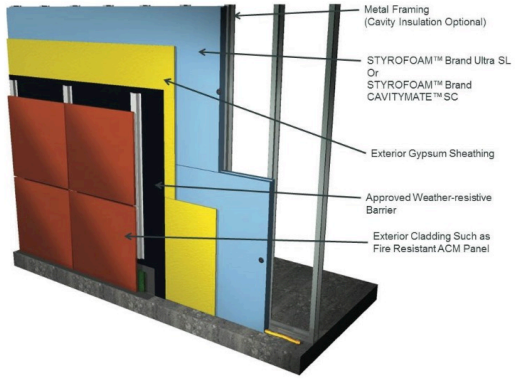
Rainscreen Cladding with Inverted Wall System and Metal Stud Backup

Item	Component	Thickness	Manufacturer	Product
1	Interior Finish *(vapor permeable)*	0”	-	-
2	Interior Gypsum Board	5/8”	-	Type X
3	Metal Stud *(18 GA. Min. @16” O.C.)*	6”	-	-
3A[1]	Stud Cavity Insulation *(Optional)*	6”	-	Fiberglass Batt
4[1]	Continuous Insulation	2 1/2”	Dow	Styrofoam Ultra
5	Exterior Gypsum Sheathing	5/8”	-	Type X
6[1]	Fluid Applied Air/Water Barrier	40mils	Carlisle	Barritech VP
7	Cladding Attachment System	1 1/2”	Knight Wall	HCI System
8[1]	Rainscreen Cladding	-	-	NFPA 285 Compliant
	Total	**-**		



[1] *Product recommendations are based on Type I-IV construction requiring NFPA 285 assembly acceptance criteria compliance per IBC 2015 Sections 1403.5 & 2603.5.5.*

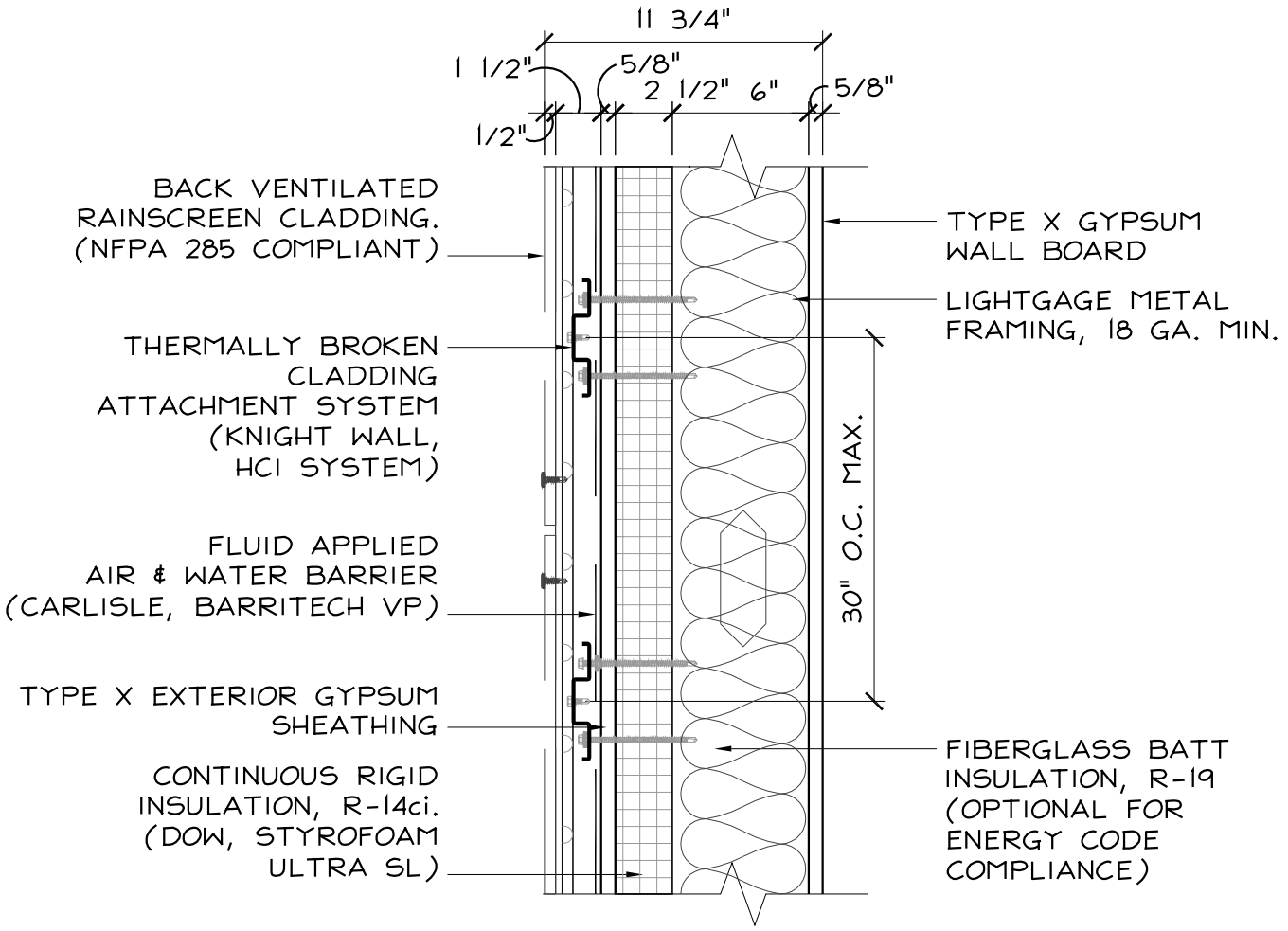
Assembly Performance: *(proposed assembly U-Factors are approximately 8%|33% better than code and have 92%|79% thermal effectiveness)*

	Code Requirement *(IECC 2015 – Metal Framed)*	**Project Requirement** *(if different)*	**Proposed**
Design R-Value: [a]	R-13 + R-7.5ci	N/A	R-14ci | R-19 + R-14ci
Total R-Value:	N/A	N/A	R-18.66 | R-36.60
Effective R-Value: [c]	N/A	N/A	R-17.08 | R-28.75
Design U-Factor: [a, b]	U-0.064	N/A	U-0.059 | U-0.043
Effective U-Factor: [c]	N/A	N/A	U-0.059 | U-0.035
Assembly Air Permeability	0.04 cfm/ft^2 @75Pa	N/A	0.0024 cfm/ft^2 @75Pa

[a] *Wall assembly meets energy code and project thermal requirements without stud cavity insulation.*
[b] *Assembly U-Factor is based on the stud size & spacing noted above and is calculated per IECC 2015 & ASHRAE 90.1-2013 Appendix A.*
[c] *Effective assembly thermal performance is based on stud size & spacing above, manufacturer literature and industry studies on the thermal performance of façades.*

Attachments:

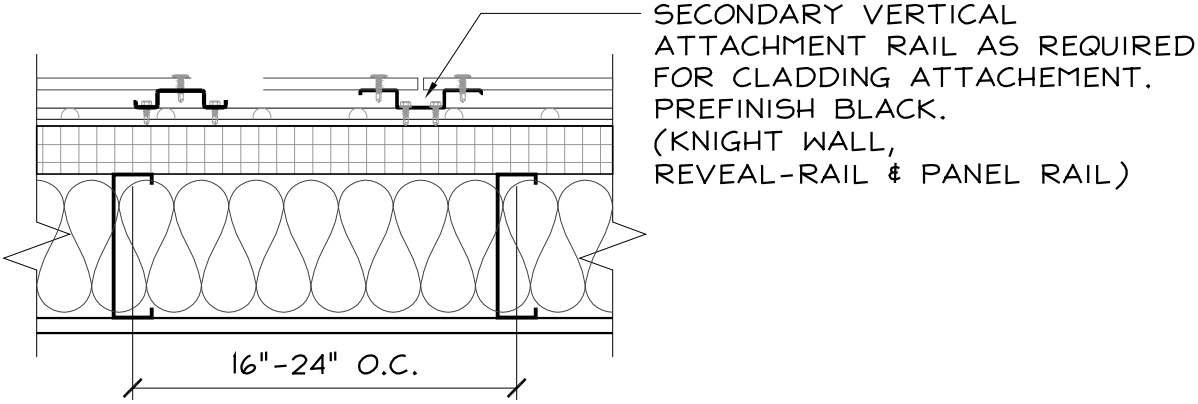
- Typical Clear Wall Detail
- Assembly Dew Point Calculation(s)
- Product Literature



TYPICAL INVERTED WALL ASSEMBLY

SCALE: 1 1/2" = 1'-0"

(SECTION DETAIL)



TYPICAL INVERTED WALL ASSEMBLY

SCALE: 1 1/2" = 1'-0"

(PLAN DETAIL)

PACE BUILDING ENVELOPE REPRESENTATIVES
One Rockdale Street
Braintree, MA 02184
781-541-5060
www.pacerepresentatives.com

Contents: RAINSCREEN CLADDING w/ THERMALLY BROKEN RAINSCREEN ATTCHMENT SYSTEM, INVERTED WALL SYSTEM & METAL STUD BACK-UP

Sketch #:

SK-01

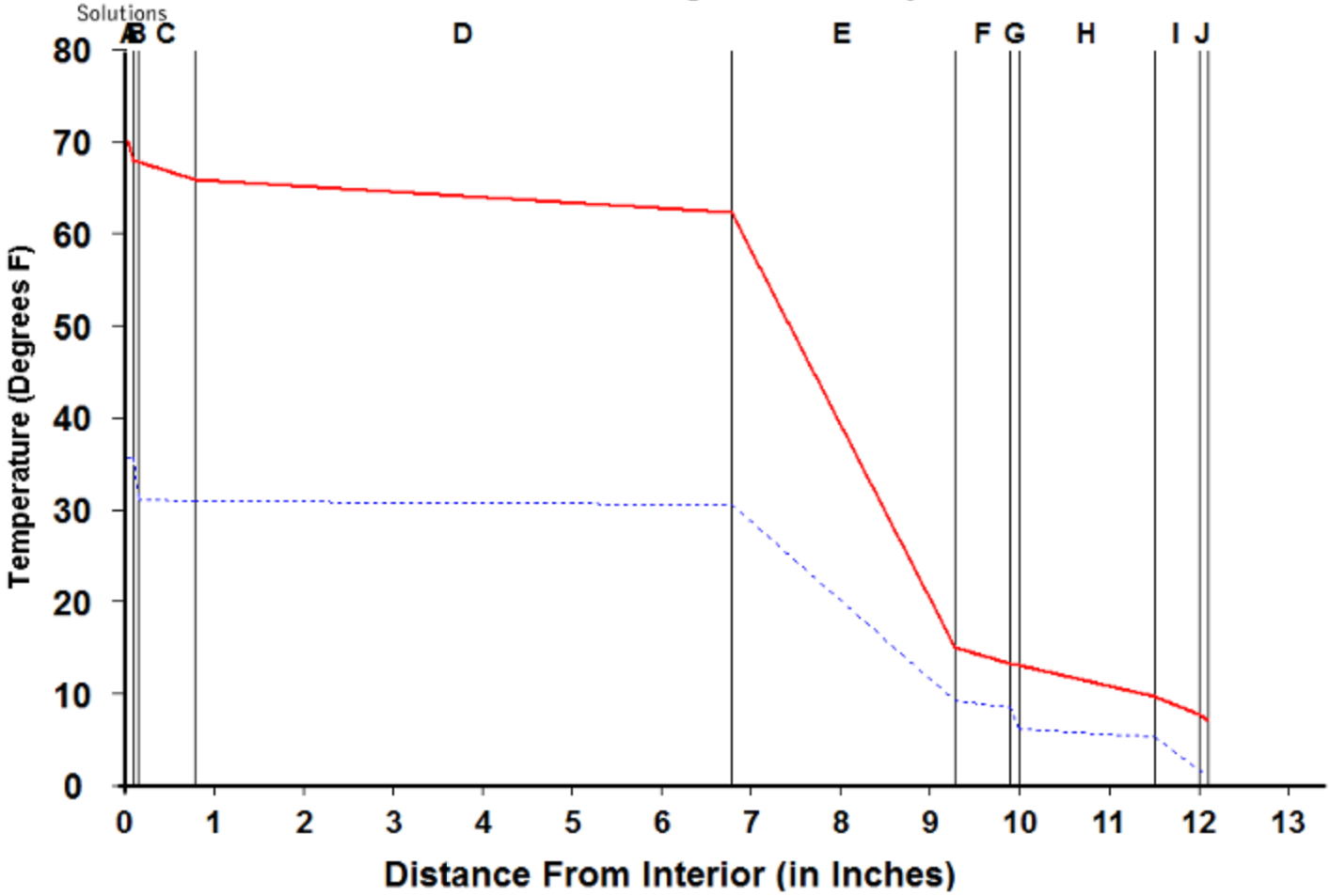
Sheet 1 of 1

Reference detail. Registered professional in responsible charge to review prior to use.

Dewpoint Analysis - Dow Chemical

Building Solutions

Rainscreen Cladding w/ Inverted Wall System



Legend
Actual Temperature
Dewpoint Temperature

Dewpoint Theory predicts condensation in a system at any point where the actual and dewpoint temperature lines cross.

Conditions:	Interior	Exterior
Temperature	70.0	7.0
Humidity	28.0	75.0

	Component Name	Thickness	R-Value	Rep
A	Interior Air Film	0.100	0.68	0.001
B	Latex Paint 2 Coat	0.050	0.01	0.500
C	Gypsum Wall Board	0.625	0.56	0.023
D	Wall Air Space NonRefl	6.000	1.05	0.028
E	STYROFOAM XPS Ultra	2.500	14.00	1.538
F	Gypsum Sheathing	0.625	0.56	0.027
G	Carlisle Barritech VP	0.100	0.01	0.095
H	Wall Air Space NonRefl	1.500	1.01	0.028
I	Rainscreen Cladding	0.500	0.60	0.125
J	Out Air Film Winter	0.100	0.17	0.001
K				
L				
	TOTAL	12.100	18.65	2.366

Interface	Temperature Actual	Temperature Dewpnt	Accum (oz/day-sqft)
-A	70.00	35.43	0.000
AB	67.70	35.42	0.000
BC	67.67	30.93	0.000
CD	65.78	30.72	0.000
DE	62.23	30.48	0.000
EF	14.94	9.04	0.000
FG	13.05	8.41	0.000
GH	13.01	5.98	0.000
HI	9.60	5.23	0.000
IJ	7.57	1.44	0.000
JK	7.00	1.41	0.000
KL			
L-			

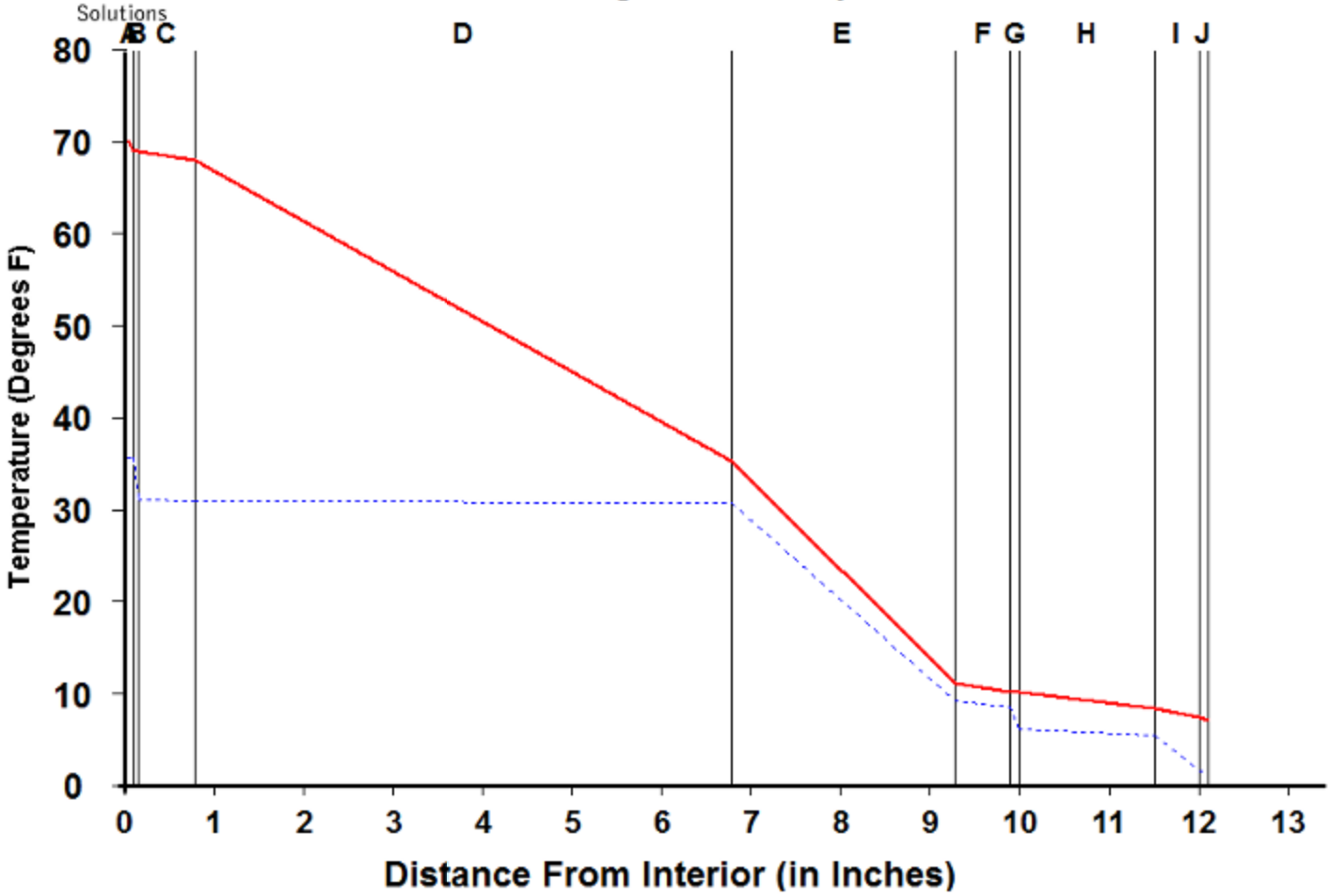
NOTICE: This calculation is based on the theory of Water Vapor Migration presented in the ASHRAE 1993 Fundamentals Handbook. Actual performance may vary depending upon air infiltration. workmanship, and building materials. Since the information is provided without charge, The Dow Chemical Company assumes **no obligation or liability** for its use.

May 12 2016 3:04:33 PM

Dewpoint Analysis - Dow Chemical

Building Solutions

Rainscreen Cladding w/ Inverted Wall System w/ R-19 Batt



Legend
Actual Temperature
Dewpoint Temperature

Dewpoint Theory predicts condensation in a system at any point where the actual and dewpoint temperature lines cross.

Conditions:	Interior	Exterior
Temperature	70.0	7.0
Humidity	28.0	75.0

	Component Name	Thickness	R-Value	Rep
A	Interior Air Film	0.100	0.68	0.001
B	Latex Paint 2 Coat	0.050	0.01	0.500
C	Gypsum Wall Board	0.625	0.56	0.023
D	Fiberglass Batt	6.000	19.00	0.010
E	STYROFOAM XPS Ultra	2.500	14.00	1.538
F	Gypsum Sheathing	0.625	0.56	0.027
G	Carlisle Barritech VP	0.100	0.01	0.095
H	Wall Air Space NonRefl	1.500	1.01	0.028
I	Rainscreen Cladding	0.500	0.60	0.125
J	Out Air Film Winter	0.100	0.17	0.001
K				
L				
	TOTAL	12.100	36.60	2.348

Interface	Temperature Actual	Temperature Dewpnt	Accum (oz/day-sqft)
-A	70.00	35.43	0.000
AB	68.83	35.42	0.000
BC	68.81	30.89	0.000
CD	67.85	30.69	0.000
DE	35.14	30.60	0.000
EF	11.05	9.09	0.000
FG	10.08	8.46	0.000
GH	10.06	6.02	0.000
HI	8.33	5.26	0.000
IJ	7.29	1.44	0.000
JK	7.00	1.41	0.000
KL			
L-			

NOTICE: This calculation is based on the theory of Water Vapor Migration presented in the ASHRAE 1993 Fundamentals Handbook. Actual performance may vary depending upon air infiltration. workmanship, and building materials. Since the information is provided without charge, The Dow Chemical Company assumes **no obligation or liability** for its use.

May 12 2016 3:02:55 PM

STYROFOAM™ Brand Ultra SL Extruded Polystyrene Foam Insulation

Product Information — Commercial — U.S.

1. PRODUCT NAME

STYROFOAM™ Brand Ultra SL Insulation

2. MANUFACTURER

The Dow Chemical Company
Dow Building Solutions
200 Larkin
Midland, MI 48674
1-866-583-BLUE (2583)
Fax 1-989-832-1465

3. PRODUCT DESCRIPTION

Basic Use

STYROFOAM™ Brand Ultra SL Insulation is a moisture-resistant, durable and lightweight extruded polystyrene foam board with shiplap edges designed specifically to be used as a continuous insulation (ci) and installed over block, concrete or metal stud backup behind masonry or stone veneers. Manufactured with a patented carbon-black technology, STYROFOAM™ Brand Ultra SL Insulation features an R-value of 5.6 per inch (RSI of 0.97 per 25 mm),[1] the highest of all extruded polystyrene foam insulation products. Its closed-cell structure offers advanced long-term thermal performance and moisture control. STYROFOAM™ Brand Ultra SL Insulation with shiplap edges maximizes the thermal performance of the wall assembly.

STYROFOAM™ Brand Ultra SL Insulation — when tested with WEATHERMATE™ Flashing taped joints, penetrations and transitions — complies with ASTM E2178 and ASTM E2357 Assembly Air Barrier tests. It is also an approved air barrier assembly by the Air Barrier Association of America (ABAA). These tests are included as acceptable compliance tests in meeting the continuous Air Barrier Standard that has been approved by the ASHRAE 90.1 committee for inclusion into the 90.1-2010 standard. This wall assembly was tested in accordance with the ASTM E331 Water Penetration Test and passed.

4. TECHNICAL DATA

Applicable Standards

STYROFOAM™ Brand Ultra SL Insulation meets ASTM C578 Type IV Standard Specification for Rigid Cellular Polystyrene Insulation. Applicable standards include:

- C518 — Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- D1621 — Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- E96 — Standard Test Methods for Water Vapor Transmission of Materials
- D696 — Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30˚C and 30˚C With a Vitreous Silica Dilatometer
- C203 — Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- D2126 — Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- D2842 — Standard Test Method for Water Absorption of Rigid Cellular Plastics

When tested with WEATHERMATE™ Flashing or GREAT STUFF PRO™ Insulating Foam Sealant[2] around joint treatments, penetrations and transitions, STYROFOAM™ Brand Ultra SL Insulation meets the following standards:

- ASTM E2357 Air Barrier Assembly Test
- ASTM E2178 Air Barrier Assembly Test
- ASTM E331 Water Penetration Test for Block and Steel Stud — Passed
- Approved as an air barrier assembly by the Air Barrier Association of America (ABAA)
- Meets NFPA requirements[3]

Code Compliance

STYROFOAM™ Brand Ultra SL Insulation complies with the following codes:

- Meets IBC/IRC requirements for foam plastic insulation; see ICC-ES ESR 2142
- BOCA-ES RR 21-02
- Underwriters Laboratories, Inc. (UL) Classified, see Classification Certificate D369

Contact your Dow sales representative or local authorities for state/provincial and local building code requirements and related acceptances.

Physical Properties

STYROFOAM™ Brand Ultra SL Insulation exhibits the properties and characteristics indicated in Table 2 when tested as represented.

TABLE 1: U.S. SIZES, R-VALUES AND EDGE TREATMENTS FOR STYROFOAM™ BRAND ULTRA SL EXTRUDED POLYSTYRENE FOAM INSULATION

NOMINAL BOARD THICKNESS,[1] IN	R-VALUE[2]	BOARD SIZE,[3] IN	EDGE TREATMENT
1.75	10.0	4' x 8'	8' SHIPLAP
2.125	12.0	4' x 8'	8' SHIPLAP
2.5	14.0	4' x 8'	8' SHIPLAP
3.0	16.8	4' x 8'	8' SHIPLAP

1 Not all product sizes are available in all regions.
2 R means resistance to heat flow. The higher the R-value, the greater the insulating power. R-values are expressed in ft^2 x h x°F/Btu. R-value determined by ASTM C518.
3 4' x 10', 4' x 12' lengths available through special order.

1 Aged R-value (RSI) at 75°F (24°C) mean temp. R means resistance to heat flow. The higher the R-value or RSI, the greater the insulating power. Refer to Table 2 for thermal resistance at other mean temperatures.
2 Consult label and Material Safety Data Sheet carefully before use.
3 Meets NFPA 285 per Section 2603.5.5 of the building code. For specific assemblies, see code report ESR 2142.

Do not leave STYROFOAM™ Brand Ultra SL Insulation exposed to direct sunlight for more than 90 days. Consult a Dow representative if exposure is expected to be longer than 90 days. Prolonged exposure to ultraviolet radiation may cause the surface of STYROFOAM™ Brand Ultra SL Insulation to become faded and dusty. The surface degradation will have no measurable effect on the insulating value of the plastic foam unless the deterioration is allowed to continue until actual foam thickness is lost. Since the dust would impair the performance of adhesives and finishes, dusty surfaces should be brushed off before these products are applied. A light-colored, opaque protective covering should be used if excessive solar exposure is expected. When stored outdoors, keep insulation boards tarped or covered to protect from weather and weighted down to prevent boards from being blown around by the wind.

Environmental Data

STYROFOAM™ Brand Ultra SL Insulation is hydrochlorofluorocarbon-free (HCFC-free) with zero ozone-depletion potential. STYROFOAM™ Brand Ultra SL Insulation is reusable in many applications.

Fire Information

STYROFOAM™ Brand Ultra SL Insulation 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.

5. INSTALLATION

Boards of STYROFOAM™ Brand Ultra SL Insulation are easy to handle, cut and install. Contact a local Dow representative or access the literature library at ultrawallsystem.com for more specific instructions.

6. AVAILABILITY

STYROFOAM™ Brand Ultra SL Insulation is manufactured in several locations across North America and is distributed through an extensive network. For more information, call 1-800-232-2436.

7. WARRANTY

In the United States, a 50-year thermal limited warranty is available on STYROFOAM™ Insulation products 1.5 inches and greater. For thickness less than 1.5 inches, other warranties may apply. Warranties are available as described at dbswarranties.com

8. MAINTENANCE

Not applicable.

9. TECHNICAL SERVICES

Dow can provide technical information to help address questions when using STYROFOAM™ Brand Ultra SL Insulation. Technical personnel are available to assist with any insulation project. For technical assistance, call 1-866-583-BLUE (2583)

10. FILING SYSTEMS

- dowbuildingsolutions.com
- ultrawallsystem.com

TABLE 2: PHYSICAL PROPERTIES (U.S.) OF STYROFOAM™ BRAND ULTRA SL EXTRUDED POLYSTYRENE FOAM INSULATION

PROPERTY AND TEST METHOD	VALUE			
Thermal Resistance per in. ASTM C518, $ft^2 \times h \times °F/Btu$, R-value,[1] min. @ 75°F mean temp.	1.75"	2.125"	2.5"	3.0"
	10.0	12.0	14.0	16.8
Compressive Strength,[2] ASTM D1621, psi, min.	25			
Water Absorption, ASTM C272, % by volume, max.	0.3			
Water Vapor Permeance, ASTM E96, perm, max.	1.75"	2.125"	2.5"	3.0"
	1.1	0.8	0.65	0.50
Maximum Use Temperature, °F	165			
Coefficient of Linear Thermal Expansion, ASTM D696, in/in x °F	3.5×10^{-5}			
Flexural Strength, ASTM C203, psi, min.	50			
Flame Spread,[3] ASTM E84	0			
Smoke Developed, ASTM E84[3]	155			

1 Values are consistent with the criteria of ASTM C578 and the FTC R-value rule (16 CFR Part 460).
2 Vertical compressive strength is measured at 10 percent deformation or yield, whichever occurs first. Since STYROFOAM™ Brand Extruded Polystyrene Foam Insulations are visco-elastic materials, adequate design safety factors should be used to prevent long-term creep and fatigue deformation. For static loads, 3:1 is suggested. For dynamic loads, 5:1 is suggested. Contact Dow for design recommendations.
3 These numerical flame-spread and smoke-developed ratings are not intended to reflect hazards presented by this or any other material under actual fire conditions.

In the U.S.
The Dow Chemical Company
200 Larkin
Midland, MI 48674

Technical Information
1 866 583 BLUE (2583) (English)
1 800 363 6210 (French)
Sales Information
1 800 232 2436 (English)

dowbuildingsolutions.com
ultrawallsystem.com

Notice: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The products shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

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.

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

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 240°F (116°C). 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.

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.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.

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SCIENCE. SERVICE. SOLUTIONS.

CARLISLE COATINGS & WATERPROOFING

AIR & VAPOR BARRIER

Fire Resist Barritech™ VP

Description

Fire Resist Barritech VP is a fluid-applied membrane made from inherently fire-resistant materials. Fire Resist Barritech VP is applied to exterior wall assemblies where it functions as an air barrier and a water-resistive barrier. Fire Resist Barritech VP is vapor-permeable - moisture vapor can diffuse directly through the membrane. Fire Resist Barritech VP can be applied over concrete block, concrete, exterior gypsum sheathing, plywood, OSB and many other common building materials. The product is fully adhered to the substrate, flexible and rubber-like. Fire Resist Barritech VP is a single-component, air-drying product applied by spray or roller at nominal 0.040" (40 mils) dry film thickness. The high film thickness and flexible, elastic properties enable Fire Resist Barritech VP to bridge cracks and seal around penetrations, which creates a truly continuous, monolithic air and water barrier.

Features and Benefits

- Fire-resistant composition permits use in many wall assemblies requiring NFPA 285
- Dries to a distinctive blue color for easy identification (lighter blue color when wet)
- 180-day UV resistance allows flexibility in schedule
- Vapor-permeable feature permits use in wall assemblies where a vapor barrier is not needed
- Non-flammable & fume-free composition contributes to safety during installation
- Easy, water clean-up of tools & equipment reduces harmful chemicals on the jobsite
- Spray-through standard, one-part equipment provides a simple and quick installation
- Monolithic coverage and self-sealing properties around fasteners enable an air and watertight installation
- Non-asphalt composition permits contact with many window and joint sealants
- Fire Resist Barritech VP is a warranted air/vapor barrier system from Carlisle Coatings & Waterproofing

Project Conditions

Building codes and project specifications require continuity of the air barrier installation. It is the installer's responsibility to understand the extent and sequencing of air barrier installation on the project. Do not proceed with installation until substrate and project conditions conform to requirements specified in this document. Identify any membranes, coatings, sealants, tapes and joint compounds by others which will come into contact with Barritech VP and CCW accessories, and verify compatibility through CCW. All surfaces accepting Barritech VP and CCW accessories shall be clean, dry, frost free and of sound condition. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind or around the membrane installation. Gaps and cracks exceeding ¼ inch across shall be filled with materials and technique approved by CCW. As Barritech VP and CCW Accessories cannot span any gap in excess of ¼ inch (exception: 1 inch gap for P/S Elastoform), electrical/mechanical penetrations, structural steel penetrations, columns/beams, expansion/seismic joints,

AIR & VAPOR BARRIER

Fire Resist Barritech VP

shelf angles, tie-ins to fenestration and transitions to other building assemblies may require extra work and materials to provide suitable surfaces for continuous installation of the air barrier. Please consult CCW's Barritech VP details for guidance.

Substrate Inspection

Concrete

Shall be cured in place 7 days minimum. It shall be smooth, with sharp protrusions such as cold joints ground flush. Honeycomb and holes/ cracks exceeding ¼" across shall be filled with grout or mortar.

Concrete Masonry Unit (CMU)

Mortar joints shall be struck flush and shall be free of voids exceeding ¼" across. Mortar droppings shall be removed from brick ties and all other surfaces accepting Barritech VP and CCW accessories. Mortar joints shall be allowed to cure 3 days minimum before installation of Barritech VP.

Gypsum Sheathing

Sheathing boards shall be flush at joints, with gap between boards according to building code and sheathing manufacturer's requirements. Sheathing boards shall also be securely fastened to the structure with proper fastener type, technique and spacing according to building code and sheathing manufacturer's requirements. Sheathing boards shall be repaired or replaced if inspection reveals moisture damage, mechanical damage or if sheathing boards have exceeded the exposure duration or exposure conditions as required by the sheathing manufacturer.

OSB, Plywood, Lumber, Pressure-Treated Wood

Wood sheathing inspection carries the same protocol given for gypsum sheathing. Also, moisture content, measured with a wood moisture meter in the core of the substrate, shall be below 20%. Do not cover any wooden materials with Barritech VP or CCW accessories if moisture content is 20% or above. Do not encapsulate wood (such as nailers) with membrane, as this will cause premature rot. In most cases fire- and pressure-treated wood must be kiln dried to accommodate the less than 20% moisture content requirement.

Surface Preparation

Apply CCW contact adhesive to ALL surfaces accepting 705FR-A. CCW-702, CCW-702LV, CCW-702 WB, CCW-715, CAV-GRIP and Travel-Tack are all acceptable for this application. Apply SURE-SEAL primers to all surfaces accepting P/S Eastoform. SURE-SEAL EP-95, HP-250 and Low-VOC Primer are all acceptable for this application. Follow the application instructions on the respective contact adhesive/ primer product data sheet.

Installation

In sheathing over stud construction, sheathing joints shall be detailed with any of the following three methods: 1) Prep surface with CCW contact Adhesive and install 4" 705FR-A centered over joint; 2) 4" DCH reinforcing fabric centered over joint and imbedded in Barritech VP; 3) Fill joint with approved sealant and tool as shown in CCW details. Window openings, inside-outside corners, base of wall, roofline, control joints and other transitions shall be flashed with 705FR-A or Liquifiber™-W imbedded in Fire Resist Barritech VP or DCH Reinforcing Fabric imbedded in Fire Resist Barritech VP. P/S Elastoform may be used to detail expansion joints and window wall transitions. Please consult CCW details for guidance.

Apply Fire Resist Barritech VP over surfaces at minimum 0.060" (60 mils) wet in a single or multiple coats through approved spray equipment. Recommended spray tip sizes are GHD 635 for high coverage and GHD 429 for detail coat. Theoretical application rate is 25 ft^2/gal in one coat. Fire Resist Barritech VP may also be applied with a paint roller. For roller application, apply a minimum of two 0.030" (30 mils) wet thickness coats. Theoretical application rate is 50 ft^2/gal for each coat. For roller application, allow Fire Resist Barritech VP to dry firm between coats.

705FR-A details can be applied to the substrate or over cured Fire Resist Barritech VP. All surfaces shall be prepped with CCW Contact Adhesive before installation of 705FR-A. Follow application instructions on the CCW Contact Adhesive product data sheet. Installer shall apply CCW Contact Adhesive in a sufficient footprint to extend a minimum of 1" beyond the edges of 705FR-A. Neighboring pieces of 705FR-A shall lap 2" minimum. If 705FR-A is installed over Fire Resist Barritech VP, seal terminating edges of 705FR-A with CCW-201, Sure-Seal Lap sealant or approved sealant by others. If 705FR-A is installed to the substrate, lap Fire Resist Barritech VP at least 2" over edges of 705FR-A.

For installation of LiquiFiber-W in Fire Resist Barritech VP details, fill all gaps with approved sealant. Apply a bead of Fire Resist Barritech VP at 30 wet mils thickness. Lay LiquiFiber-W into Fire Resist Barritech VP and press in place with chip brush or drywall knife. Set the LiquiFiber-W tight into corners (no bridging), and then smooth over surface. Overlap neighboring pieces of LiquiFiber-W at least 2" and apply 30 wet mils of Fire Resist Barritech VP into the laps. Immediately encapsulate the LiquiFiber-W with a second coat of Fire Resist Barritech VP. Cover all LiquiFiber-W with Fire Resist Barritech VP the same day of installation. Liquifiber-W can be used on inverted surfaces, and it will conform to complex multi-plane details without precise cutting and fitting.

Installation of DCH Reinforcing Fabric is performed like Liquifiber-W, with the following differences: fill all gaps exceeding ¼" with approved sealant. DCH Reinforcing Fabric is not suitable for use over complex, multi-plane details or on inverted surfaces.

Fire Resist Barritech VP may be left exposed up to 6 months (180 days). If the membrane is damaged during exposure, repair damaged membrane by removing loosely adhered material, cleaning the surface and coating the damaged area with a minimum 0.060" (60 mils) wet thickness coating of Fire Resist Barritech VP.

Clean Up

Promptly clean uncured Barritech VP from hands, tools, surfaces and spray equipment with tap water. Cured product must be removed mechanically or by soaking in solvent, such as xylene.

Limitations

- Do not allow product in packaging or in spray equipment to freeze.
- Maintain product temperature above 45°F during spray.
- Do not apply at ambient temperature below 40°F or if temperature is expected to fall below 32°F in the next 16 hours.
- Do not apply product in rain. Do not install if rain is expected during drying time of product.
- Do not use in areas where temperatures exceeding 180°F are anticipated.
- Product is designed to be used as a positive side water barrier and will not function as negative side water barrier.

Packaging

Barritech VP

Fluid-applied, fire-resistant air/vapor barrier packaged in 50-gallon drums and 5-gallon pails

Other CCW Products:

Fire Resist 705FR-A
36" x 75' roll: (225 ft²/roll) 1 roll/box
24" X 100' roll: (200 ft²/ roll) 1 roll/box
18" X 100' roll: (150 ft²/ roll) 1 roll/box
12" X 100' roll: (100 ft²/ roll) 2 roll/box
9" X 100' roll: (75 ft²/ roll), 2 roll/box
6" X 100' roll: (50 ft²/ roll) 4 roll/box
4" X 100' roll: (33.3 ft²/ roll) roll/box
Fire Resist 705FR-A is available with standard or low temperature (LT) adhesive formulas.

CCW SURE-SEAL Pressure-Sensitive Elastoform Flashing (P/S Elastoform)
90 mil malleable, self-adhering EPDM flashing. Provided in 50' rolls of 12", 9" and 6" widths.

Sure-Seal EPDM Primers
EP-95 Splicing Cement: solvent-based, packaged in 1-gal cans
HP-250 Primer: solvent-based, packaged in 2.5-gal pails
Low-VOC Primer: OTC Compliant, solvent-based, packaged in 1-gal cans

LiquiFiber-W
Glass matt consisting of randomly oriented strands in soluble binder, packaged in 300' rolls of 6" and 12" widths.

DCH Reinforcing Fabric
Woven polyester fabric available in 324' rolls of 4", 6", and 12" widths.

CCW Contact Adhesives (select any):

CAV-GRIP™
Aerosol spray contact adhesive packaged in pressurized cylinders containing 30 lb. fill weight of adhesive. Reusable spray gun and 6', 12' or 18' hose are sold separately and are attached to cylinder for dispense.

CCW-702
Solvent-based contact adhesive packaged in 1-gal cans and 5-gal pails

CCW-702 LV
OTC-compliant, solvent-based contact adhesive packaged in 5-gal pails

CCW-702 WB
Water-based contact adhesive packaged in 5-gal pails

CCW-715
Solvent-based contact adhesive for green concrete, packaged in 5-gal pails

TRAVEL-TACK™
Aerosol contact adhesive packaged in 12-oz. cans

Approved Sealants:

LM-800XL (under Fire Resist Barritech VP)
Trowel-grade synthetic rubber sealant packaged in 29 fl-oz cartridges, 12/case and in 5-gal pails (Note: maximum UV exposure of 10 days)

CCW-201 (over or under Fire Resist Barritech VP)
2-part, non-sag polyurethane sealant packaged in 1½-gal kits

Sure-Seal Lap Sealant (over or under Fire Resist Barritech VP)
1-part, solvent-based synthetic rubber packaged in 10.3 fl-oz cartridges, 25/case

Sealants by Others: (over or under Fire Resist Barritech VP)
Polyurethane, polyether or MS polymer sealant meeting ASTM C920 Type S or M, Grade NS, Class 25, 35, 50 or 50/100, Use NT Outdoor Grade Acrylic Latex Caulk meeting ASTM C834 Type OP Grade minus 18°C

Sealants by Others: (over Fire Resist Barritech VP only)
Silicone sealants meeting ASTM C920 Type S, Grade NS, Class 25, 35, 50 or 50/100, Use NT

Storage

Store Fire Resist Barritech VP and accessory products in a location protected from temperature extremes, precipitation and direct sunlight. Protect Fire Resist Barritech VP from freezing temperatures during delivery, storage and handling. Shelf life of Fire Resist Barritech VP in original, unopened packaging, stored under these conditions, is one year from the date of manufacture.

SCIENCE. SERVICE. SOLUTIONS.

CARLISLE COATINGS & WATERPROOFING

AIR & VAPOR BARRIER

Fire Resist Barritech VP

Typical Properties

Property	Method	Results
Color	--	Un-Cured: Light Blue Cured: Medium Blue
Application Temperature	--	Minimum 40°F
Volume % Solids	--	66%
Drying time of 60 mil wet film at 73ºF/50% RH*	--	3 hr until tack-free 48 hr until fully dry
Coverage (Theoretical)**	Percent solids calculation	25 ft²/gal (60 wet mils, 40 dry mils)
Volatile Organic Content (VOC)	--	<52 g/L
Water Resistance of In-place membrane	Rilem Tube – 60 wet mils on CMU AND AATCC 127, modified 60 wet mils on CMU and DensGlass 22 inch (55 cm) column of water	No water leakage through membrane
Air leakage resistance of In-place membrane	ASTM E1186 Bubble Gun – 60 wet mils on CMU with imbedded ties	No visible bubbling
Nail Sealability	ASTM D1970	Pass
Water Vapor Permeance	ASTM E96 B (Water Method) ASTM E 96 A (Desiccant Method)	14 Perms 0.7 Perm
Pull-Off Adhesion	ASTM D4541, modified 4" wood puck	> 30 PSI on CMU and OSB (maximum reading on gauge) > 12 PSI on DensGlass (de-lamination of facer from gypsum core)
Elongation at Break	ASTM D412	500%
Low-Temp Flexibility	ASTM D1970, 180° bend over 1" mandrel	No cracking at -20°F
Aging/ Long-Term Flexibity	CGSB 71-GP-24M Aging 70°C [140°F] for 500 h then 180° bend	No cracking
Low-Temp Crack Bridging	ASTM C1305	No cracking after 10 cycles at -15° F
Mold Resistance	ASTM D5590	No Growth
Peel Adhesion	ASTM D903	13 lb/in on CMU and DensGlass Gold (facer failure)
Air Permeance	ASTM E2178 - Mod Single, 60 mil wet coating spray-applied to CMU	</= 0.001 L/s*m² @ 75 Pa [0.0002 CFM/ft² @ 1.57 PSF]
Wall Assembly Burn Test	NFPA 285	Pass - Various wall assemblies with up to 3 inches of polyiso or XPS insulation. Consult CCW NFPA 285 White Paper for assembly details.

Property	Method	Results
Air Barrier Assembly Test	ASTM E2357. Gypsum sheathing over steel studs, wall assembly with joints and penetrations. Gaps and joints caulked with latex caulk. Barritech VP spray-applied at 60 mils wet. Liquifiber-W reinforcement at details. CCW-201 @ window-wall interface.	Air Leakage: Maximum 0.012 L/s*m² @ 75 Pa [0.0024 CFM / ft² @ 1.57 PSF] infiltration & exfiltation, after deformation, pressure cycling and gust loading. Deformation: No Damage. 600 Pa [12.56 PSF], sustained load for for 60 min Pressure Cycling: No damage. 2000 cycles at +/- 800 Pa [16.75 PSF] Gust Load: No damage, 1400 Pa [110 mph wind], windward and leeward load, 10 sec each direction.
Water Resistance of In-Place Membrane	ASTM E331, Single, 60 mil wet coating spray-applied to CMU	No visible leakage to interior after 15 minutes water spray rack @ 6.24 PSF
Surface Burning	ASTM E84. Product applied @ 60 mils wet, full coverage, to cement board substrate.	Flame Spread Index 15, Smoke Generation Index 135
Measurement of Heat Release by Cone Calorimeter	ASTM E1354. 50 kW/m² Heat Flux	Peak Heat Release Rate: 167 kW/m² Total Heat Release: 14.7 MJ/m² Effective Heat of Combustion: 12.3 MJ/kg

* Drying time varies with ambient temperature, ambient humidity, substrate temperature, substrate dampness, coating thickness, sun and wind. Cool, moist, shady conditions and high coating thickness present the worst case scenario, causing the product to take many days to dry. In conditions such as these, it is advisable to tarp, heat and ventilate the area or wait for better weather.

** Actual coverage varies by substrate and is typically less than theortetical coverage due to substrate roughness and porosity, wind, scrap and installer skill. Measurable dy mil thickness may also be lower than theoretical, due to substrate roughness, porosity and measurement technique. On all substrates, coating shall be visibly continuous, with no pinholes. Dry thickness, measurable with a pin gauge, comb gauge or micrometer shall be a minimum of 30 mils.

Limited Warranty

Carlisle Coatings & Waterproofing Incorporated (Carlisle) warrants this product to be free of defects in workmanship and materials only at the time of shipment from our factory. If any Carlisle materials prove to contain manufacturing defects that substantially affect their performance, Carlisle will, at its option, replace the materials or refund its purchase price. This limited warranty is the only warranty extended by Carlisle with respect to its materials. There are no other warranties, including the implied warranties of merchantability and fitness for a particular purpose. Carlisle specifically disclaims liability for any incidental, consequential, or other damages, including but not limited to, loss of profits or damages to a structure or its contents, arising under any theory of law whatsoever. The dollar value of Carlisle's liability and buyer's remedy under this limited warranty shall not exceed the purchase price of the Carlisle material in question.

Carlisle Coatings & Waterproofing
900 Hensley Lane | Wylie, TX 75098 | 800.527.7092 | **www.carlisleccw.com**

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KNIGHT WALL SYSTEMS

ARCHITECTURAL RECORD
Record Products 2014
WINNER

HCI™ SYSTEM RAINSCREEN ATTACHMENT:

Horizontal Continuous Insulation Should Be Simple to Design + Easy to Install

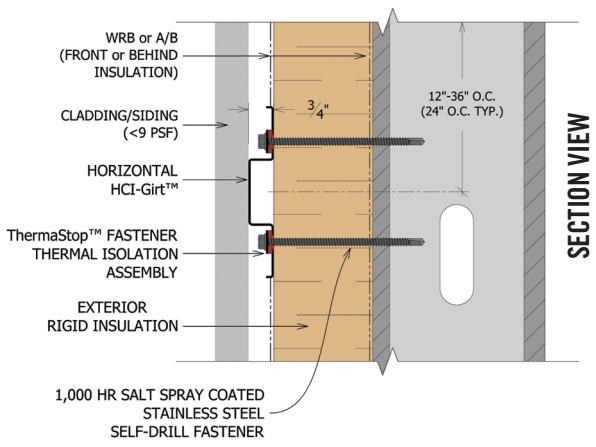
Knight's award-winning HCI™ System provides outstanding thermal performance by way of true ci (continuous insulation). As a compliment to the original CI™ System, the HCI System enables vertical cladding (and secondary rails) to be installed directly to the HCI-Girt™. This offers easy installation, broad design flexibility, and cost savings, all while still easily meeting North American energy code requirements.

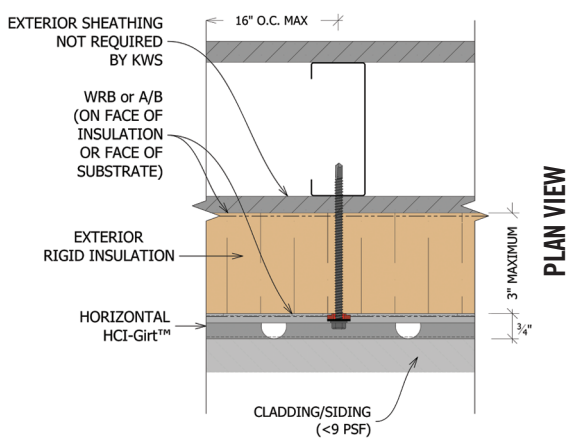
The HCI System uses unique ¾" deep horizontal girts- called HCI-Girts –designed to properly disburse the façade loads over exterior rigid board insulation - with only unique thermally isolated fasteners penetrating the thermal barrier thus minimizing thermal bridging. For basic, cost-effective vertical claddings, only a single layer of HCI-Girts may be needed. For more complex cladding designs or types, choose from a wide variety of Knight Wall secondary rails for those panels requiring specific attachment points.

HCI Systems components are produced in standard and custom lengths, in either 16 or 18 gauge Zn-Al-Mg coated steel (standard silver or black PVDF coated) and also available in stainless steel.

The HCI System attachment completes the rainscreen envelope design, whether choosing metal panels, Aluminum Composite Material (ACM) panels, fiber cement, GFRC, or many more. And choose any brand of insulation that meets minimum compressive strength and code requirements, simplifying design specifications.

HORIZONTAL HCI-GIRT™ ONLY



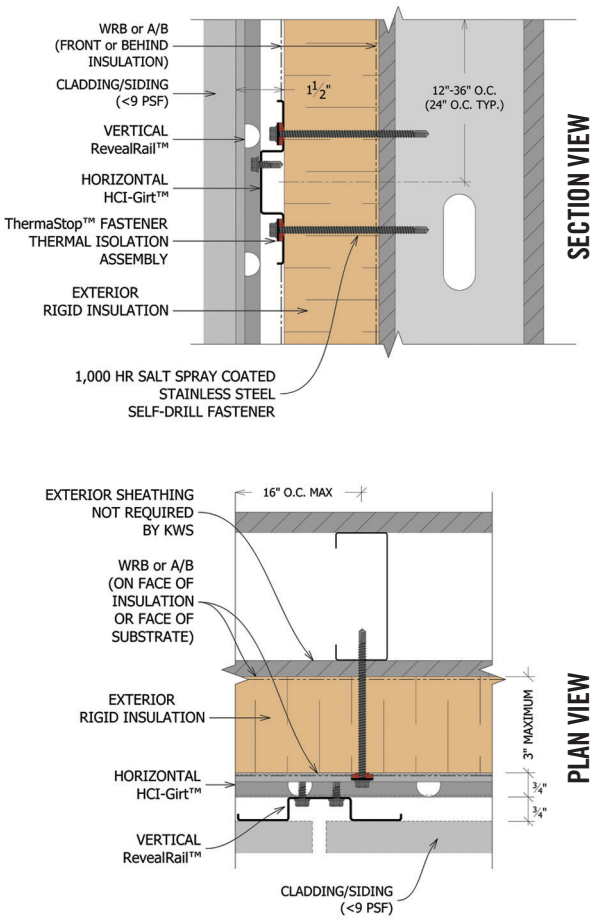


ADVANTAGES TO THE KNIGHT HCI™ SYSTEM RAINSCREEN

- Horizontal HCI-Girts can be spaced from 12” up to 36” O.C.*
- Support cladding weighing up to 9 PSF*, covering many popular cladding types
- Real labor savings – no notching or cutting of exterior rigid board insulation like with Z girts, brackets or clips
- Thermally isolated fasteners with specially designed ThermaStop™ washers come preassembled
- Highly corrosive-resistant Zn-Al-Mg ZM40 (ASTM A1046) coated steel provides a long service life vs. typical G90 Galvanized steel
- Black PVDF finish or stainless steel options available, competitively priced
- Easily installed over any type of substrate – steel studs, wood studs, CMU, concrete, even brick
- Engineering calculations provide design load compliance for each specific project
- Attach nearly any type of cladding – supplied by any manufacturer – with easy and efficient detailing and installation
- Use any manufacturers insulation meeting minimum compressive strength and other code requirements
- Cladding can be attached directly to the horizontal HCI-Girt or used with optional vertical rails (such as PanelRails or RevealRails)
- Excellent ventilation with a ¾-inch minimum continuous rainscreen cavity
- Pre-engineered and 3rd party tested for proven performance and durability
- Competitive, budget conscious assembly that meets ASHRAE 90.1 standard
- Complete, drop-in rainscreen attachment system – girts, thermally isolated fasteners, rails and engineering – one source liability for the whole system
- Limited labor and material warranty

*Maximum allowable spacing and dead load (weight of cladding) is based on the total load (dead + live) acting on the assembly and connections. Wall anchors must be specified and supplied by KWS for a written limited warranty. Knight will specify the exact anchor type, embedment depth and spacing for anchors in project specific engineering packages. ThermaStop thermal isolation washers must be used on all types of wall anchors with the HCI or CI System, no matter the substrate. Contact KWS for more information.

HCI-GIRT™ + REVEALRAIL™



KNIGHT WALL CAN CONTRIBUTE TO THE FOLLOWING USGBC LEED CREDITS:

- Energy & Atmosphere (EA) Prequisite and Credit 1
- Materials & Resources (MR) Credits 4 and 5

ALL KNIGHT WALL SYSTEMS COMPONENTS ARE MANUFACTURED IN THE USA.

NO EXPRESS WARRANTIES ARE GIVEN EXCEPT FOR ANY APPLICABLE WRITTEN WARRANTIES SPECIFICALLY PROVIDED BY KNIGHT WALL SYSTEMS. ALL IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. No freedom from any patent owned by Knight Wall Systems or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use.

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509.262.0104

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