



08-12-2015

**U.S. Environmental Protection Agency (EPA) Seal and Insulate with ENERGY STAR®
Insulation Product Certification Report – R-TECH EPS Board Insulation Manufactured by
Insulfoam**

Insulfoam
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Report Number: 12CA41488

Subject: EPA Seal and Insulate with ENERGY STAR Insulation Product Certification
Report: Insulfoam R-TECH EPS Board Insulation

PURPOSE:

The purpose of this report is to certify the test results for R-TECH Board Insulation manufactured by Insulfoam. shown herein have been compared to the criteria provided by the Seal and Insulate with ENERGY STAR Insulation Definitions and Testing Requirements for Residential Insulation Version 1.0 and the IBC, IRC, and IRCC codes relative to Surface Burning Characteristics. This Report is intended for use by the EPA. UL is an EPA recognized certification body.

CODES and STANDARDS:

The following codes and standards were referenced in the development of this report.

- International Building Code (IBC) – 2012
- International Residential Code (IRC) – 2012
- International Energy Conservation Code (IECC) – 2012
- ANSI/UL723, "Test for Surface Burning Characteristics of Building Materials" 10th Edition, dated September 10, 2008
- ASTM E84-12, "Standard Test Method for Surface Burning Characteristics of Building Materials"
- ASTM C518-10, "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus"
- Seal and Insulate with ENERGY STAR Insulation Definitions and Testing Requirements for Residential Insulation Version 1.0

DEFINITIONS:

Board Insulation: Semi-rigid insulation preformed into rectangular units having a degree of suppleness particularly related to their geometrical dimensions. Typical materials include, but are not limited to fiberglass, expanded polystyrene (EPS), extruded polystyrene (XPS), polyisocyanurate, or polyurethane. The product may or may not be faced.

Facing: A thin covering adhered to the surface of insulation prior to field installation. Facings may include, but are not limited to Kraft paper, metal foil, or polymer.

R-value: The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area. For the purposes of this program, Imperial units will only be accepted [(h · ft² · °F)/Btu].

Smoke-Development Index: The characteristic of a material to emit smoke when exposed to flame or fire compared to red oak and inorganic cement.

Flame-Spread Index: The characteristic of a material to resist the spreading of flames when exposed to flame or fire compared to red oak and inorganic cement.

TEST LABORATORIES:

The laboratories that conducted testing covered by this report was ISO 17025 accredited at the time of testing.

Since these products are UL certified for Surface Burning Characteristics, the manufacture of the samples used for testing was witnessed by a UL representative and the formulation of the product is documented.

PRODUCT:

The product covered by this report is expanded polystyrene (EPS), designated R-TECH.

R-Tech is a high-performance rigid insulation consisting of a superior closed-cell, lightweight and resilient expanded polystyrene (EPS) with advanced polymeric laminate facers. R-Tech is available with factory adhered metallic-reflective facers, white facers or a combination of the two.

USE / PREPARATION / INSTALLATION:

R-TECH board insulation is intended for residential use as insulation for application to:

- Concrete walls
 - Interior: above grade
 - Exterior: above and below grade
- Wood framed walls
 - Interior: above grade
 - Exterior: above grade

Installation Instructions attached as Appendix A, show detail methods of application and finishing that meet the criteria set forth in the Seal and Insulate with ENERGY STAR Partnership Commitments.

THERMAL RESISTANTS

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

R-TECH Thermal Resistance Values:

ASTM Type	Density, min., lb./ft ³	Thermal Resistance (hr•ft ² •°F)/BTU
Type I	1.0	3.85
Type VIII	1.25	3.92
Type II	1.5	4.17
Type IX	2.0	4.35

The R-TECH materials utilized in this investigation were neither prepared nor selected by a Laboratories' representative such that no verification of composition can be provided.

The minimum R-Values exceed the minimum R > 3.0 required by Energy Star. Test results can be found in Appendix B.

SURFACE BURNING CHARACTERISTICS

The tests were conducted in accordance with Standard ANSI/UL723, "Test for Surface Burning Characteristics of Building Materials", (ASTM E84), Tenth Edition, dated September 10, 2008, with revisions through August 12, 2013.

The test determines the Surface Burning Characteristics of the material, specifically the flame spread and smoke developed indices when exposed to fire.

Insulfoam R-TECH board insulation is certified for Surface Burning Characteristics by UL LLC under UL's Classification program. The published UL Surface Burning Characteristics Classification is provided below:

Foamed Plastic in the form of boards designated "R-TECH"

	¼ - 5in. Thick
Flame spread	20
Smoke developed	150-300

The product has a Flame Spread and Smoke Developed index rating of less than 25 and 450 respectively while material remained in the furnace “ceiling” test position and complies with applicable code requirements for Surface Burning Characteristics.

CONCLUSION

These products are certified to meet the requirements of the Seal and Insulate with ENERGY STAR Definitions and Testing Requirements for Residential Insulation Version 1.0.

The Classification Marking of Underwriters Laboratories Inc. on the product is the only method provided by Underwriters Laboratories Inc. to identify products which have been produced under its Classification and Follow-Up Service.

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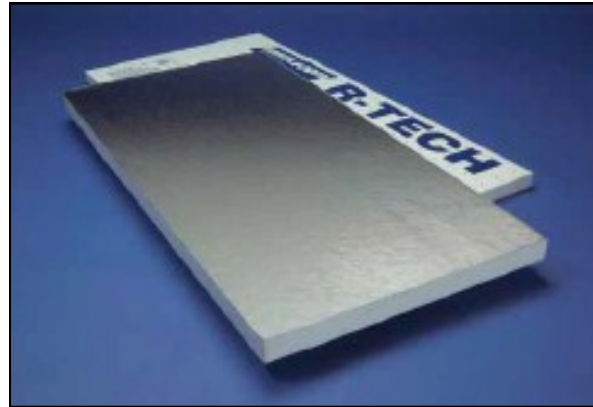
R-TECH®

INSTALLATION INSTRUCTIONS

The following instructions are provided for the installation of Insulfoam R-TECH insulation. These instructions provide guidance and do not cover all aspects related to the installation or use of insulation products in a structure. Check to ensure that the installation complies with the applicable code requirements such as thermal and ignition barriers. Local building-codes may have requirements for thickness and R-value of the insulation, vapor retarders, interior thermal barriers and finish materials, exterior weather resistive barriers and claddings, ventilation, insulation in adjacent areas, caulking and sealing, and other items. R-TECH insulation is not required to be installed by a trained or certified installer. As the installer, you are solely responsible for the proper installation of all materials, following product label instructions and or using proper safety precautions during installation to avoid injury. Insulfoam is not responsible for building design and accepts no responsibility for the performance of its products resulting from improper building design, construction faults, or defective installation workmanship.

Adhesive and sealant solvents, which attack InsulFoam R-TECH rigid insulation include esters, ketones, ethers, aromatic, and aliphatic hydrocarbons and their emulsions, among others. InsulFoam R-TECH insulation is not to be placed in contact with materials (or their vapors) of unknown composition, pretest for compatibility at maximum exposure temperature.

Do not install or use InsulFoam R-TECH insulation products with coal tar pitch, highly solvent extended mastics, or solvent-based adhesives without adequate separation.



Insulfoam-a division of Carlisle Construction Materials Inc., does not make any warranty with respect to suitability of adhesive products. Please check with the adhesive manufacturer to confirm the compatibility of their adhesive/sealants with expanded polystyrene (EPS) and specific applications.

R-TECH insulation should not be installed in applications where the temperature exceeds 167°F (75°C). Protect the R-TECH from direct contact with hot objects and sources of ignition.

Tools Needed

- ◆ Tape Measure
- ◆ Utility Knife
- ◆ Straightedge
- ◆ Power Drill
- ◆ Saw
- ◆ Hammer
- ◆ Nail and/or pneumatic Staple Gun (minimum 6d ring-shank nails and 15/16" diameter plastic washer or minimum 1.0" wide crown staples)

Protective Gear

- ◆ Work Gloves
- ◆ Loose-fitting, long-sleeved shirt
- ◆ OSHA-approved safety glasses
- ◆ Disposable dust respirator (NIOSH or MSHA approved)

R-TECH®

INSTALLATION INSTRUCTIONS

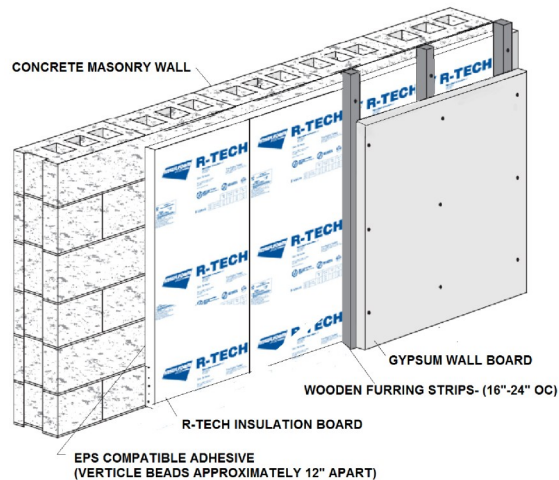
APPLICATION OF INSULFOAM R-TECH TO A CONCRETE WALL:

1. Remove any obstacles or debris from the wall and area of work that may interfere with the attachment of the boards.
2. Cut the boards to match the wall height.
Note: Cut the boards as needed to fit tightly around pipes, ducts, vents, openings or similar objects. Cracks and openings should be sealed with compatible caulk and/or sheathing tape to provide air seals.
3. Install termination fixtures as required. Examples include corner braces, drip edges, window flashings and wall reglets.
4. Using Expanded Polystyrene (EPS) compatible adhesive, apply the adhesive to the wall, or directly to the board, in vertical beads approximately 12" apart.
5. Press/hold the board firmly to the wall.
6. Position wood battens at 16" or 24" on center spacing (vertically or horizontally) over the boards and attach using concrete fasteners through the battens and insulation into the concrete wall. *Note: Wood battens must be pressure treated when used below grade or when in direct contact with concrete.*
7. Interior Application: After completion of steps 1-6, Install a code compliant thermal barrier, such as 1/2" gypsum board if required, to the battens per the requirements of the applicable building code.

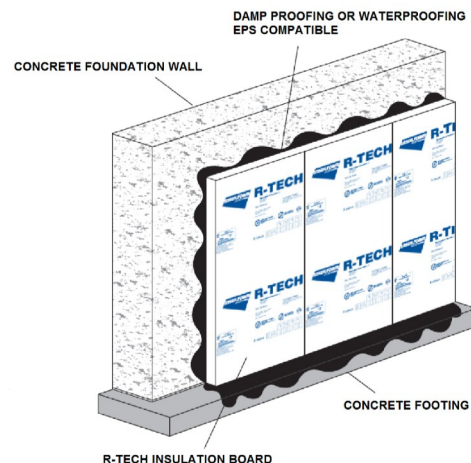
Exterior Application (above grade): After completion of steps 1-6 ensure all flashings are installed around openings and penetrations in compliance with the applicable building code. Install exterior cladding per manufacturers instructions.

Exterior Application (below grade): Follow steps 1-3. Waterproof or damp-proof walls with EPS compatible products in compliance with the applicable building code prior to installation of Insulfoam R-TECH insulation boards. Press/hold the board firmly to the wall. Back-fill and complete final grade.

TYPICAL INTERIOR WALL APPLICATION



TYPICAL EXTERIOR BELOW GRADE WALL APPLICATION



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INSTALLATION INSTRUCTIONS

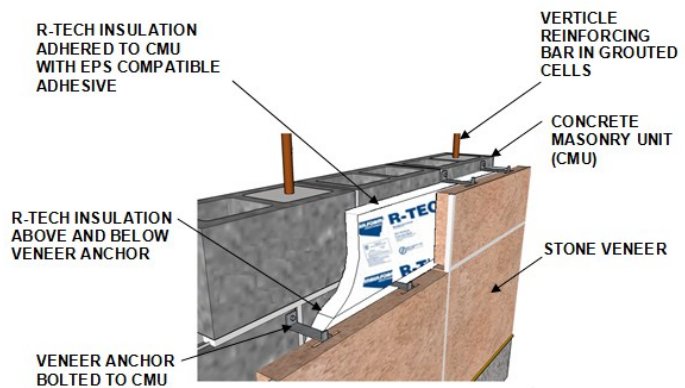
APPLICATION OF INSULFOAM R-TECH TO A CONCRETE WALL:

TYPICAL EXTERIOR / CAVITY WALL ABOVE GRADE
STONE SLAB VENEER / REINFORCED CONCRETE
BLOCK

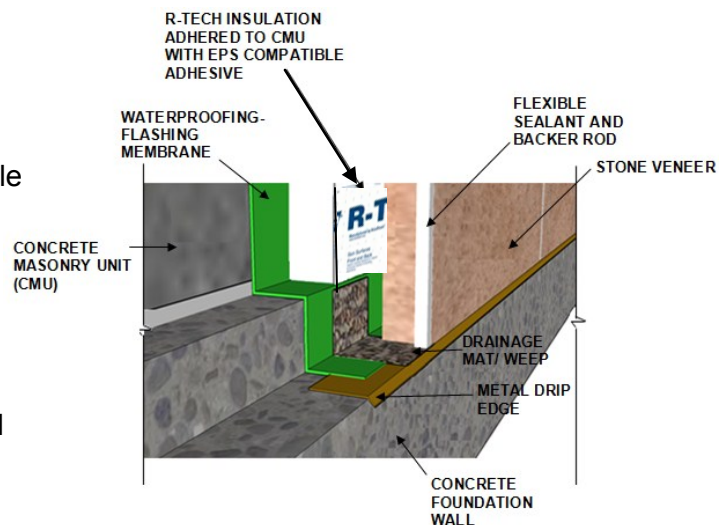
1. Remove any obstacles or debris from the wall and area of work that may interfere with the attachment of the boards.
2. Cut the boards to match the wall height.
Note: Cut the boards as needed to fit tightly around veneer anchors, pipes, ducts, vents, openings or similar objects. Cracks and openings should be sealed with compatible caulk and/or sheathing tape to provide air seals.
3. Install termination fixtures as required.
Examples include corner braces, drip edges, window flashings and wall reglets.
4. Using Expanded Polystyrene (EPS) compatible adhesive, apply the adhesive to the wall, or directly to the board, in vertical beads approximately 12" apart.
5. Press/hold the board firmly to the wall.
After completion of steps 1-4 ensure all flashings are installed around openings and penetrations in compliance with the applicable building code.
6. Install exterior cladding (veneer) over the insulated wall surface.

Applications which incorporate a dead air space/cavity; refer to the R-TECH cavity wall instructions.

WALL DETAIL-STONE VENEER CLADDING



WALL BASE FLASHING DETAIL



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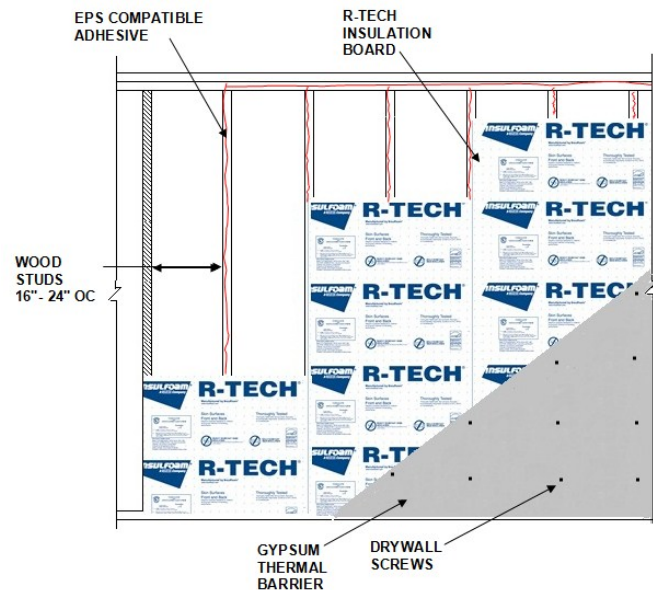
INSTALLATION INSTRUCTIONS

APPLICATION OF INSULFOAM R-TECH TO A WOOD FRAMED INTERIOR WALL:

1. Remove any obstacles or debris from the wall and area of work that may interfere with the attachment of the boards.
Note: The wall to receive the board must be braced or sheathed in compliance with the applicable building code.
2. Cut the boards to match the wall height.
Note: Cut the boards as needed to fit tightly around pipes, ducts, vents, openings or similar objects. Cracks and openings should be sealed with compatible caulk and/or sheathing tape to provide air seals.
3. Install termination fixtures as required. Examples include corner braces, drip edges, window flashings and wall reglets.
4. Attach using Expanded Polystyrene (EPS) compatible adhesive.
5. Press/hold the board firmly to the wall.
Note: All edges of the Insulfoam R-TECH insulation board must be supported by the wood studs.
6. Install a code compliant thermal barrier, such as 1/2" thick gypsum board-if required, per the requirements of the applicable building code.
7. After completion of steps 1-6 apply interior finish materials.

8. Gypsum (drywall) fasteners shall be Type S, Type W screws compliant with ASTM C1002 or ASTM C954. Consult the manufacturer on maximum fastening patterns for board edges and field.

TYPICAL INTERIOR-WOODEN STUD WALL APPLICATION



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INSTALLATION INSTRUCTIONS

APPLICATION OF INSULFOAM R-TECH TO A WOOD FRAMED EXTERIOR WALL:

1. Remove any obstacles or debris from the wall and area of work that may interfere with the attachment of the boards.

Note: The wall to receive the board must be braced or sheathed in compliance with the applicable building code.

2. Cut the boards to match the wall height.

Note: Cut the boards as needed to fit tightly around pipes, ducts, vents, openings or similar objects. Cracks and openings should be sealed with compatible caulk and/or sheathing tape to provide air seals.

3. Install termination fixtures as required.

Examples include corner braces, drip edges, window flashings and wall reglets.

4. Press/hold the board firmly to the wall.

Note: All edges of the Insulfoam R-TECH insulation board must be supported by the wood studs.

5. Attach using corrosion-resistant 1" wide crown staples through insulation and into the wood studs with a minimum 1" penetration. Fastener spacing must be no greater than 6" on center.

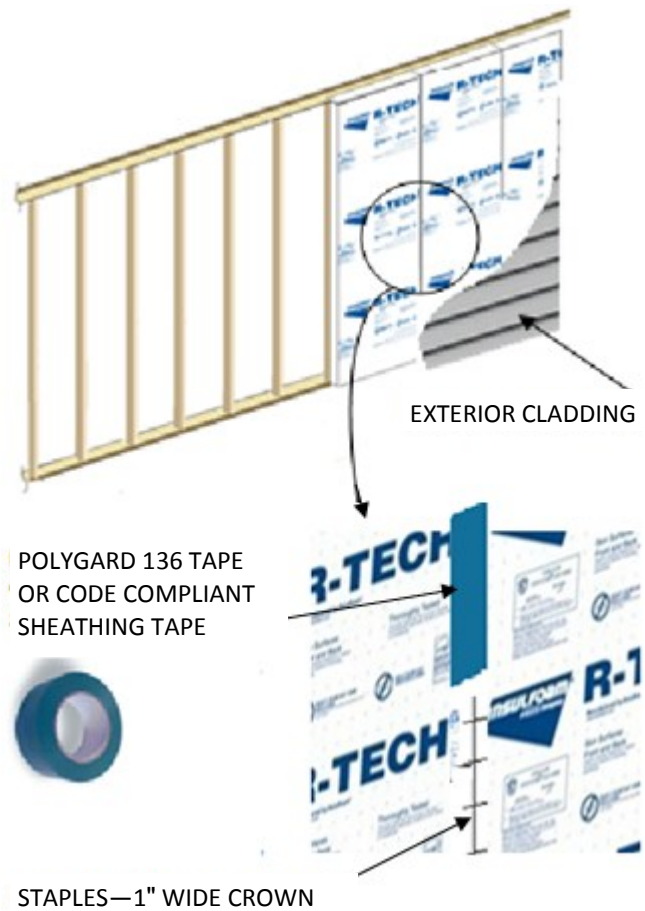
Staples - shall be galvanized steel, not less than 16 gauge and with a minimum 1" wide crown.

6. Apply Insulfoam Polygard 136 tape or sheathing tape over fastener heads, board joints, and corners if a weather resistive barrier is desired.

Exterior Application (above grade):

After completion of steps 1-6 ensure all flashings are installed around openings and penetrations in compliance with the applicable building code. Install weather resistive exterior cladding materials according to manufacturers installation instructions. Openings such as windows and doors shall be flashed as shown in the window details of these instructions.

TYPICAL EXTEIOR-WOODEN STUD WALL APPLICATION

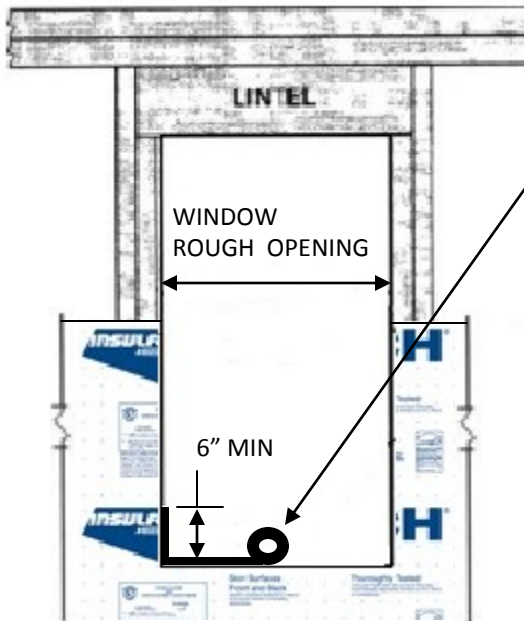


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INSTALLATION INSTRUCTIONS

APPLICATION OF INSULFOAM R-TECH TO A WOOD FRAMED WALL; TYPICAL WINDOW INSTALLATION

STEP 1

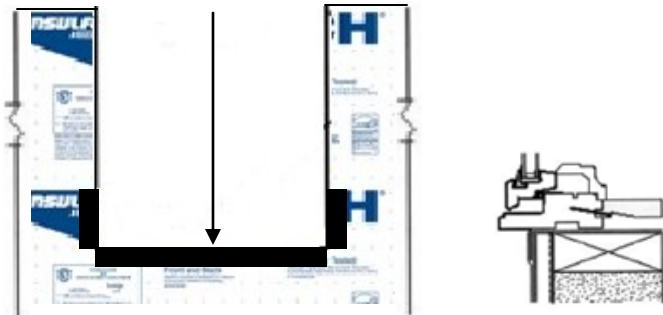


TOP VIEW



CODE COMPLIANT FLASHING TAPE-
ICC-ES -AC 148

STEP 2



STEP 3



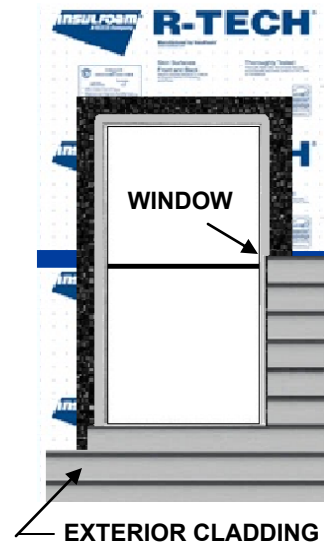
STEP 4



STEP 5



STEP 6



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INSTALLATION INSTRUCTIONS

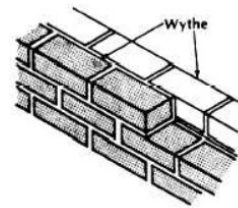
APPLICATION OF INSULFOAM R-TECH TO A CAVITY WALL:

1. Cut the inner wall's mortar joints flush with the CMU to provide an even surface for the R-TECH insulation board.
2. Beginning at the bottom of the inner wythe, install boards with the metallic reflective facer towards the dead air space. Cut R-TECH to fit snugly around all through-wall penetrations.
3. Secure R-TECH in conformance with local building codes and/or specifier's recommendations. Always keep the R-TECH above the level of the outer wall. Leave sufficient space between the R-TECH insulation and the outer wythe (at least 1"). The use of a EPS compatible adhesive or mechanical fastener may be used.

4. Stagger additional layers of R-TECH and butt the ends tightly.

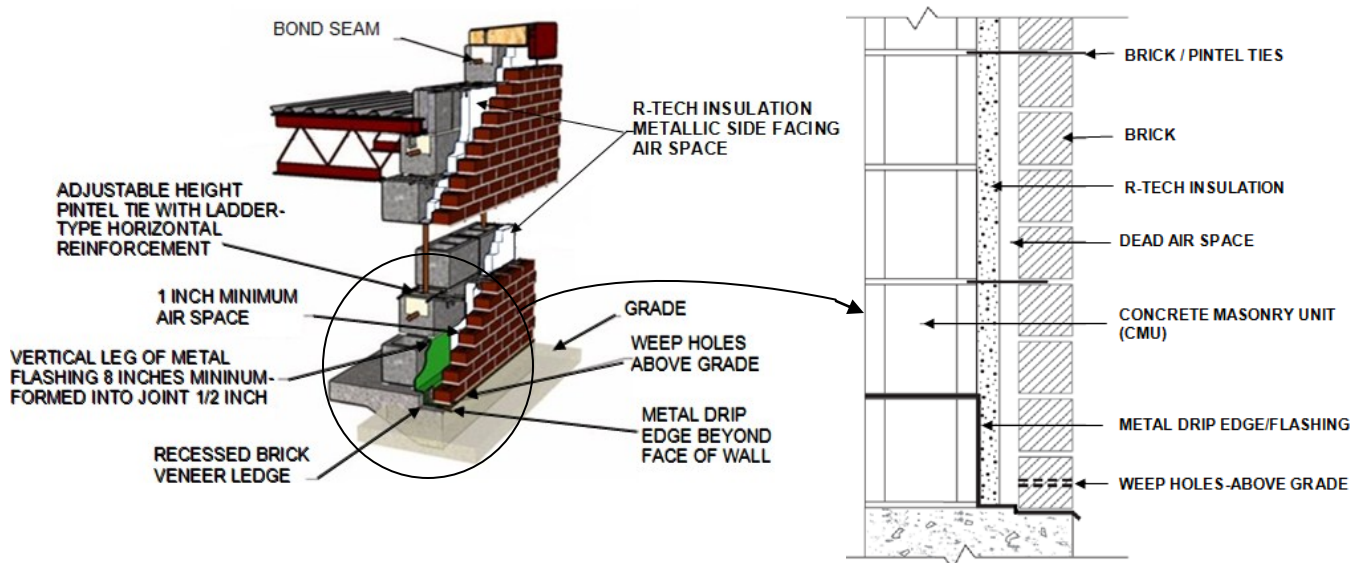
For an additional air barrier, tape all joints with InsulFoam Poly-Guard 136 tape or code compliant sheathing tape.

Enhanced R-Values-in certain applications, increased R-Values can be obtained by placing the metallic reflective (MR) side of the R-TECH towards a dead air space. R-Value gain is dependent on the amount of dead air space between the R-TECH and outer surface. R-Value gains are based on the ASHRAE Handbook of Fundamentals.



A wythe is a continuous vertical section of masonry one unit in thickness. A wythe may be independent of, or interlocked with, the adjoining wythe. A single wythe of brick that is not structural in nature is referred to as a veneer.

Typical Cavity Wall Application



Typical Physical Properties of R-Tech

Property	Type I	Type VIII	Type II	Type IX	Test Method
Nominal Density (pcf)	1.0	1.25	1.5	2.0	ASTM C303
C-Value (Conductance) BTU/(hr•ft ² •°F)					ASTM C518 or ASTM C177
(per inch) @ 25° F	.23	.22	.21	.20	
@ 40° F	.24	.235	.22	.21	
@ 75° F	.26	.255	.24	.23	
R-Value (Thermal Resistance) (hr•ft ² •°F)/BTU					ASTM C518 or ASTM C177
(per inch) @ 25° F	4.35	4.54	4.76	5.00	
@ 40° F	4.17	4.25	4.55	4.76	
@ 75° F	3.85	3.92	4.17	4.35	
Compressive Strength (psi, 10% deformation)	13	16	20	28	ASTM D1621
Flexural Strength (psi)	33	40	50	70	ASTM C203
Dimensional Stability (maximum %)	< 2%	< 2%	< 2%	< 2%	ASTM D2126
Water Vapor Transmission (perms)	< 1.0	< 1.0	< 1.0	< 1.0	ASTM E96
Absorption (% vol.)	< 1.0	< 1.0	< 1.0	< 1.0	ASTM C272
Capillarity	none	none	none	none	–
Flame Spread	< 20	< 20	< 20	< 20	ASTM E84
Smoke Developed	150 - 300	150 - 300	150 - 300	150 - 300	ASTM E84

*Properties are based on data provided by resin manufacturers, independent test agencies and Insulfoam.