



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

This is a general specification guide for use by experienced construction professionals in conjunction with approved construction practices and sound judgment. It is the responsibility of the specifier and the purchaser to ensure that R-Seal is suitable for the project and is ordered in the correct R-Value. Pacific Insulated Panel, DBA Pacific Insulation Products, does not assume any responsibility for how the content of this guide specification is applied to actual projects and is not responsible for any liability arising from errors or omissions in the building design, detailing, structural design, instructions, or installation.

R-SEAL GUIDE NOTE: This master guide specification includes guide notes intended solely for the specifier to assist in the specification writing. The notes are in red and should be edited, added, or deleted prior to release of the final guide specification as suitable to meet specific project requirements. Optional text is identified by the following square brackets [] and brackets should be deleted once filled in with the appropriate values.

SHORT FORM GUIDE SPECIFICATION
SECTION 07 21 00 THERMAL INSULATION
PRE-ENGINEERED METAL BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. SECTION INCLUDES: Roof and Wall single layer metal building insulation for new construction or existing buildings.
- B. RELATED SECTIONS:
 - 1. SECTION 13 12 00 Pre-Engineered Metal Buildings.
 - 2. SECTION 07 22 00 Roof & Deck Insulation.
 - 3. SECTION 07 25 00 Water-Resistive Barriers/Weather Barriers.
 - 4. SECTION 07 27 00 Air Barriers.

1.2 PRODUCT DESCRIPTION

- A. Furnish and install one piece flexible faced continuous rigid polyurethane insulation system in custom lengths with factory applied seal tabs [adhesive tabs with release film] for use on Pre-Engineered Metal Building roof, walls, and roof and walls. Product to be exposure rated for interior exposure without any additional thermal barrier required. Insulation system will provide continuity of the building envelope to meet current energy code requirements (including air barrier requirements) without any additional insulation or weather/moisture barriers necessary. Product to be white in color and of excellent surface appearance suitable for finished interior surface.



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

1.3 REFERENCED STANDARDS

A. ASTM International:

1. ASTM C-209 Standard Test Methods for Cellulosic Fiber Insulating Board.
2. ASTM C-518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM C-523 Method of Test for Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer.
4. ASTM D-543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
5. ASTM D-774 Standard Test Method for Bursting Strength of Paper.
6. ASTM C-1136 Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
7. ASTM C-1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
8. ASTM D-1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
9. ASTM D-1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
10. ASTM D-1693 Test Method for Environmental Stress Cracking of Ethylene Plastics.
11. ASTM D-1790 Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact.
12. ASTM D-2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
13. ASTM D-2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
14. ASTM D-6226 Standard Test Method for Open Cell Content of Rigid Cellular Plastics.
15. ASTM D-774 Standard Test Method for Bursting Strength of Paper.
16. ASTM E-779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
17. ASTM E-84 Standard Test Method for Surface Burning Characteristics of Building Materials.
18. ASTM E-96 Standard Test Methods for Water Vapor Transmission of Materials.

B. Underwriter's Laboratory:

1. UL-1715 Fire Test of Interior Finish Material.

C. ULC (Underwriter's Laboratory Canada):

1. CAN/ULC-S102-07 Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
2. CAN/ULC-S127-07 Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Foam Plastic Building Materials.

D. NATIONAL FIRE PROTECTION AGENCY:

1. NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

E. US GREEN BUILDING COUNCIL LEED (Leadership in Energy and Environmental Design) BD + C: New Construction.



1.4 ADMINISTRATIVE REQUIREMENTS

- A. PRE-INSTALLATION CONFERENCE/MEETING: Conduct a pre-installation meeting prior to product being manufactured.
 - 1. Attendees should include a representative from the manufacturers approved distribution partner, a representative from the purchaser, and a representative from the building erection company (if different).
 - 2. At this time review of project specific shop drawings per Section 1.5 E should be performed and signed off per Section 3.1 C should be completed if not done previously.
 - 3. Pre-Installation conference can be eliminated for simple projects if the erection company has installed R-Seal previously.
- B. ORDER LEAD TIME: R-SEAL needs to be released for fabrication when the Pre-Engineered Metal Building is released for fabrication to ensure timely job site delivery.
- C. INSTALLER CERTIFICATION: Installing contractor needs to comply with Section 3.1 B for R-SEAL installation certification.

1.5 SUBMITTALS

- A. Comply with [SECTION 01 33 00] - Submittal Procedures.
- B. PRODUCT DATA: Submit current brochure & manufacturer's technical literature showing compliance with specification requirements.
- C. INSTRUCTIONS: Provide installation instructions for the [roof, wall, roof and wall] product as appropriate and applicable.
- D. SAMPLES: Provide [two] product samples per thickness of R-Seal being supplied for the project.
- E. PROJECT SPECIFIC SHOP DRAWINGS:
 - 1. Shop drawings to be completed and provided by product manufacturer only.
 - 2. Provide elevation drawings showing panels in relationship to the building's primary framing, secondary framing, and openings. Include details for terminations and joints.
 - 3. Drawings to be accompanied by work order with panel width, lengths, and number.
 - 4. Drawings and work orders to include customer and project information.
 - 5. [Include additional details for projects intended to be tested per ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.]

1.6 QUALITY ASSURANCE

- A. Provide manufacturer listing numbers or data sheet indicating product compliance with requirements as requested.
- B. Provide manufacturer's written installation instructions including proper material storage, material handling, panel location, details, and required accessories.
- C. Demonstrate that product meets building envelope air leakage per ASTM E779 when required by energy code, specifier request, or owner's requirement.



1.7 SUBSTITUTIONS

- A. Any substitutions must be detailed for the specific project and have equal or better thermal, fire, and air barrier performance.
 - 1. Substitutions must be rigid insulation with a flame spread of 20 or less and smoke development of less than 100.
 - 2. Substitutions must be polyurethane core with white flexible faced insulation system designed specifically for metal buildings.
 - 3. Substitutions must that come in individual lengths as required for each project.
[Stock sizes not allowed.]
 - 4. Substitutions must be rigid insulation system that has specific layout and detailing package for each project completed by manufacturer. [Stock sizes not allowed.]

1.8 LEED CONTRIBUTION

- A. LEED BD+C: New Construction
 - 1. Energy and Atmosphere (EA): Demonstrating percentage of performance improvement compared with baseline building rating.
 - 2. Material and Resources (MR): For products and materials required to comply with requirements for regionally manufactured materials. Include statement indicating cost, location of manufacturer, and distance to project for each regionally manufactured material.
 - 3. Indoor Environmental Quality (IEQ): For sealants, paints, and coatings, including printed statement of VOC content.
 - [4. Innovation in Design (ID): Include specific requirements related to documenting credit.]

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Product to be manufactured by Pacific Insulated Panel, DBA Pacific Insulation Products, or approved licensee:
 - 1. PO Box 12604, Everett, WA 98188.
Phone (877)-300-3794. www.pacificinsulationproducts.com.
- B. Product to be purchased through the following approved distributors:
 - 1. Therm-All Insulation: 31387 Industrial Parkway, North Olmsted, OH 44070.
Phone (800)-886-9494. www.therm-all.com.
 - 2. Daw Construction: 12552 S 125 W, Draper, UT 84020.
Phone (801) 553-9111. www.dawcg.com.
 - 3. Total-R: #C122, 2726 - 45 Avenue, S.E., Calgary, AB T2B 3M1.
Phone (403)-243-7567. www.total-r.com.
 - 4. WinRoc/SPI: 18270 Segale Park B Drive, Seattle, WA.
(253)-872-0800. www.spi-co.com/paragon.html.



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

2.2 SYSTEM DESCRIPTION

- A. Install project specific insulation pieces on exterior of Pre-Engineered Metal Building secondary framing [wall girts and/or roof purlins] with insulation permanently held in place with exterior metal panels.

2.3 PERFORMANCE CRITERIA

- A. FIRE RESISTANCE: Able to be left exposed to interior of the building without an additional approved thermal barrier.
 - 1. ASTM E84: Class A per ASTM E84 with Flame Spread of 20 or less and smoke development of 100 or less.
 - 2. NFPA 286: Successfully passed acceptance criteria.
 - [3. UL 1715: Successfully passed acceptance criteria.]
- B. THERMAL PERFORMANCE: Per ASTM 518 90 Day aged 1" R-7.5 measure at 75 Degree Fahrenheit Mean Temperature. Nominal Thicknesses Available:
 - 1. 2.0" R-15.0 (U=0.064).
 - 2. 2.5" R-19.0 (U=0.052).
 - 3. 3.0" R-22.5 (U=0.044).
 - 4. 4.0" R-30.0 (U=0.031).
 - 5. 5.0" R-37.5 (U=0.027).
- C. AIR BARRIER PERFORMANCE:
 - 1. Materials with an air permeability no greater than 0.004 cfm/foot squared under a pressure differential of 0.3 inches water gauge (75 pa) when tested in accordance with ASTM E-2178 (Materials Test).
 - 2. Assemblies of materials and components with an average air leakage not to exceed 0.04 cfm/foot squared under a pressure differential of 0.3 inches water gauge (75 pa) when tested in accordance with ASTM E-2357.
 - 3. The completed building shall be tested and the air leakage rate of the building envelope not to exceed 0.4 cfm/foot squared under a pressure differential of 0.3 inches water gauge (75 pa) when tested in accordance with ASTM E-779.
- D. ENERGY CODE: Supplied insulation will be demonstrated to meet the project specific energy code requirements for the building envelope with completed compliance documentation prepared by a Certified Energy Plans Examiner supplied upon request.
- E. PRODUCTS NOT MEETING OR EXCEEDING ALL TESTING AND PERFORMANCE CRITERIA ARE NOT PERMITTED FOR USE ON THE PROJECT'S EXTERIOR ROOF OR WALLS.

2.4 MATERIALS

- A. COMPOSITE MATERIAL
 - 1. Maximum Flame Spread of 20 or less and maximum Smoke Developed of 100 or less tested in accordance with ASTM E-84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. NFPA 286: Successfully passed acceptance criteria.



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

B. CORE

1. Dimensional Stability <0.4% maximum change when tested for 28 days in accordance with ASTM D-2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
2. Compressive Modulus to be >700 lb./in. sq. parallel and >400 lb./in. sq. ft. perpendicular when tested in accordance with ASTM D-1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
3. Water absorption to be <1.6% by weight when tested for 96 hours in accordance with ASTM D-2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
4. Water absorption to be <0.1% by volume when tested for four hours in accordance with ASTM C209-12 Standard Test Methods for Cellulosic Fiber Insulating Board.
5. Aged R-Value shall be R-7.5 or greater for 1" at 75 degree mean temperatures verified by actual tested values per ASTM C-518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
6. Density to be 2.1# to 2.5# per cubic foot when measured per ASTM D-1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
7. Closed Cell content >92% when tested in accordance with ASTM D-6226 Standard Test Method for Open Cell Content of Rigid Cellular Plastics.
8. Percentage Weight Loss to be <1.8% when tested in accordance with C-421 Standard Test Method for Tumbling Friability of Preformed Block-Type and Preformed Pipe-Covering-Type Thermal Insulation.

C. VAPOR BARRIER

1. Light Reflectance to be >85% when tested in accordance with ASTM C-523 Method of Test for Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer.
2. Bursting Strength to be >120 psi when tested in accordance with ASTM D-774 Standard Test Method for Bursting Strength of Paper.
3. Tensile Strength to be >195lbs/inch width (MD) and >150 lbs/inch width (XD) when tested in accordance with ASTM C-1136 Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
4. Water Vapor Permeance to be <0.09 perms (grains/hr ft sq Hg) per ASTM E-96 Standard Test Methods for Water Vapor Transmission of Materials.
5. Vapor barrier to remain flexible with no delamination when tested at low temperature of <-40 degrees F and high temperature of >240 degrees F in accordance with ASTM D-1790 Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact.
6. No Growth when tested in accordance with ASTM C-1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
7. Vapor barrier highly resistant to solvents and chemicals when tested in accordance with ASTM D-543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
8. Vapor barrier has excellent resistance to environmental stress cracking when tested in accordance with ASTM D-1693 Test Method for Environmental Stress Cracking of



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

Ethylene Plastics when tested with common polar organic liquids, detergents, and silicone fluids.

- D. PRODUCTS NOT MEETING OR EXCEEDING ALL TESTING AND PERFORMANCE CRITERIA ARE NOT PERMITTED FOR USE ON THE PROJECT'S EXTERIOR ROOF OR WALLS.

2.5 ACCESSOIRES

- A. METAL TRIM [by Metal Building Manufacturer]
1. Base Trim: See instructions and approved details.
 2. Roof to Wall Transition: See instructions and approved details.
 3. Butt Joint Transition: 1.5" x 1.5" 18 gauge galvanized angle.
 4. Roof Bearing Plate: Use approved Metal Building Manufacturers Standing Seam Bearing Plate.
- B. TAPES
1. R-Seal Double Faced Application Tape to be 3/4" wide with release film.
 2. Matching R-Seal Patch Tape to be 3" wide with adhesive on one side of matching vapor barrier material.
- C. PENETRATION FILLER
1. GREAT STUFF™ Fireblock Insulating single component polyurethane insulating foam sealant [or equal that is ASTM E84 Class A and has passed UL 1715 or passed NFPA 286.]
 2. Approved two part quick cure polyurethane foam that has passed NFPA 286 and has been tested per ASTM E-84 to be Class A.
- D. SEALANTS [Required for completed building air barrier testing.]
1. Product to be non-skinning, non-drying sealant, elastomer with a non-stringy consistency and excellent resistance to severe environmental conditions to heat, cold, and moisture.
 2. Approved products to be approved for sealing polyurethane panel joints to achieve a positive seal at joints.
 - [3. Basis of design is Schnee-Morehead, Inc. Acryl-R SM5430.]

2.6 PACKAGING

- A. All product to arrive in sealed shrink wrapped UV packaging suitable to be left exposed on jobsite for up to 90 days.
- B. All packages to have identification of number of pieces, their lengths, and their location on the project building.



November 2014

Pacific Insulation Products

Short Form Guide Specification: THERMAL INSULATION AND AIR BARRIER

PART 3 – INSTALLATION

3.1 INSTALLER REQUIREMENTS

- A. Installation contractor must have installed [five] metal buildings in the previous [five] years or hire an approved installer for first project.
- B. All installers required to complete on line certification process to demonstrate understanding of insulation system and fundamentals of installation prior to starting project.
- C. Installer required to review and sign project specific shop drawings per Section 1.5 E prior to order being released for fabrication.

3.2 INSTALLATION

- A. Roof Installation: To be installed according to project instructions shipped with the order.
- B. Wall Installation: To be installed according to project instructions shipped with the order.
- C. Projects with Roof and Wall R-Seal to have continuity of thermal envelope sealed per recommended trim and provided project details.

3.3 FIELD QUALITY ASSURANCE

- A. Deliver panel materials in manufacturer's original, unopened, undamaged packaging with labels intact. Inspect for damage prior to signing Bill Of Lading.
- B. Storage to be per instructions with product supported off ground on dunnage.
- C. Handling per instructions.

END OF SECTION