

R-Seal

Rigid Envelope System Insulation Guide



Pacific Insulation Products

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Pacific Insulation Products serves the Pre-Engineered Metal Building market and commercial construction market throughout North America

We are an innovative company developing new products to meet today's stringent building envelope performance requirements.

Our primary objective is to provide the best finished envelope insulation system using a unique blend of skills and experience from metal building erection, product manufacturing, and sales fields.

By working closely with building manufacturers, dealers, and erectors, we become a part of your team to provide quality project delivery.

In pursuit of excellence our team has the following memberships, certifications, and accreditations:

- IECC Certified Commercial Energy Plans Examiner
- International Code Council (ICC) Member
- Northwest Energy Efficiency Council (NEEC) Member
- AIA Registered Speaker (Metal Buildings & Metal Building Insulation)
- US Green Building Council (USGBC) Member
- Metal Building Contractors and Erectors Association (MBECA)
- National Insulation Association (NIA) Member
- AIA 2030 Challenge Adopter
- National Save Energy Coalition Member

R-Seal: Rigid Envelope System

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Description:

Pacific Insulation Products proprietary rigid polyurethane insulation (R-Seal) is specifically designed and produced for metal building erectors. R-Seal provides the most economical and lowest installed cost method to meet current energy code requirements for continuous insulation, air barrier requirements, and higher installed R-Values.

With the highest R-Value per inch in the industry, custom lengths, integral tape tabs, and individual building detailing, this product installs as fast as blanket insulation with higher installed R-Values than Banded Liner Systems alone can achieve.

Applications:

In addition to meeting the energy code and air barrier requirements for new construction of Pre-Engineered Metal Buildings R-Seal is a great solution for retrofits of existing buildings.

With proper trim and detailing the durable surface is also a suitable application for Walk-In Coolers, with the board able to be fastened directly to the interior of Metal Building framing using a thermally broken fastener.

Products		
R-Value	Thickness (inches)	Joint Style
R-15	2.0"	Butt
R-19	2.5"	Butt
R-22	3.0"	Butt/Shiplap
R-27	3.5"	Butt/Shiplap
R-30	4.0"	Butt/Shiplap

Tolerances subject to normal manufacturing variations.

Technical Data	
*Fire hazard classification: (Composite: Facing/Foam Core/Facing)	Flame Spread <25 Smoke Developed <450
Full Scale Fire Test: (Tested to IBC Section 2603.9 standards)	UL 1715 PASS CAN/ULC-S138 PASS
Air Barrier Performance:	Component: Less than 0.004CFM Assembly: Less than 0.04CFM Building: Less than 0.4CFM

*The above flame spread rating was determined in accordance with ASTM E-84. This standard is used solely to measure and describe properties of materials and products in response to heat and flame under controlled laboratory conditions. This numerical flame spread is not intended to reflect hazards presented by this or any other material under actual fire conditions.

Comparison of R-Seal Versus Common Polyisocyanurate Rigid Boards

Attribute	R-Seal Board	Polyisocyanurate Board
R Value Per Inch	7.5	6.5
Compressive Strength	31psi	20psi
Density	2.2-2.5 lb/sq ft	2.0 lb/sq ft
Dimensional Stability	Good	Fair
Exposure Rated Foam	Yes	Thermax Only
Custom Lengths	Yes	No
Finished Seams	Yes	Requires Additional Products & Installation
Installation Details	Yes	Not Available

R-Seal: System Fundamentals

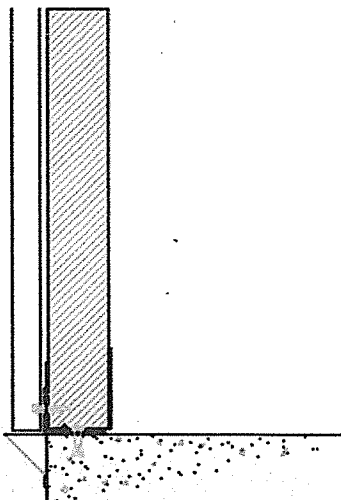
For new construction R-Seal installs in a very similar manner to traditional laminated Metal Building Insulation.

Preparation:

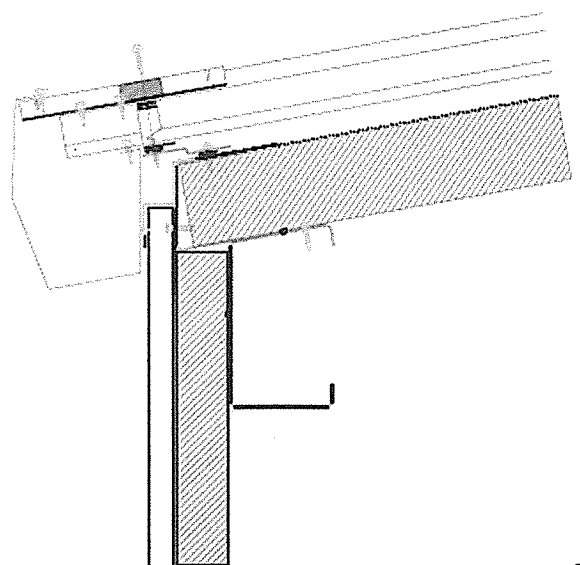
When the building manufacturer is aware that rigid foam is going to be used on the building envelope they will detail the trim package, just as would be done with Insulated Metal Panels, thereby ensuring a proper flashing package for the thickness of rigid board being supplied. Longer fasteners need to be specified for the through fastened wall and/or roof sheeting and proper considerations for sheer need to be made. For Standing Seam Roofs a bearing plate style clip should be specified.

Wall Installation:

The base trim and/or the concrete needs to be configured to support the bottom of the panel. Double faced tape at the eave and at the base is used to hold the panel in place prior to wall sheeting just as when installing traditional "blanket" MBI. The panel should also be fastened at the top and bottom with two screws. If wind is an issue, a self-tapping screw with a fender washer can be used at the intermediate girts for additional support.



Base Detail



Eave Detail

R-Seal: Installation Basics

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Wall Installation:

For walls less than 24' the panel is typically supplied in one piece from base to eave. For taller eave heights the panel will be detailed to stop at a girt line. It is recommended that an "L" angle be attached to this girt to properly support the edges of the upper and lower panel.

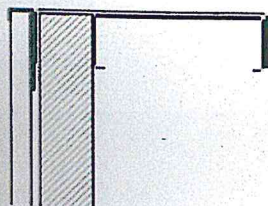
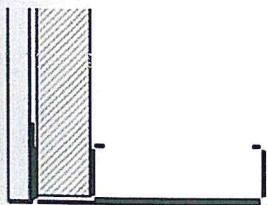
Trimming around the windows and doors can be done with a reciprocating saw as the edges will be covered with the Metal Building trim package.

Roof Installation:

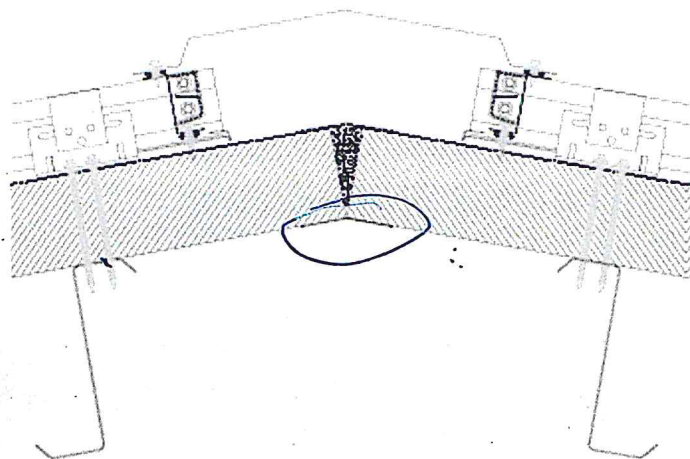
The bottom edge of the roof panels are held in place with framing "J" supplied by with the Metal Building Manufacturer. As with the wall panels the roof can be temporarily held in place with double faced tape until the roof is sheeted. The roof panels are typically supplied in 20' or shorter lengths (typically whatever length spans three or four purlins). They will break on a purlin and it is recommended that an "L" angle be attached to the purlins to properly support the edges of the upper and lower panel.

At the ridge it is optional to use a 6" piece of sheet stock bent to the roof pitch to secure the panel joint at the ridge.

Roof and wall dings can be repaired with a readily available can of spray foam and supplied patch tape.

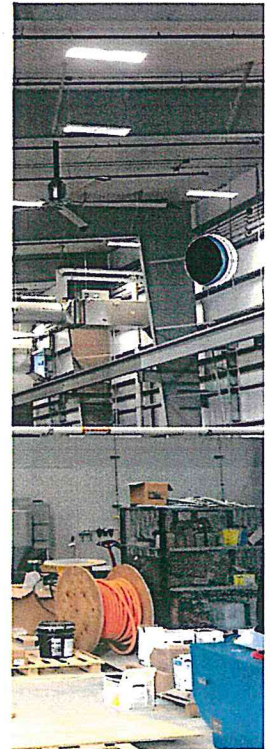
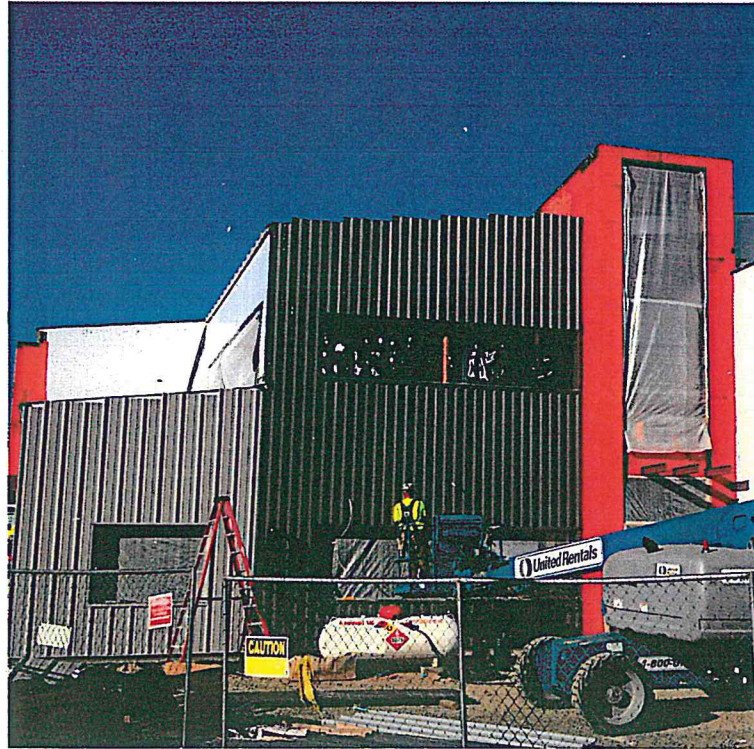


Framing Opening Detail



Ridge Detail

R-Seal: Applications



R-Seal's applications and uses span many

Warehouses

Manufacturing Plants

Distribution Facilities

Aerospace & Aviation

Agricultural Buildings

Walk-In Coolers

Food Processing Facilities

Wineries

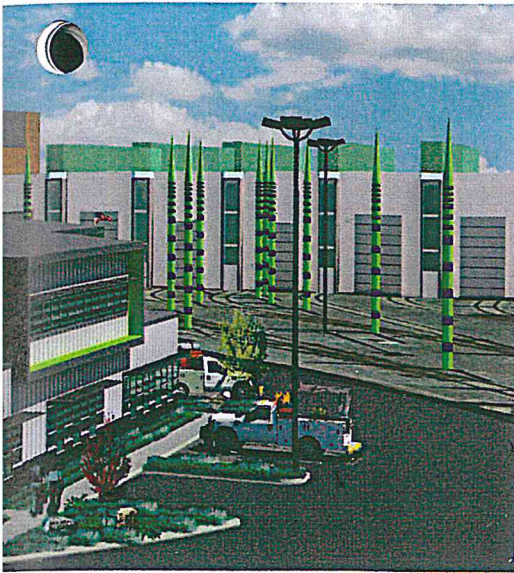
Public Works

Military Buildings

Federal & State

Municipal

R-Seal: Applications



ifferent types of metal building construction

& Sanitation
ngs
e Facilities
dings

Schools & Universities
Community Centers
Convention Centers
Worship Facilities

Offices & Retail Stores
Showrooms
Athletic Centers
And Many More...

R-Seal: Air Barrier Applications

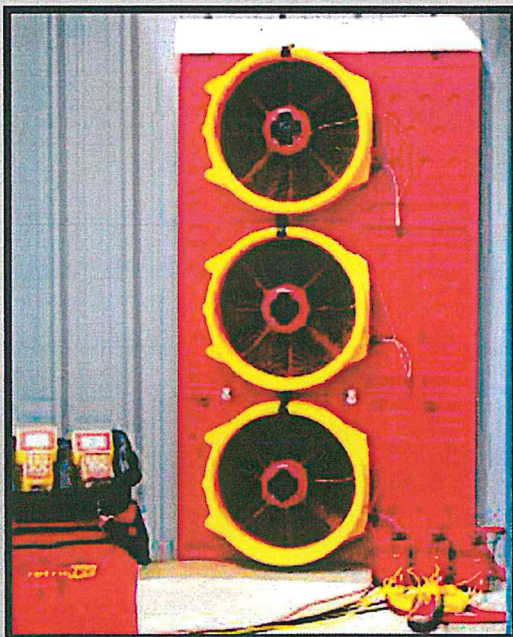
Air Barriers are being specified more and more frequently to comply with USACE (US Army Corps of Engineers), IGCC (International Green Conservation Code), and NZEB (Net Zero Energy Buildings). The reason is that a highly insulated and air tight building envelope is the first step to improving a building's energy efficiency.

Metal buildings face significant challenges when required to pass the Whole Building Air Barrier Pressure Test. R-Seal overcomes these challenges by placing the insulation on the exterior of the building envelope in a continuous layer that is uninterrupted by framing, and that vastly simplifies the detailing required to seal correctly.

Each building presents unique challenges, but the base requirements to upgrade R-Seal to an insulation package that meet air barrier includes using non-skinning butyl at the panel laps, panel joints, as well as at the base and eave transitions.

Pacific Insulation Products works with the building designer, manufacturer, and the erector to make sure that your Pre-Engineered Metal Building Air Barrier projects are successful. We can also provide "Pre-Testing" services to verify that the building meets the testing required prior to sub-trades commencing their work.

Building Performance Testing/Benchmarking



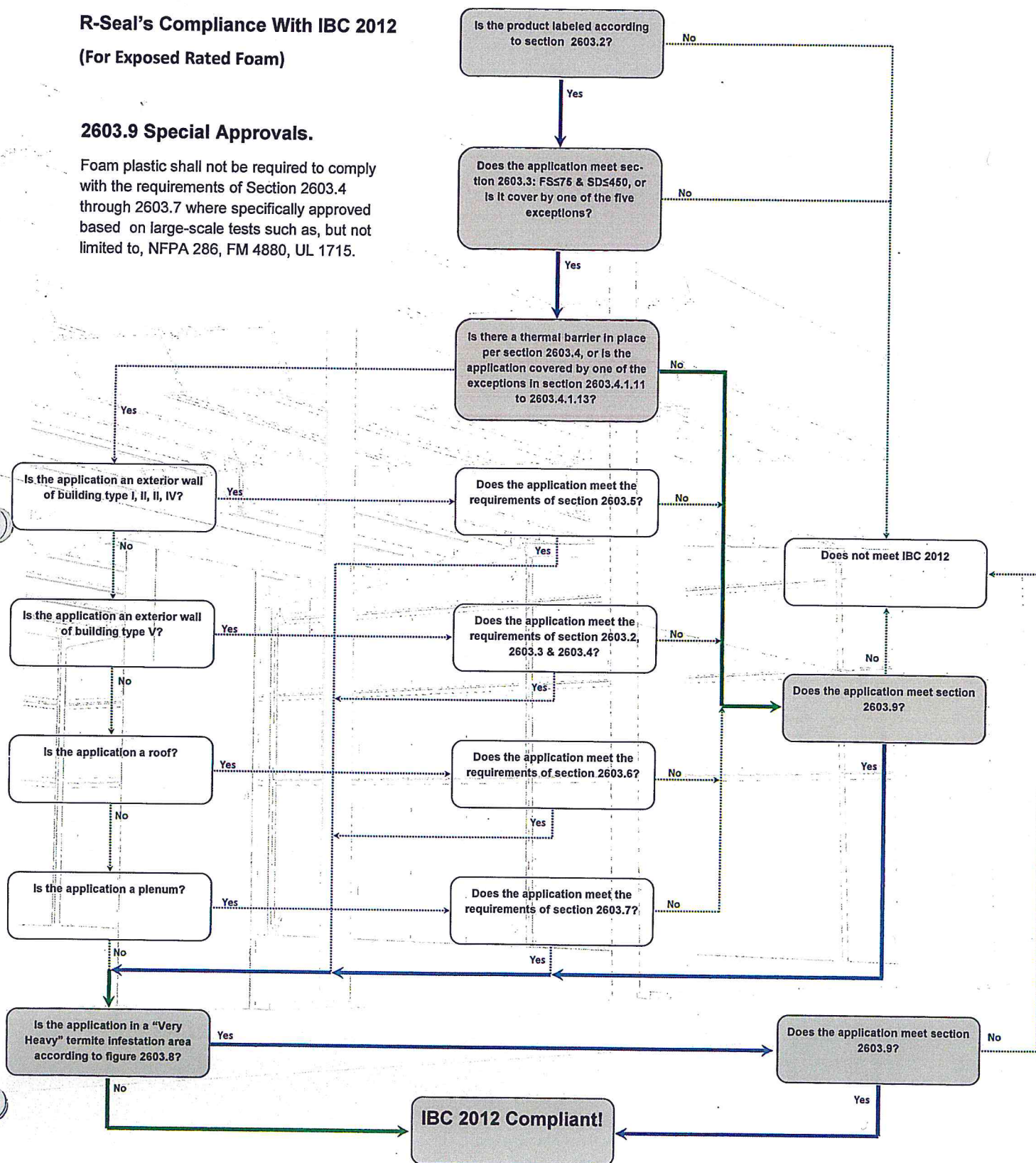
R-Seal: IBC Compliance Path

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R-Seal's Compliance With IBC 2012 (For Exposed Rated Foam)

2603.9 Special Approvals.

Foam plastic shall not be required to comply with the requirements of Section 2603.4 through 2603.7 where specifically approved based on large-scale tests such as, but not limited to, NFPA 286, FM 4880, UL 1715.



R-Seal: Material Data Sheet

PHYSICAL PROPERTIES	ASTM METHOD	ENGLISH UNITS	VALUES
COMPOSITE			
SURFACE BURNING FLAME SPREAD UP TO 6" SMOKE GEN. UP TO 6"	E-84		20 450
R-VALUE (PER INCH)	C-518	hr·ft ² ·°F/Btu	7.5
CORE			
DENSITY	D-632	lb/ft ³	2.25 +/- .25
COMPRESSIVE STRENGTH -PARALLEL -PERPENDICULAR	D-1621	lb/in ²	40 23
COMPRESSIVE MODULUS -PARALLEL -PERPENDICULAR	D-1621	lb/in ²	1400 266
K-FACTOR	C-518	Btu·in/hr·ft ² ·°F	0.137
WATER VAPOR TRANSMISSION	E-96	perm-inch	2.27
WATER ABSORPTION (96hr IMMERSION)	D-2842	%	1.66
CLOSED CELL	D-2856	%CLOSED	87
NBS SMOKE DENSITY	E-662		220
DIMENSIONAL STABILITY			
100°F / 100% RH @ 28 DAYS		% CHANGE	-0.461
158°F / 100% RH 28 DAY	D-2126	% CHANGE	1.806
158°F 28 DAY		% CHANGE	-0.941
200°F 28 DAY		% CHANGE	-0.569
-20°F 7 DAY		% CHANGE	-0.178
SURFACE BURNING FLAME SPREAD SMOKE GENERATION (UL SUBJECT 723(FILE #R5692-6" CORE)	E-84		25 450
MINIMUM SELF-IGNITION TEMP	D-1929	°F	932
MINIMUM FLASH-IGNITION TEMP	D-929	°F	698
TENSILE STRENGTH	C-1136	lb/in ²	100
BURSTING STRENGTH	D-774	lb/in ²	35
PUNCTURE RESISTAN	C-1136	beach units	
THICKNESS	MICROMETER	in	0.007
PERMEANCE	E-96 (PROCEDURE A)	perm	0.02
MOLD RESISTANCE	C-665/C-1338		NO GROWTH
EMISSIONITY	E-408		0.03 - 0.8
SURFACE BURNING FLAME SPREAD SMOKE GENERATON	E-84		10 35

R-Seal: Specification Guide

RIGID AIR/VAPOR BARRIER INSULATION PANEL: Rigid closed cell foam board insulation panel consisting of a polyurethane foam core laminated between fiber-reinforced polypropylene.

1. Manufacturer/Product: Pacific Insulation Products, R-SEAL.
2. Board Edges:
 - A) Tongue and Groove
 - B) Butt Joint
3. Facers: PS (Polypropylene/Scrim) bonded to rigid foam.
4. Tape Tab: Pacific Insulation products primary and/or secondary tape tab/tabs for air tight seal of air/vapor barrier seams.
5. The panel core shall have a flame spread no greater than 25 and a smoke development no greater than 450 when tested in accordance with ASTM E 84 test method.
6. The panel shall comply with chapter 26 of the 2009 IBC.
7. Compressive Strength (Core) Per ASTM D1621:
 - A) Parallel: 31 psi
 - B) Perpendicular: 16 psi
8. Compressive Modulus (Core) Per ASTM D1621:
 - A) Parallel: 721 psi
 - B) Perpendicular: 433 psi
9. Water Absorption (Core) Per ASTM D2842: 1.6%
10. Dimensional Stability (Core):

100°F/100% RH @ 28 days	0.1
158°F/100% RH @ 28 days	0.4
158°F @ 28 days	0.0
200°F @ 28 days	0.1
-20°F @ 7 days	0.3
11. Total R-Value: As indicated on drawings.
12. LEED Requirement: Must contribute to Recycled Content Credit MRc4.1 & MRc4.2: Rigid insulation shall contribute to 10% post-consumer content.
13. Air Barrier Materials Air Permeance: Not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 w.g. (1.57 psf or 75 Pa) when tested in accordance with ASTM E2178.
14. Air barrier systems shall accommodate changes in the substrate and perimeter sealing conditions.
15. Different air barrier systems shall be permanently joined together in a manner approved by both manufacturers.

Accessories:

1. Spray Foam: Spray polyurethane foam sealant as required for gap filler.
2. Butyl Sealant: Butyl rubber, non-drying, non-skinning, non-curing; SM5430 butyl rubber sealant manufactured by SCHNEE-MOREHEA for application between panel edges and miscellaneous sealing where butyl tape is not adequate for airtight seal.
2. Butyl Tape: 1 inch wide by 1/8 inch thick butyl tape.
3. Patch Tape: 3 inch wide roll adhesive PS.
4. Screws:
 - A) SPS Thermally Broke fastening system
 - B) Tec-4 Panel fasteners



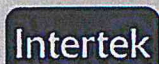


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