

R-TECH®

Description

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 laminated metallic reflective facers, white facers or a combination of the two. The core of R-Tech is the same high-quality EPS as our InsulFoam insulations and meets or exceeds the requirements of ASTM C578 *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*. R-Tech has excellent dimensional stability, compressive strength and water resistance properties. R-Tech is an ENERGY STAR® qualified insulation and can contribute towards LEED® credits.

Uses

R-Tech has been used successfully for numerous commercial, industrial and residential applications. The following are examples of the many R-Tech applications:

- Siding Underlayment
- Basement Walls
- Cavity Walls
- Crawl Spaces
- One-Coat Stucco
- Below Concrete Slabs
- In Floor Radiant Heating

Advantages

- Labor Savings. Available in 4' x 8' panels and in 100 ft² (one-square) and 200 ft² (two-square) bundles, and is lightweight enough that the average contractor can carry 400 ft² at one time.
- Environmentally Friendly. R-Tech does not contain any ozone-depleting blowing agents, may contain recycled material and the foam core is 100% recyclable.
- Stable R-value. The product's thermal properties will remain stable over its entire service life. There is no thermal drift, so the product is eligible for an Insulfoam 20-Year Thermal Performance Warranty.
- Water Resistance. R-Tech facers provide a surface that is virtually impervious to moisture.
- Insect and Mold Resistance. R-Tech can be manufactured with an inert additive that deters termites and carpenter ants. R-Tech does not sustain mold and mildew growth.



University of Alaska at Fairbanks

Benefits

Insulfoam is committed to ensuring that R-Tech Insulation products comply with the current editions of the 2012 International Building Code (IBC), International Residential Code (IRC) and International Energy Code (IECC).

R-Tech is listed with numerous agencies for compliance with building codes such as:

- ◆ Underwriters Laboratories ULEX report ER14313.01; NFPA 285 - Standard Fire Test for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Assemblies Containing Combustible Components
- ◆ Underwriters Laboratories Categories:
 - * TGFU (Roofing)
 - * QORW (Polystyrene Thermal Insulation, Rigid Cellular Type + ASTM C578)
- ◆ Florida Department of Business & Professional Regulation FL14328-R1
- ◆ Miami Dade County Florida - NOA No.: 14-0311.07
- ◆ Canadian Construction Materials Centre—CCMC Evaluation Listing Number 13548-L
- ◆ Factory Mutual FM Approvals (Roof Nav).
- ◆ ICC-ES - Evaluation Report ER 1788

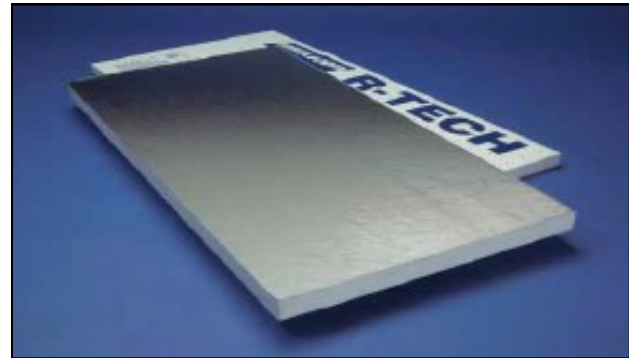
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INSTALLATION INSTRUCTIONS

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.

| SUBSTRATE | ADHESIVE TYPE [TUBE] | APPLICATION RATE |
|-----------|----------------------|-------------------|
| WOOD | URETHANE | 1/4" BEAD- 16" OC |
| METAL | URETHANE | 1/4" BEAD- 16" OC |
| CONCRETE | URETHANE | 1/4" BEAD- 16" OC |



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

- ◆ 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)
- ◆ Caulk Gun
- ◆ Tape Measure
- ◆ Utility Knife
- ◆ Straightedge

Protective Gear

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

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INSTALLATION INSTRUCTIONS

APPLICATION OF INSULFOAM R-TECH BELOW CONCRETE SLAB ON GRADE RADIANT IN FLOOR HEATING SYSTEMS



Radiant floor heating has been used in building designs for decades. Presently, insulation materials and technology have increased the benefits of radiant heated floors, offering the promise of cost-efficient comfort for residential and commercial construction applications.

Insulfoam—a division of Carlisle Construction Materials Inc., manufactures several suitable R-TECH insulations for use with radiant in-floor heating systems. R-TECH insulation products can be manufactured with high compressive strength, excellent resistance to moisture and proven long term R-value for radiant floor applications.

The variety of densities of R-TECH offer compressive strengths which allows architects and designers to select the right product for calculated design loads. Insulfoam sales representatives can assist with the right product to meet your specifications.

Vapor retarders under the slab are an important part of these systems, and a moisture barrier installed beneath the foam insulation is also often advised. Consult your local building code.

Design of Concrete Slabs on Grade Supported by R-TECH Insulation:

Insulated concrete slabs are common in cold storage facilities. These slabs and the layers below must be capable of supporting the live and dead loads imposed by vehicles, stationary or moving equipment, loaded storage racks and pedestrian traffic. InsulFoam R-TECH Expanded Polystyrene (EPS) insulation provides support beneath insulated concrete floor slabs. The slab and supporting layers must be designed with consideration given to the rigidity of each layer. Proper design avoids excessive deflection which can result in cracking.

Note: It is recommended that final insulated concrete slab design be specified by a professional architect or engineer.

Insulfoam—a division of Carlisle Construction Materials Inc., recommends professional Architects, Engineers and Installers be familiar with insulated concrete slab design and construction.

Reference sources are:

- *The American Society of Civil Engineers*—Publishes documents that can be helpful for floor and slab construction. Two publications that deal with suspended slab construction are the “ASCE Standard for the Structural Design of Composite Slabs” (ANSI/ASCE 3-91) and “ASCE Standard Practice for Construction and Inspection of Composite Slabs” (ANSI/ASCE 9-91).
- *American Concrete Institute*- Guide for Concrete Floor and Slab Construction- ACI 302.1R-96
- Radiant Professionals Alliance
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APPLICATION OF INSULFOAM R-TECH BELOW CONCRETE SLAB ON GRADE RADIANT IN FLOOR HEATING SYSTEMS

Maximum Allowable Stress on R-TECH Insulation:

A concrete slab must be capable of distributing loads over an area sufficiently large so that pressure on underlying layer(s) does not exceed allowable limits. When R-TECH insulation is used below the slab, allowable stress limits are defined based on a percentage of the R-TECH insulation's minimum compressive strength as shown in Table 1.

TABLE 1

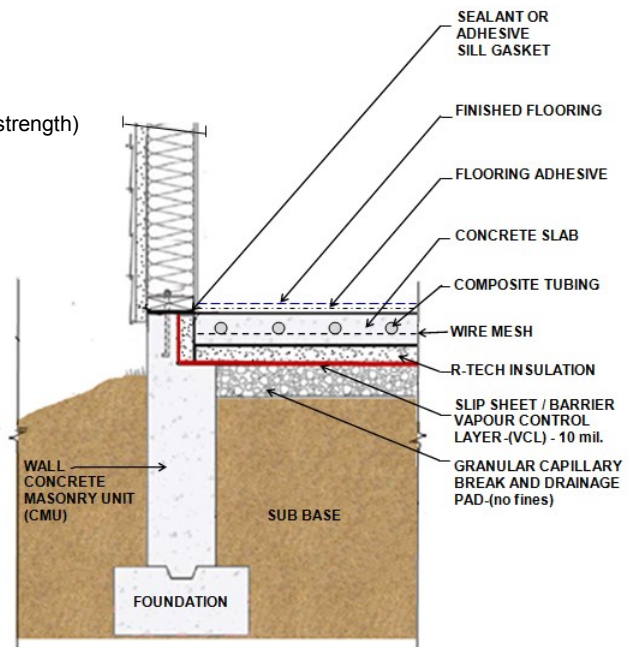
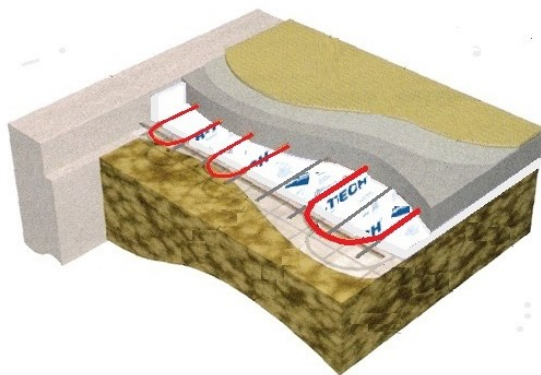
| PROPERTY | TYPICAL PROPERTIES OF INSULFOAM R-TECH INSULATIONS | | | | | | |
|-------------------------------------------------------------|----------------------------------------------------|----------|-------------|----------|-----------|-----------|------------|
| | UNITS | R-TECH I | R-TECH VIII | R-TECH X | R-TECH IV | R-TECH VI | R-TECH VII |
| COMPRESSIVE RESISTANCE ¹ @ 1% DEFORMATION (min) | psi | 3.6 | 5.8 | 7.3 | 10.9 | 15.0 | 18.6 |
| COMPRESSIVE RESISTANCE ¹ @ 10% DEFORMATION (min) | psi | 10.0 | 13.0 | 15.0 | 25.0 | 40.0 | 60.0 |
| k (psi) for 1" thickness | psi | 360 | 580 | 730 | 1090 | 1500 | 1860 |

Max Pressure on InsulFoam R-TECH = $\frac{P}{8} \sqrt{\frac{K}{D}}$

KEY: ¹ = ASTM D1621

- P = Load on concrete slab (lbs)
- K = Sub Grade Modulus (k / R-TECH Thickness)
- D = $Eh^3 / 12(1-u^2)$
- E = Modulus of Elasticity of Concrete Slab 57000 * SQRT(concrete strength)
- h = Concrete Slab Thickness
- u = Poison's Ration of concrete (0.15)

[This equation is based on "Theory of Plates and Shells; Timoshenko and Woinowshy-Krieger, McGraw-Hill, 1959"]



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