25psf.
   2. Water penetration: When tested in accordance with ASTM E331, no uncontrolled water penetration shall occur at a minimum differential pressure of 6.24 psf for minimum test duration of 2hrs.
   3. Mold resistance: Thermal wall [and air barrier] system components shall provide non-food source for fungal growth.
   4. All joints, penetrations and gaps of the thermal (and air barrier) wall system shall be made watertight (and air-tight).

C. Reference Standards:
   1. ASTM C518- Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
   2. ASTM D1621- Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   3. ASTM E96- Standard Test Methods for Water Vapor Transmission of Materials.

4. ASTM D696- Standard Test Method Expansion of Plastics between -30degrees C and 30degrees C with a Vitreous Silica Dilatometer.
5. ASTM C203- Standard Test Methods for Breaking Load and flexural Properties of Block-type thermal Insulation.
6. ASTM D2126- Standard Test Method for Response of Rigid Cellular Plastics to thermal and Humid Aging.
7. ASTM D2842- Standard Test Method for Water Absorption of rigid Cellular Plastics.
8. CAN/ULC S701 type 3.
9. ASTM E331-[00]: Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors By Uniform Static Air Pressure Difference.

D. Code Compliance:
1. Meets IBC/IRC requirements for foam plastic insulation; see ICC-ES ESR 2142.
2. BOCA-ES RR 21-02
3. Underwriters Laboratories, Inc. (UL) Classified, see Classification Certificate D369.
4. National Building Code of Canada.
5. CCMC- Evaluation Listing #11420-L.

E. Fire Resistance:
1. System complies with NFPA 285 [2006, 2009 & 2012]: Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Bearing/Non-Load Bearing Wall Assemblies (verify rating) Containing Combustible components Using the Intermediate-Scale, Multistory Test Apparatus.

F. Joint Treatment
1. All joints, penetrations and gaps of the thermal [and air barrier] wall system shall be made watertight [and air-tight].

1.6 INFORMATIONAL SUBMITTALS

A. Product test reports.
B. Research/evaluation reports.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation from physical damage and from deterioration due to moisture, soiling and other sources. Store inside and in a dry location.

B. Comply with manufacturer’s recommendations for handling, storage and protection.

C. Handle boards carefully so corners are not broken off or boards otherwise damaged.

D. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment. Exposure time is limited to 90 days duration.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to project site before installation time.
3. Quickly complete installation and concealment of foam-plastic board installation in each area of construction.

1.8 PROJECT CONDITIONS

A. Environmental Requirements: Install Thermal and Air Barrier Wall System work only when weather conditions are in compliance with Manufacturer's specific environmental requirements and conditions will permit work to be performed in accordance with manufacturers recommended minimum surface temperatures.

1.9 WARRANTY

A. Provide written warranty that the actual thermal resistance of the extruded polystyrene foam insulation will not vary by more than 10% from its published thermal resistance.

B. In the United States, a 50-year thermal limited warranty is available on STYROFOAM™ Extruded Polystyrene Foam Insulation products 1.5 inches and greater, that for a period of fifty (50) years, commencing with the date of manufacture printed on the unit label or insulation, that the insulation's actual thermal resistance will not vary by more than ten (10) percent from the minimum R-value identified in ASTM C578. For thicknesses less than 1.5 inches, other warranties may apply. Warranties are available as described at http://building.dow.com/na/en/tools/warranty.htm.

C. Flashing Tape: Limited Warranty.

PART 2- PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
1. Rigid closed cell extruded polystyrene foam insulation.
2. Comply with ASTM C 578-95, Type IV, density 1.6 lb/cu. ft. min. compressive resistance 25 psi (ASTM D 1621-94)
3. Thermal resistance: R-values of 6.0 and 5.6 min. per inch °F-ft^2-h/Btu^2/inch at 40 °F and 75 °F respectively (ASTM C 518-98).
4. Water absorption: Max. 0.1% by volume (ASTM C 272-91 (96)).
5. Surface Burning Characteristics (ASTM C 578-95)
   a. Flame spread: 0.
   b. Smoke Developed: 155.

B. Panel dimensions: nominal thickness: 1.75", 2.125", 2.5", & 3.0" (custom thickness available- check

with manufacturer)- board size: 48"x96" (ship lap edges on long dimension).

C. Acceptable manufacturer's product: The Dow Chemical Company STYROFOAM™ BRAND Ultra SL Extruded Polystyrene Foam Insulation or approved equal.

2.2 JOINT FLASHING TAPE

A. Tape: Provide insulation manufacturer's recommended board joint tape for sealing joints, seams and veneer tie penetrations through the insulation layer. The Dow Chemical Company WEATHERMATE™ Straight Flashing Tape with butyl rubber adhesive.

B. Approved equal.

2.3 ADHESIVE

A. Adhesive: The Dow Chemical Company GREAT STUFF PRO™ Gaps & Cracks single component insulating foam sealant.

B. Approved equal.

2.4 ACCESSORIES

1. Fasteners: Provide insulated sheathing manufacturer's recommended polymer or other corrosion protective coated steel screw fasteners for securing the rigid foam sheathing to CMU back-up wall. Fastener length and size based on wall thickness and fastening requirements. Wall Anchors and/or Fasteners should not exceed a maximum distance of 8" from any insulation board edge when used as part of the fastening pattern installation.
   a. Acceptable Products: Rodenhouse Inc. w/ 1-3/4 inch diameter high-grade plastic washers.
   b. Approved equal: Windlock D1621 series.
2. Wall Opening Flashing: Provide insulated sheathing manufacturer's recommended flashing sealing window and door wall openings.
   a. Acceptable Products: The Dow Chemical Company "WEATHERMATE™ Straight Flashing Tape, with butyl rubber adhesive, at straight opening heads, jambs and sills.
   b. When greater widths are required for through wall flashings butyl rubber adhesive is recommended.
3. Penetration Filler: Provide insulated sheathing manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.
   a. Acceptable Products: The Dow Chemical Company "GREAT STUFF PRO™ Gaps & Cracks" single component polyurethane insulating foam sealant.
   b. Acceptable Products: The Dow Chemical Company "GREAT STUFF PRO™ Window & Door" single component polyurethane low-pressure foam sealant.
4. Gap Air Infiltration Filler: Two Component, Quick Cure Polyurethane Foam:
   a. Acceptable Products: The Dow Chemical Company FROTH-PAK™ Foam Insulation two component, quick-cure polyurethane foam
      1) NFPA 286 Approval for Exposed use to the interior of the building without the need

for a 15-min thermal barrier.
2) ASTM E-84 Class A

5. Flexible polyethylene foam gasketing strip to reduce air infiltration between a concrete foundation and sill plate.
   a. Acceptable Products: The Dow Chemical Company "STYROFOAM™ Sill Seal Foam Gasket.
6. Wall anchors: Provide wall anchors for attachment through the rigid foam sheathing. Verify anchor size and installation pattern with manufacturer. CMU to be pre-drilled for installation of anchors. As a suggested installation for anchors- use hammer drill and "Pos-i-tie" drill and sleeve combination. Wall anchors and/or fasteners should not exceed a maximum distance of 8" from any insulation board edge when used as part of the fastening pattern installation.
   a. Acceptable Products: Tested masonry anchors- Heckmann "Pos-i-tie ThermalClip™" single barrel tie tested & approved with the Dow NFPA 285 and ASTM 2357 & E331 tests including #75-TC thermal clips at each anchor for thermal break characteristics.
7. Adhesive for bonding insulation: Product recommended, approved, and warranted by insulation manufacturer without damaging insulation and substrates.

PART 3 – EXECUTION

3.1 INSPECTION & PREPARATION

A. Examine substrates and installation conditions for compliance with requirements for installation conditions affecting performance of the work.

1. Verify that masonry joints are struck flush and that other conditions are satisfactory for proper installation.
2. Remove concrete fins and mortar projections that interfere with placement of insulation boards.
3. Do not install while raining
4. Verify that CMU walls, opening framing, bridging, bracing and other framing support members and anchorage have been installed within thermal wall system alignment tolerances and requirements.
5. Verify that items required to penetrate the thermal wall system are placed and penetration gaps and cracks are properly sealed.
6. Do not proceed with thermal and air barrier wall system installation until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION OF CAVITY WALL INSULATION

A. Install insulation in accordance with manufacturer's recommendations. Fasten to exterior face of CMU wall framing using sheathing manufacturer's recommended type and length screw fasteners with washers. Abut panels tightly together and around openings and penetrations.

1. Install sheathing panels with length of boards oriented horizontally or vertically (ship-lapped edges)**.** To allow for staggering of joints cut first insulation board in half to a 2'x8' or 4'x4' dimension depending on chosen orientation. Use maximum lengths to minimize number of joints. For the first course of rigid insulation provide a continuous 1" bead of Great Stuff Pro™ Gaps & Cracks Insulating Foam Sealant from Dow so that the bottom edge on each insulation board will seat and create a seal between the bottom face of the foam and the foundation. Do this for the bottom course of insulation only. If installing base flashing use "Rodenhouse" fasteners in place of "Pos-i-tie" for first row from the bottom. This will allow for a flush mount of the installed base flashing. Insulation needs to be continuous with no interruptions full height and width of cavity. Use a table saw, skill saw and/or drywall trim saw when cutting insulation to ensure tight joints for quality of installation in achieving an air barrier system.
2. Insulation panels are fastened to the CMU substrate by using a mixture of wall fasteners and anchors. Use a minimum amount of wall fasteners to hold insulation in place until the anchors are installed. Drill pilot holes into the CMU substrate for installation of wall anchors- using a drill adapter, screw anchors into pilot holes until neoprene washers are seated firmly against the rigid insulation. The wall anchor installation pattern is based on a horizontal and vertical spacing of 16" centers to comply with the ASTM 2357 air barrier testing requirements. If the noted fastening pattern for the wall anchors cannot be adhered to then additional wall fasteners will need to be added to the assembly to ensure that all board edges have an anchor or fastener within 8" of all board edges. Do not countersink perimeter wall fasteners- they can be detailed to bridge the gap of abutting board joints due to the 1.75" diameter of the washer used to fasten the board to the studs. Maximum of two board joints may be bridged per wall fastener.
3. Wall ties shall be inserted through insulation board according to manufacturers instructions. Do not allow shaft of fastener to "drift" or "wobble". Rubber washer on back of pintle shaft is intended to seal shaft hole in foam board, insulation.
4. Install flashing joint tape at end and edge joints with sufficient hand pressure to ensure seal and in accordance with sheathing manufacturer's joint sealing recommendations.
5. Install flashing tape behind wall tie and mechanical fastening assemblies for rain screen claddings.
6. Seal sheathing joints and penetrations of sheathing in accordance with sheathing manufacturer's joint and penetration sealing recommendations.
7. Rigid foam shall be installed tight against the substrate both at the top and all edges. If not fill gaps with Great Stuff Pro™ Gaps & Cracks Insulating Foam Sealant or Froth-Pak™ Foam Insulation from Dow not exceeding manufacturer's product limitations. Openings greater than 2" are to be filled with rigid foam insulation pieces fastened to the CMU substrate per standard attachment methodology. Where the through-wall flashing is installed behind the rigid insulation use WEATHERMATE™Straight Flashing Tape 4" wide from Dow with butyl rubber adhesive as a counter flashing. Install a bead of Great Stuff Pro™ Gaps & Cracks Insulating Foam Sealant from Dow at the top of the counter flashing to provide the required air barrier performance characteristics.
8. For masonry and similar veneers install thermal clips on anchors for thermal isolation.

B. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

3.3 CLEAN-UP

A. Remove and dispose of excess insulation, wrappings and other waste materials.

END OF SECTION

STYROFOAM™ Brand Extruded Polystyrene Foam Insulation
CAUTION: This product is combustible. Protect from high heat sources. A protective barrier or thermal barrier may be required as specified in the appropriate building code. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989 636-4400 in the U.S. or 1-519-339-3711 in Canada.

Dow Polyurethane Foam Insulation and Sealants:
CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240ºF (116ºC). For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada

FROTH-PAK™ Spray Polyurethane Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing (including long sleeves), gloves, goggles or safety glasses, and proper respiratory protection.

Do not breathe vapor or mist. Use only with adequate ventilation. It is recommended that applicators and those working in the spray area wear respiratory protection. Increased ventilation significantly reduces the potential for isocyanate exposure; however, supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a particulate filter may still be required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure, air-supplying respirator (air line or self-contained breathing apparatus). Spraying large amounts of foam indoors may require the use of a positive pressure, air-supplying respirator. Contents under pressure.

GREAT STUFF PRO™ Insulating Foam Sealant products contain isocyanate and a flammable blowing agent. Read the label and Material Safety Data Sheet carefully before use. Eliminate all sources of ignition before use. Wear long sleeves, gloves, and safety glasses or goggles. Provide adequate ventilation or wear proper respiratory protection. Contents under pressure.

CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product

CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240ºF (116ºC). For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

Sheet carefully before use. Eliminate all sources of ignition before use. Wear long sleeves, gloves, and safety glasses or goggles. Provide adequate ventilation or wear proper respiratory protection. Contents

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