Development Services

From Concept to Construction

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APPEAL SUMMARY

Status: Decision Rendered - Held over from ID 21855 (9/11/19) for additional information

Appeal ID: 21984	**Project Address:** 3192 SW 12th Ave, Bldg 1
Hearing Date: 10/9/19	**Appellant Name:** Gabriel Headrick, AIA
Case No.: B-013	**Appellant Phone:** 5033488874
Appeal Type: Building	**Plans Examiner/Inspector:** Chris Pagnotta, Ali Sohelli
Project Type: commercial	**Stories:** 5 **Occupancy:** R-2, S-2 **Construction Type:** V-A, I-A
Building/Business Name: Marquam Hill Apartments - Building 1	**Fire Sprinklers:** Yes - all
Appeal Involves: Erection of a new structure,Reconsideration of appeal	**LUR or Permit Application No.:** 19-135368-CO
Plan Submitted Option: pdf [File 1] [File 2] [File 3] [File 4]	**Proposed use:** Apartments - R2

APPEAL INFORMATION SHEET

Appeal item 1

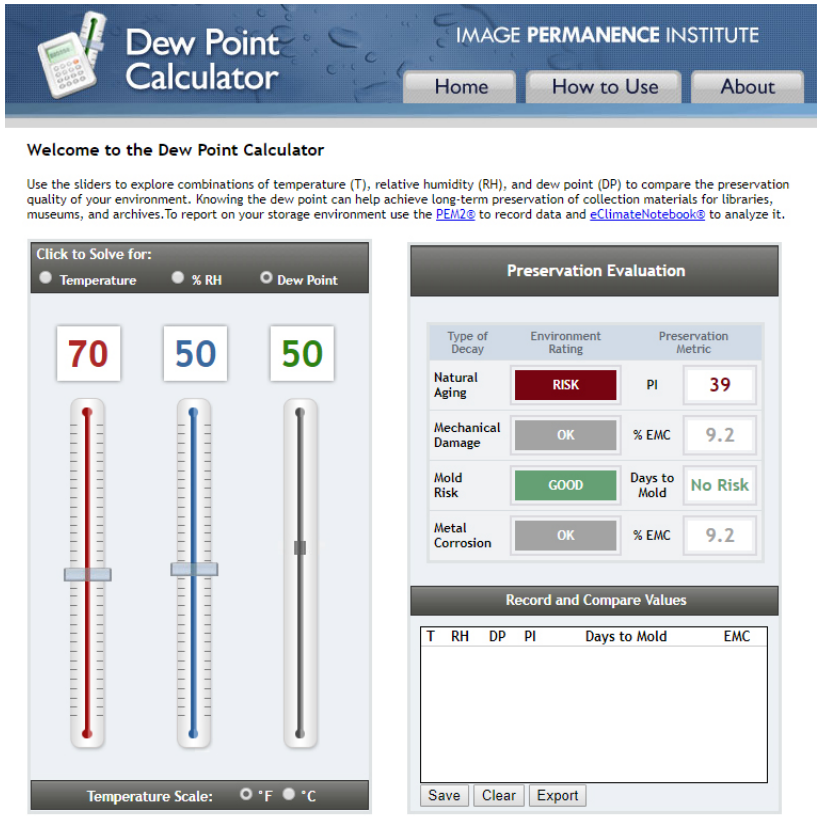
Code Section	2014 OSSC 1203.1 Attic Spaces, 1203.2 Ventilation
Requires	Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of the roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. An airspace of not less than 1-inch shall be provided between the insulation and the roof sheathing.
Proposed Design	Based on feedback from the original appeal we've made modifications to the proposed design. The ventless roof assembly shall consist of 5" of polyiso rigid insulation above the plywood sheathing and 6" min. fiberglass BIBS (blown in batts) within the framing cavity, tight to the underside of the sheathing. At over R50 this far exceeds the R38 requirement while meeting the dew point criteria requested from the last appeal. The assembly meets option 5.1.2 of section 1202.3 of the 2018 IBC. Please see attached details and calcs.
Reason for alternative	The proposed assembly meets the requirements of option 5.1.2 of section 1202.3 of the 2018 IBC which will soon be adopted into the OSSC. The assembly raises the dew point above the blown in insulation so ventilation is not required. The assembly also exceeds insulation levels previously approved in appeal 20188.

APPEAL DECISION

Unvented roof assembly: Granted as proposed.

The Administrative Appeal Board finds that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.

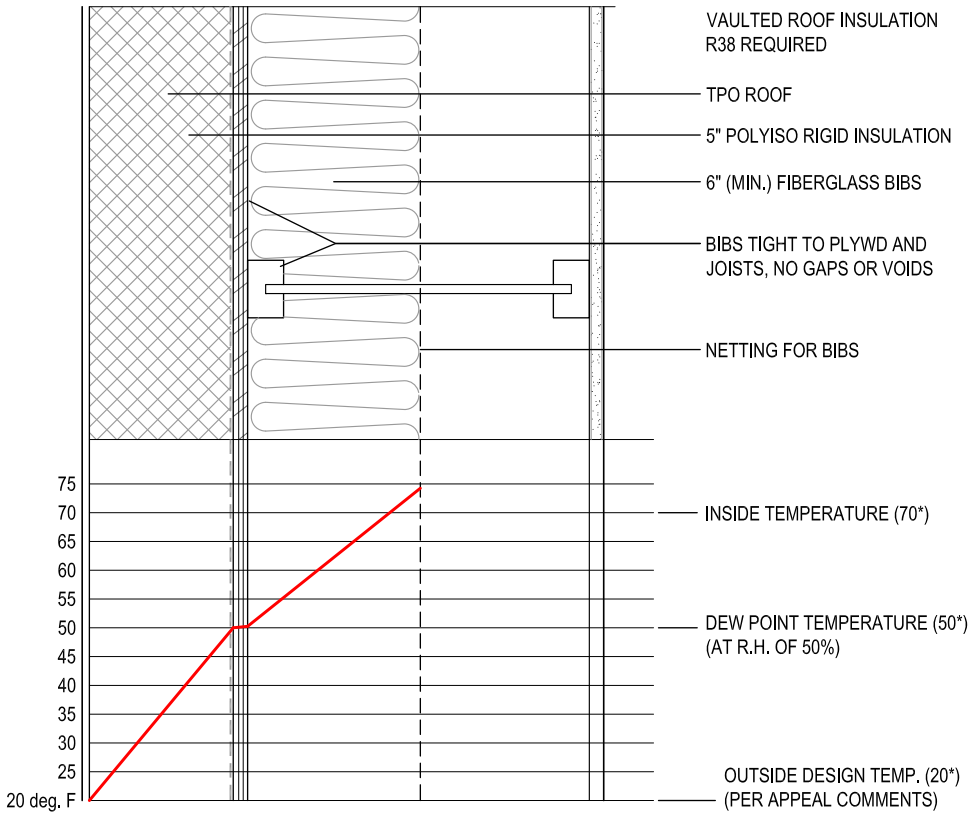


The dew point temperature determines what combinations of temperature and RH will be possible in the storage environment. At a constant dew point, when the temperature goes up, the RH goes down and when the temperature goes down, the RH goes up. Controlling the dew point is key to managing the risk of material decay. What's your dew point? If you know the T & RH in your space you can use the DP Calculator to get the DP. If your building does not have humidification or dehumidification, the indoor dew point is the same as the outdoor dew point.

MARQUAM HILL APARTMENTS VENTLESS ROOF CALCS:

OUTSIDE DESIGN TEMP: 20 DEG.
INTERIOR DESIGN TEMP: 70 DEG.
RELATIVE HUMIDITY: 50%

DEW POINT: 50 DEG.



1 TYPICAL VAULTED ROOF ASSEMBLY - DEW POINT ANALYSIS
N.T.S.

R-VALUES	
TPO ROOF:	0.0
POLYISO (R5.9 / INCH) x 5"	29.5
¾" PLYWOOD	0.5
FIBERGLASS BIBS (R4 / INCH) x 6" (MIN.)	24
⅝" GYPSUM BOARD	0.56
TOTAL	R54.5

MARQUAM HILL APARTMENTS
APPEAL 21855 - 10/04/19

STEELHEAD ARCHITECTURE

1202.3 Unvented attic and unvented enclosed rafter assemblies.

Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any air-impermeable insulation shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall be located in accordance with the following:
    - 5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
        - 5.1.1. Where only air-impermeable insulation is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
        - 5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table 1202.3 for condensation control.
        - 5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the R-values in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
        - 5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.
    - 5.2. Where preformed insulation board is used as the *air-impermeable insulation* layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.

FRAMING AND RAIN SCREEN NOTES:

- INTERMEDIATE OR ADVANCED FRAMING IS PREFERRED. 3-STUD CORNERS AND LADDER BLOCKING AT INTERIOR WALLS ARE SHOWN IN THE WALL DETAILS

- PLYWOOD SHEATHING IS HIGHLY RECOMMENDED. ANY USE OF OSB IS SUSCEPTIBLE TO TRAPPED WATER AND DAMAGE OVER TIME.

- RAIN SCREENS ARE TO BE USED IN ALL WALL ASSEMBLIES. A MINIMUM OF 1/2" AIR GAP - 3/4" PREFERRED. USE REGULAR DOUG FIR OR CEDAR FURRING STRIPS RATHER THAN PRESSURE TREATED (P.T.) TYP. REFER TO WALL DETAILS AS SOME CALL OUT FOR METAL FURRING STRIPS DEPENDING ON CLADDING

WATER RESISTIVE BARRIER (WRB):

- REFER TO FLOOR, WALL AND ROOF ASSEMBLIES FOR WRB LOCATIONS. ALL WRB ARE TO BE VAPOR PERMEABLE / OPEN. SELF ADHERED MEMBRANES ARE PREFERRED. ALL NON-ADHERED / STAPLED WRB ARE TO HAVE TAPED SEAMS.

- WRB1: PREFERRED PRODUCTS
  - PRO CLIMA SOLITEX MENTO 1000 ADHERO
  - PRO CLIMA SOLITEX MENTO 1000
  - HENRY BLUESKIN VP 160
  - SIGA MAJVEST EXTERIOR WALL MEMBRANE
  - VAPROSHIELD WRAPSHIELD SA
  - PROSOCO FLUID APPLIED PRODUCTS (CAT-5, R-GUARD)
  - TEMCO EXOAIR 230

- WRB1: ACCEPTABLE
  - TYVEK COMMERCIAL WITH TAPED SEAMS
  - BUILDING FELTS ONLY IF THEY ARE QUICKLY COVERED TO AVOID UV DEGRADATION

- WRB2: PEEL AND STICK SELF ADHERED STRIPS (WHERE CALLED OUT IN DETAILS)
  - WALLS: GRACE CONSTRUCTION BITUTHENE 3000
  - WALLS: PRO CLIMA, SIGA OR BLUESKIN COMPANION PRODUCTS / FULLY ADHERED

- WRB3: SELF ADHERED HORIZONTAL SURFACE PRODUCTS
  - ROOF (IF NO INSULATION IS ABOVE): PRO CLIMA WELDANO (VAPOR OPEN)
  - ROOF FELTS ONLY IF THEY ARE QUICKLY COVERED TO AVOID UV DEGRADATION

  - ROOF (IF RIGID INSULATION IS ABOVE): GRACE CONSTRUCTION ICE AND WATER SHIELD
  - DECKS: GRACE CONSTRUCTION BITUTHENE DECK SYSTEM

AIR BARRIER AND VAPOR BARRIER NOTES:

- THE PRIMARY AIR BARRIER IS TO BE AT THE EXTERIOR WRB / SHEATHING. ALL WRB JOINTS ARE TO BE SEALED / TAPED. DETAILS FOR CONNECTING THE WALL TO THE ROOF AIR BARRIER DEPENDS ON VENTING / NON-VENTING AND WHAT INSULATION IS USED. REVIEW DETAILS AND CONTACT ARCHITECT WITH QUESTIONS. REFER TO ACCEPTABLE WRB MEMBRANES ABOVE. IT IS PREFERRED THAT A BLOWER DOOR TEST TAKE PLACE ONCE THE WRB IS INSTALLED (AND ANY SPRAY FOAM IN PLACE IF USED) BUT BEFORE EXTERIOR RIGID OR INTERIOR BLOWN INSULATION IS INSTALLED. THIS WILL IDENTIFY ANY TEARS OR HOLES WHICH CAN THEN BE FIXED.

- A SECONDARY INTERIOR AIR BARRIER IS ALSO ACCEPTABLE (EVEN ADVISABLE) ALTHOUGH IT DOES NOT TAKE THE PLACE OF THE PROPERLY SEALED EXTERIOR WRB LOCATION. PREFERRED PRODUCTS FOR THE INTERIOR:
  - PRO CLIMA INTELLO PLUS
  - SIGA MAJPELL WITH SIGA TAPE AT SEAMS

THESE ARE FASTED TO THE INSIDE FACE OF FRAMING FOR AIR SEALING AND SMART VAPOR CONTROL. THESE PRODUCTS ALSO TAKES THE PLACE OF THE NETTING FOR LOOSE FILL INSULATION - REFER TO MANUFACTURERS RECOMMENDATIONS.

- INTERIOR AIR SEALING AT DRYWALL APPROACH IS ACCEPTABLE WITH THE USE OF TAPED SEAMS, SILL SEAM FOAM TAPE AT TOP AND BOTTOM PLATES PLUS EITHER AIRTIGHT ELECTRICAL BOXES OR GASKETED / SEALED BOXES.

- ALL AIR BARRIERS (INTERIOR OR EXTERIOR) ARE TO BE CONTINUOUS - WALL TO ROOF TO FLOOR - WITHOUT GAPS OR UN-SEALED HOLES

- IF VAPOR BARRIER IS NOT TAKEN CARE OF WITH INTERIOR MEMBRANE THEN USE A PVA PRIMER ON ALL INTERIOR DRYWALL SURFACES

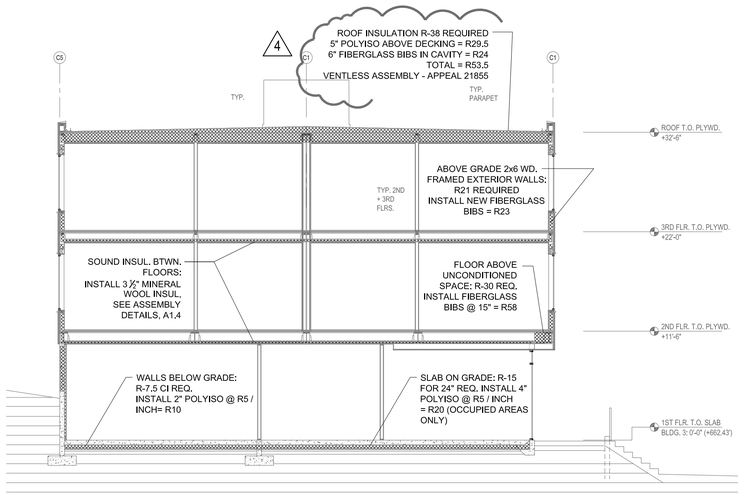
SUPPLIERS:

SMALL PLANET SUPPLY
2963 RW JOHNSON BLVD. SW
TUMWATER, WA 98512
855.367.7442 - 360.866.8779
SMALLPLANETSUPPLY.US

SIGA PRODUCTS, SANDEN HEAT PUMPS, ZEHNDER HRV, OTHER PRODUCTS.

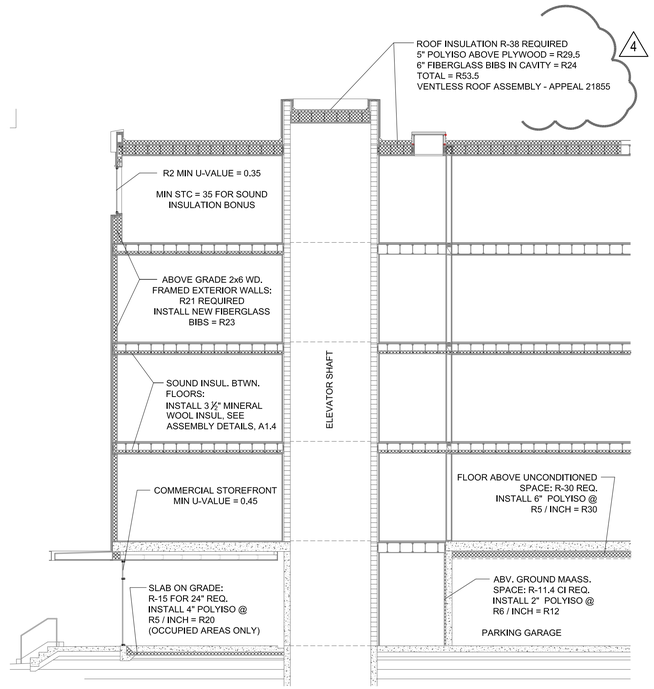
475 HIGH PERFORMANCE BUILDING SUPPLY
334 DOUGLASS STREET
BROOKLYN, NY 11217
800.995.6329
FOURSEVENFIVE.COM

PRO CLIMA PRODUCTS, LUMOS HRV



3. ENERGY CODE COMPLIANCE - BLDG. 3

SCALE: 1/8"=1'-0" ON 22X34 1/16" = 1'-0" ON 11X17



2

PRESCRIPTIVE COMPLIANCE :

BUILDING 1 - ROOMS UTILITY / FIRE 104, ELEC / DATA 105 AND BIKE STOR. 106 ARE NON-CONDITIONED ROOMS WITH FREEZE PROTECTION. THE PRESCRIPTIVE THERMAL BARRIER IS BETWEEN THESE ROOMS AND THE CONDITIONED SPACES - R21 BATTS WITHIN INTERIOR WALLS, SEE A3.12 FOR SPECIFIC LOCATIONS
BUILDING 2 - CONDITIONED SPACES AT THE CONCRETE WALL AROUND LOBBY 101 HAVE EXTERIOR RIGID INSULATION - 1 ½" POLYISO FOR R9 (R7.5 REQ), SEE NOTES ON A2.21

1. ENERGY CODE COMPLIANCE - BLDG. 1 + 2

SCALE: 1/8"=1'-0" ON 22X34 1/16" = 1'-0" ON 11X17

INSULATION NOTES:

- ROLL-IN BATT INSULATION IS TO BE AVOIDED WHENEVER AND WHEREVER POSSIBLE

- INSULATION MUST BE INSTALLED TO RESNET GRADE 1 STANDARDS WITH NO GAPS, VOIDS, COMPRESSION OR MISALIGNMENT

- INSULATION IN WALL ASSEMBLIES MUST BE ENCLOSED AND IN CONTACT WITH AN AIR-SEALED RIGID AIR BARRIER ON ALL SIDES

- FLOOR INSULATION IN FRAMING (CRAWL SPACE CONDITIONS) MUST BE IN FULL CONTACT WITH SUBFLOOR ABOVE AND PROPERLY SUPPORTED

- WHEN BLOWN IN FIBERGLASS IS CALLED OUT A SUBSTITUTION TO LOOSE FILL OR DENSE PACK CELLULOSE IS ACCEPTABLE (EVEN PREFERRED) - MAINTAIN OR EXCEED CALLED OUT DENSITIES AND R-VALUES

- OTHER FIBROUS INSULATIONS SUCH AS WOOD, MINERAL AND SHEEPWOOL MAY BE ACCEPTABLE - SUBMIT SUBSTITUTION REQUESTS TO THE ARCHITECT

- NETTING FOR LOOSE FILL / BLOWN IN INSULATION IS TO BE FASTENED TO THE BOTTOM OF THE FRAMING AND INSET 1/8" MIN. TO SIDE OF EACH FRAMING MEMBER FOR TIGHT SUPPORT, NO BULGING. USE PNEUMATIC STAPLER TO FASTEN NETTING. REFER TO AIR BARRIER NOTES FOR RECOMMENDED NETTING SUBSTITUTION.

- RIGID INSULATION
  - EXPANDED POLYSTYRENE (EPS) - STANDARD EPS (WHITE BEADS FUSED TO FOAMBOARD) OR GRAPHITE IMPREGNATED EPS (BASF NEOPOR GPS 5300+ OR ARCHITECT APPROVED ALTERNATE) ARE ACCEPTABLE
  - POLYISOCYANURATE (POLYISO) ALSO ACCEPTABLE IF NOT CALLED OUT - CONSULT ARCHITECT
  - AVOID EXTRUDED POLYSTYRENE (XPS) WHENEVER POSSIBLE

MECHANICAL / WATER SYSTEM NOTES:

REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ALL RELATED

UTILITIES AND BUILDING ENVIRONMENT EQUIPMENT.

- ALL COMBUSTION APPLIANCES ARE TO BE SEALED COMBUSTION, DIRECT VENT, POWER VENT OR INDUCED DRAFT TO ELIMINATE BACK DRAFTING AND / OR SPILLAGE. AIR SEALING OF UTILITY ROOMS (WITHOUT RELIANCE ON AMBIENT AIR SUPPLY) IS RECOMMENDED

VENTILATION NOTES:

- VENTILATION REQUIREMENTS PER TABLE N1101.1(3) ARE THE MINIMUM REQUIREMENT

- PROVIDE ZONAL PRESSURE RELIEF BETWEEN ROOMS. JUMPER DUCTS THROUGH THE CEILING AT DOORS (IN ATTIC SITUATIONS) PREFERRED, UNDERCUT DOORS OR TRANSFER GRILLS ACCEPTABLE

STEELHEAD ARCHITECTURE
201 SE 3RD AVENUE PORTLAND OREGON 97214

REGISTERED ARCHITECT
GABRIEL HEADRICK, AIA
PORTLAND OREGON
5016
STATE OF OREGON

BLDG. 1: ENERGY CODE COMPLIANCE + PERFORMANCE NOTES

MARQUAM HILL APARTMENTS
3204 SW 12TH AVENUE PORTLAND, OR 97239

PERMIT SET	3/11/19
REV. 1	7/09/19
REV.2	8/16/19
REV.3	9/13/19
REV.4	10/8/19

A1.51

Polyiso's R-value

NRCA recommends polyisocyanurate insulation be specified by its desired thickness

Jan. 1, 2014

This month, U.S. polyisocyanurate insulation manufacturers will begin reporting long-term thermal resistance (LTTR) values based on updated and revised test methods. As a result, LTTR values will be less than values previously used.

Theory of foam aging

The R-value of closed-cell, polyisocyanurate insulation is affected by the amount of gas in the foam's cells. Because the R-value of most blowing agents (gases) is greater than that of air, polyisocyanurate insulation's R-value is greatest when there is more blowing agent and less air in the foam's cells.

During polyisocyanurate insulation's service life, air diffuses into the foam's cells and the blowing agent diffuses out or partially dissolves into the cell's polymer matrix. Each of these processes occurs at rates dependent upon temperature, pressure and the foam's polymer type, gas type and cell structure. Generally, the inward diffusion of air occurs at a much faster rate than the outward diffusion of the captive blowing agent. Diffusion rates also are affected by the foam's thickness and type of facer sheets.

Because of this phenomenon, the R-value of polyisocyanurate insulation is not constant. Its R-value is highest soon after manufacturing and decreases at a relatively significant rate during the earliest portion of its service life. As polyisocyanurate insulation ages further, its R-value decreases at a slower rate until the gas concentration in the foam's cells equals the gas concentration in air, at which point its R-value no longer changes with time.

R-value testing

The R-value of most insulation products used in the roofing industry is tested using ASTM C518, "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus," originally published in 1963.

When urethane foam and later polyisocyanurate insulation boards were introduced to the U.S. roofing industry, their R-values typically were reported using ASTM C518 testing conducted immediately after manufacturing and before the cell gas had diffused from the foam's cells and been replaced with air. As a result, R-values of 7.2 or higher per inch thickness were reported.

Beginning in the 1980s, the Roof Insulation Committee of the Thermal Insulation Manufacturers Association's (RIC/TIMA's) conditioning procedure (RIC/TIMA 281-1) and later the Polyisocyanurate Insulation Manufacturers Association's (PIMA's) conditioning procedure (PIMA 101) called for preconditioning foam samples at room conditions (75 F) for 180 days before R-value testing. This preconditioning was an early attempt at addressing polyisocyanurate insulation's R-value loss over time. Using RIC/TIMA 281-1 or PIMA 101 conditioning, R-values of about 6.6 per inch thickness were reported.

In 1987, based on extensive testing of in-service R-values, NRCA and the Midwest Roofing Contractors Association issued a joint technical bulletin regarding the in-service R-values of polyisocyanurate and polyurethane insulation. The bulletin recommended using an in-service R-value of 5.6 per inch of foam thickness. This in-service R-value was intended to account for polyisocyanurate insulation's R-value losses over time and provides a more realistic design R-value for polyisocyanurate insulation during a roof system's entire design life.

LTTR

During the early 1990s, Oak Ridge National Laboratory (ORNL), Oak Ridge, Tenn., in cooperation with NRCA, PIMA and The Society of the Plastics Industry, conducted research that led to the development of a new methodology for assessing aged R-values for closed-cell plastic foam insulation. This methodology involves thin slicing and accelerated aging of polyisocyanurate insulation specimens and testing their R-values using ACTM C518—a process called LTTR.

In 1995, ASTM International published an LTTR test method, ASTM C1303, "Standard Test Method for Estimating the Long-Term Change in the Thermal Resistance of Unfaced Rigid Closed-Cell Plastic Foams by Slicing and Scaling Under Controlled Laboratory Conditions," based upon this new methodology.

In 1998, the Standards Council of Canada and Underwriters Laboratories of Canada published CAN/ULC-S770, "Standard Test Method for Determination of Long Term Thermal Resistance of Closed-Cell Thermal Insulation Foams." CAN/ULC-S770 is based on ORNL's research and ASTM C1303 and provides R-value data based on a 15-year time-weighted average, corresponding to a product's R-value five years after manufacturing.

Beginning in 2003, U.S. polyisocyanurate insulation manufacturers began reporting LTTR values using a third-party certification program, referred to as PIMA's QualityMark[cm] program. This program used the 2003 edition of CAN/ULC-S770 for LTTR

determination. LTTR values applicable in the QualityMark program from 2003 through 2013 are shown in Figure 1.

In 2009, CAN/ULC-770 was updated. ASTM C1303 also has been updated several times since its original publication; the current edition is ASTM C1303-12.

Polyiso thickness (inches)	LTTR
1.0	6.0
1.5	9.0
2.0	12.1
2.5	15.3
3.0	18.5
3.5	21.7
4.0	25.0

Figure 1: 2003-13 LTTR values

In June 2013, PIMA announced its QualityMark-certified LTTR program was being updated to incorporate using either CAN/ULC-S770-09 or ASTM C1303-11 for LTTR determination. The updated test methods are reported to result in a more accurate determination and reporting of LTTR values. The effective date for this change was Jan. 1, 2014. The new minimum LTTR values are slightly less than those from 2003 through 2013 and shown in Figure 2. The slightly increasing LTTR values per inch thickness are an indication of the slightly lower cell gas diffusion rate with thicker products.

Polyiso thickness (inches)	LTTR
1.0	5.6
1.5	8.4
2.0	11.4
2.5	14.3
3.0	17.4
3.5	20.3
4.0	23.6

Figure 2: 2014 LTTR values

NRCA recommendations

Although NRCA participated in the ORNL research and continues to participate in the task group responsible for the LTTR test method, NRCA does not recommend using LTTR for roof system design. The LTTR method for determining and reporting R-values may be considered appropriate for laboratory analysis and research comparisons; however, NRCA does not consider LTTR to be appropriate for roof system design where actual in-service R-values can be an important aspect of roof system performance.

ASTM C1303 is performed after accelerated aging test specimens under controlled laboratory conditions, indicated as 72 F ± 10 F. ASTM C1303 also defines "long term" as five years, which is intended as the time-weighted average of a 15-year period. The implication of this time-weighted average approach is actual R-values may be higher than the LTTR value for an initial five-year period, but R-values also will be less than the LTTR value from years five through 15.

The design service lives for most roof systems is longer than the five-year time-weighted average because 20-year and longer expected roof system service lives and roof system guarantees now are commonplace. Also, rooftop temperature conditions typically vary significantly from ASTM C1303's prescribed laboratory conditions. Therefore, NRCA does not view LTTR as being representative of design intentions or actual rooftop conditions.

In 2005, NRCA participated in a limited testing program that showed a majority of polyisocyanurate insulation samples tested one to four years after manufacturing had actual R-values less than their LTTR values.

In 2009, NRCA conducted R-value testing of polyisocyanurate insulation obtained through distributors; samples ranged in age from four to 13 months. R-values were tested at a 75 F mean reference temperature as well as 25 F, 40 F and 110 F and found to be less than their published LTTR values.

In 2011, with the publication of *The NRCA Roofing Manual: Membrane Roof Systems—2011*, NRCA revised its 1987 design R-value recommendations to account for polyisocyanurate insulation's R-values at different temperatures.

NRCA recommends designers use the design R-values shown in Figure 3 for polyisocyanurate insulation based upon the predominant condition for the climate where the specific building being considered is located. One way to evaluate whether the heating or cooling condition is predominant is by comparing heating degree day (HDD) values with cooling degree day (CDD) values for a specific climatic location. HDD and CDD values are provided in the ASHRAE Fundamentals Handbook.

Polyisocyanurate thickness (inches)	Heating conditions	Cooling conditions
1.0	5.0	5.6
1.5	7.5	8.4
2.0	10.0	11.2
2.5	12.5	14.0
3.0	15.0	16.8
3.5	17.5	19.6
4.0	20.0	22.4

Figure 3: NRCA's recommended design R-values

In 2013, Building Science Corp., Somerville, Mass., published Information Sheet 502, "Understanding the Temperature Dependence of R-values for Polyisocyanurate Roof Insulation," which replicated NRCA's 2009 testing with similar results.

Whether designers use LTTR or NRCA's predominant temperature condition-based design R-values, NRCA recommends designers specify polyisocyanurate insulation by its desired thickness—not its R-value or LTTR—to avoid possible confusion during procurement.

Mark S. Graham is NRCA's associate executive director of technical services.

Original BIBS System

The Original Blow-In Blanket System

The Blow-In Blanket® system or the BIBS® system is a proven, state-of-the-art insulation system utilizing specially manufactured fiberglass blowing wools installed in the walls, floors, attics, or ceilings behind a proprietary fabric. The system forms a seamless blanket of insulation that completely fills around pipes, wires, and other objects inside the cavity to maximize thermal efficiency and performance of the building envelope. The BIBS system provides with the highest attainable R-values available today.



BENEFITS

The benefits of the BIBS system make it the ideal choice for insulating residential homes, commercial or industrial buildings. In fact, more and more builders and contractors are looking for high-performance insulation systems to meet the efficiency demands of both homeowners and jurisdictions.

Higher Efficiency R-Values

The BIBS system is a high-density insulation solution for commercial and residential building applications that delivers higher R-values than traditional insulation alternatives, saving you costly heating and cooling expenses.

Reduced Air Infiltration

National laboratory tests show that the BIBS system reduces air infiltration up to 68% over conventional batt-type insulation alternatives, providing more comfort.

CONTACT US

For more information about BIBS, call us at 800.525.8992 or provide your contact information below and a representative will be in touch with you soon.

Name *

First Last

Company

Email

Phone

GET MORE INFO

The BIBS system completely fills around pipes, wires and other objects inside the cavity to help eliminate air gaps, resulting in excellent sound control.

Non-Settling

The BIBS system does not settle. The unique process of placing a measured amount of dense-pack fiberglass blowing wool behind a proprietary, dust-free fabric virtually eliminates settling when installed correctly.

Flammability

The BIBS system is naturally non-flammable. The system utilizes a proprietary fabric and approved fiberglass blowing wools that meet ASTM C764 Testing Criteria for smoldering combustion and ASTM E136 for non-combustion.

Improved Home Comfort

Many factors influence the comfort of your home. A consistent density of fiberglass blowing wools help reduce pathways for moisture, outdoor allergens, pollutants, and pests making a home more comfortable.

Certified Installation and Trusted Performance

The BIBS system can only be installed by a certified Blow-in Blanket contractor who has been trained in the proper installation of all system components.

Recycled Content

In addition to its energy-saving heating and cooling costs and custom-fit qualities, the BIBS system incorporates fiberglass blowing wools made with 25% or greater recycled content.

Projects and applications that leverage the BIBS system come together quickly, cleanly, and easily. Below is a tiny house insulation project installed by Green Home Care Incorporated.

APPLICATIONS:

The potential uses are unlimited. The BIBS system can be used in:

- Retro-fit and new construction, including wood and steel frame
- Residential homes
- Commercial buildings
- Industrial buildings
- Metal Buildings
- Interior Sound Walls

R-VALUE RATINGS:

The chart shows the R-value of the insulation identified. R means resistance to heat flow. The higher the R-value, the greater the insulating power. Ask your dealer about local codes and required R-values for the geographic region where the product will be used. The BIBS system must be installed by a trained and certified contractor.

STANDARD DENSITIES - Sidewalls, Cathedral Ceilings and Other Closed Cavities

Thickness (inches)	Framing	R-Value	Density (lbs per cu ft)*
3-1/2"	(2 x 4)	15	1.8 - 2.3
5-1/2"	(2 x 6)	23	1.8 - 2.3
7-1/4"	(2 x 8)	30	1.8 - 2.3
9-1/4	(2 x 10)	39	1.8 - 2.3
11-1/4	(2 x 12)	47	1.8 - 2.3
13-1/4	(2 x 14)	56	1.8 - 2.3

* Refer to the recommended fiber density by the specific manufacturer and product

SPECIFICATIONS:

Non-Flammable and Non-Combustible

The BIBS system is naturally non-flammable. It uses a specially manufactured, proprietary fabric and approved fiberglass blowing wools that meet ASTM C 764 Testing Criteria for smoldering combustion and ASTM E 136 for non-combustion.
Flame Spread: 5
Smoke Development: 5

Acceptances

The BIBS system has been evaluated and accepted by the following government agencies: CCMC #13198R & 11790R

Code Standards

The BIBS system meets the following standards:
– International Building Code
– International Residential Code
– International Energy Conservation Code

Approved Fibers

Certainteed InsulSafe®SP, InsulSafe®XC, & Optima®
Johns Manville Climate Pro® & Spider™
Knauf Jet Stream *ULTRA* and Jet Stream *MAX* (formerly Perimeter Plus™)

Thermal Resistance

ASTM C-518 tests for the BIBS system show the following R-values:
3 1/2" . . . . . R-15 (R-4.23 per inch)
5 1/2" R-23

Availability

The BIBS system can only be installed by contractors certified by a Blow-In Blanket instructor.