

Typical Physical Properties of Cured Foam

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|--|-------|--|
| -Nominal Density, ASTM D1622, lbs/ft ³ -Compressive Strength ASTM D1621, psi -Tensile Strength ASTM D1623, psi -Shear Strength ASTM C273, psi -Closed Cell Content Minimum % -Water Absorption ASTM D2842, gm/cc -Water Vapour Transmission ASTM C 355, perms | 3.0 | -Surface Burning Characteristics ASTM E84 Flame Spread Index 35 Smoke Development Index >500 Aged Thermal Performance -K Factor ASTM C518 aged 140F @ 90 days 0.149 -R Factor ASTM C518 aged 140F @ 90 days 6.71 - K Factor ASTM C518 aged 75F @ 180 days 0.145 -R Factor ASTM C518 aged 75F @ 180 days 6.89 Dimensional Stability ASTM D2126, % volume change @+158F, 100% R.H. 1day/7days/28 day 3.1 / 5.5 / 10 @ -10F, Ambient R.H., 28 days ±1 |
| | 45-50 | |
| | 70 | |
| | 45 | |
| | 90 | |
| | 0.017 | |
| | 1.9 | |

Compliance Standards of Coated SPF System: inclusive of Permax 108 or Permax 115 Acrylic Elastomeric Coating

| | | | |
|-------------------|---------------------|---------------------------------------|--|
| UL Class A | ICC ESR-2132 | FMRC 4470 Listing # 3032539 | FMRC 4470 Rated: 1-270 & Severe Hail |
|-------------------|---------------------|---------------------------------------|--|

Typical Physical Properties of RT-2035 Liquid Resins

| | | | |
|--|----------|--|---------|
| Liquid Resins – Component B | | Liquid Resins – Component A | |
| -Specific Gravity @ 77°F ASTM D1638 | 1.20 | -Specific Gravity @ 77°F ASTM D1638 | 1.24 |
| -Viscosity, cps | 650± 100 | -Viscosity, cps | 200 ±50 |

Description

PERMAX 3.0 is a 2-component polyurethane spray foam roof system consisting of RT-2035 Resin Components A and B, which when sprayed through special plural component spray equipment, will produce a premium seamless, monolithic, and durable closed-cell polyurethane foam roof. Surfacing with 'cool roof' or an elastomeric multi-coat waterproofing coating, applied immediately onto underlying foam will provide a complete UV and weather barrier system.

System Features

- A monolithic, sustainable roof membrane which improves thermal performance of the building envelope
- Ideally suited for both new construction as well as re-roofing applications
- Light in weight vs. traditional BUR
- Surfacing options include Energy-Star® listed coatings
- Meets stringent industry standards including UL, ICC-ES, Factory Mutual, Energy-Star®, CEC Title 24
- Easily maintained
- Excellent for extending the life of aged metal roofing and metal structures
- Most effective method of insulating cold wine tanks and heated storage tanks

Usage

The versatility and durability allows use in both new roof construction as well as re-roofing applications. Applied to a variety of substrates, from flat to vertical and surfaced with 'cool-roof' or an elastomeric membrane, Permax 3.0 offers long term roofing performance for a variety of commercial and residential constructions. Re-roofing applications benefit from additional thermal performance of 6.7 R per inch thickness of PERMAX SPF applied to existing structure.

Coverage

Average cured foam density is 3.0 pounds per cubic foot
3,000 to 3,200 board feet per 1000 lbs 'kit' consisting of 1 drum Part A and 1 drum Part B - assuming proper field processing.

Storage and Shelf Life

Both components should be stored in their original containers and away from excessive heat and moisture, especially after the seals have been broken or some materials have been used. Drums must be stored indoors and jobsite tanks maintained between 50°F and 75°F. Containers should be opened carefully to allow any pressure buildup to be vented safely while wearing full safety protection. Excessive venting of the 'B' component may result in higher density foam and reduced yield. Materials stored at temperatures below 50°F will increase in viscosity and some application equipment may not reach adequate spray temperature set points. Supply pumps and hoses must be sized to provide adequate supply when materials are cold and at a higher viscosity. **Shelf Life:** Excessive low or high temperatures may decrease shelf life. When stored in the original unopened container at 50°F-75°F, the shelf life of the "Part B" component is six months. Temperature above 75°F decreases the shelf life. The "Part A" component has a shelf life of 6 months in unopened containers when stored at 65°- 85°F.

Surface Preparation

Surfaces to receive **PERMAX 3.0** must be clean and dry, free of dirt, oil, solvent, grease, loose particulates, frost, ice and other foreign matter which could inhibit adhesion. Moisture content and surface conditions of substrate are critical to adhesion of **PERMAX 3.0** and need to be verified by installing contractor in small test areas before proceeding with full application.

Priming options:

| Substrate | Primer | Application Rate |
|--|---|--------------------------------------|
| New Construction: plywood, OSB, cleaned concrete, CMU | Acryprime Substrate Primer or Acryprime Substrate SG Primer | ½ gallon / 100 ft ² |
| Re-Cover: Existing cleaned roof surfaces to receive SPF | Acryprime Substrate Primer or Acryprime Substrate SG Primer | ½ gallon / 100 ft ² |
| Galvanized steel or aluminum surfaces including: flashing, vents, ducts, piping, etc. | Sherwin Williams® DTM Wash Primer or Krylon® Industrial Coatings™ Water-Reducible Wash Primer | ¼ to 1/3 gallon /100 ft ² |

Note: All primers must be applied per published technical data sheets and product labels.

Plywood, OSB, and lumber shall not have greater than 15% moisture content. Generally a primer is not required for these surfaces. On substrates where the moisture content cannot be determined or exceeds 15%, a suitable primer is recommended. Adhesion spray tests may be performed with insulating foam and the interface line checked upon cure for good cell structure and adhesion. Warming of these surfaces during winter conditions may increase adhesion.

CMU, structural and poured-in-place concrete must have a minimum 28-day cure and moisture content below 15%. Painted Steel, galvanized steel, and aluminum panels: check surfaces for mill oil used in the manufacturing process and moisture condensate. All oil must be removed and the surface clean and dry before priming. Washed and dry painted steel panels may not require priming. All aluminum and galvanized panels must be primed using **Sherwin Williams® DTM Wash Primer** or **Krylon® Industrial Coatings™ Water-Reducible Wash Primer**.

Recommended Substrate Temperatures

PERMAX 3.0 is formulated in three different reactivity profiles to meet varying substrate temperatures at jobsite. For applications below 50°F, Henry Company technical personnel should be consulted.

| | <u>Winter Grade</u> | <u>Regular Grade</u> | <u>Summer Grade</u> |
|------------------------------|---------------------|----------------------|---------------------|
| Minimum substrate & air temp | 50°F | 70°F | 100°F |
| Maximum substrate & air temp | 75°F | 100°F | 120°F |

PERMAX 3.0 Polyurethane Spray Foam Roof System

PROCESSING CHARACTERISTICS

Liquid Component Properties

| | |
|------------------------------------|--------------|
| Viscosity/Specific Gravity at 77°F | |
| Part A Component (CPS)/(g/cc) | 200±50 /1.24 |
| Part B Component (CPS)/(g/cc) | 650±100/1.20 |
| Mixing Ratio by Volume | |
| Part A Component (CPS) | 50 |
| Part B Component (CPS) | 50 |

Recommended Pre-Heater Processing Temperatures **

| | |
|---------------|-----------|
| Component - A | 100-120°F |
| Component - B | 110-125°F |
| Hose | 110-120°F |

Processing temperatures typically used with conventional **Gusmer® or **Graco®** equipment. Environmental conditions may dictate the use of other temperature ranges, however 140°F must never be exceeded. It is the responsibility of the installing contractor to determine the specific temperature settings to meet environmental, equipment and product limitations.

| Machine Mix at Recommended Temperatures* | Winter Grade | Regular Grade | Summer Grade |
|--|--------------|---------------|---------------|
| Cream Time | 2-3 seconds | 3-5 seconds | 4-5 seconds |
| Tack Free Time | 8-9 seconds | 12-13 seconds | 15-16 seconds |
| Initial Cure Time | 4 Hours ** | 4 Hours ** | 4 Hours ** |

- Properties cited were achieved using a **Gusmer H-2000 Proportioner** and **GAP Pro Gun** with #01 module with a static proportioner pressure setting of 1400 psi.

** Complete cure will depend on temperature, humidity and degree of ventilation. Complete cure usually occurs within 24-72 hours

Climatic Conditions and Humidity

Moisture in the form of rain, dew or frost can seriously affect the quality and adhesion of the **PERMAX 3.0** to the substrate or itself. Henry Company does not recommend the spraying of this system when the relative humidity (RH) exceeds 85%.

Application

Equipment

The proportioning equipment shall be manufactured specifically for heating, mixing, and spray application of polyurethane foam and be able to maintain 1:1 metering with a ±2% variance and adequate main heating capacity to deliver heated and pressurized materials up to 130°F. Heated hose must be able to maintain pre-set temperatures for the full length of the hose. Minimum 2:1 ratio feeder pumps are required to supply stored materials through minimum ½ inch supply hoses. Pressurized and heated tanks systems may be used if sized appropriately to provide adequate flow at maximum operating capacity and temperatures. Older equipment may be upgraded with supplemental heaters or minimum H-2000 heater / proportioner to adequately pre-heat to process temperatures.

Spray guns such as **GX-7**, **GAP Pro Gun** and **Fusion gun**, are well suited for roofing applications where 20 lbs/min or higher volume is desired. These guns may be fitted with smaller output tips (15 – 18 lbs/min.) to perform detail work on pipes, curbs, platforms and parapets etc.

Processing Temperatures

Recommended processing temperatures 'Part A' Main 100-120°F, 'Part B' Main 110-125°F, Hose 110-120°F are critical settings to achieve viscosity to allow balanced pressure during spraying. Balanced chemical output pressures are important to produce a good mix. Foam output pressures greater than 200 psi differential indicate either improper chemical temperatures, or worn gun/packing parts. Unequal pressures will cause poor chemical mixing through the module and uneven backpressure. A critical requirement for good spray mixing requires appropriate tip/module sizing to the proportioner and adequate heating capacity. Unequal pressure (>200 psi) can cause excessive pump wear.

Do not re-circulate the 'B' component for increased storage temperature as frothing or boil-over may occur at material temperatures above 60°F.

PERMAX 3.0 Polyurethane Spray Foam Roof System

Spraying

Thin “flash passes” (<1/2 inch) are not permitted. They can result in reduced yield and loss of adhesion. It is recommended that the total design thickness be completed each day.

This spray system should be applied in uniform minimum pass thickness of 3/4-inch, maximum pass thickness 1 ½ inch. Application temperatures below 50°F may require reduction in single pass application thickness. Additional thickness may be applied after a brief waiting period. Yield and in-place density is dependent upon the temperature of the substrate, ambient air temperature, gun speed application, gun tip size, and the output of the proportioning unit. **PERMAX 3.0** is designed to provide maximum yield when sprayed in ¾ inch to 1 inch thick passes. Excessive pass thickness can cause reduced density, poor cell structure and lower physical properties.

Elastomeric Coating Options

All SPF surfaces need be coated within 24 hours of application to protect from UV and weather degradation. Coating selection criteria is based upon project specifications, building use and other design criteria. PERMAX coating options include:

| PERMAX SPF ROOF Coatings Options | Energy Star Listed White | Color Options |
|--|--------------------------|---|
| Permax 120 – good grade, 100% acrylic, water-based, several reactivities including Permax 120 FS – fast set formula. UL, CRRC listed | | White, Off-white, Tan, Gray, Light Gray, Dark Gray, Custom Colors |
| Permax 108 – better grade, 100% acrylic, water-based, including Permax 108 FS – fast set formula. UL, CRRC and FM listings over PERMAX 3.0 | ✓ | White, Off-white, Tan, Gray, Light Gray, Dark, Gray, |
| Permax 115 – best grade, 100% acrylic, high-tensile strength and durability. UL, CRRC and FM listings over PERMAX 3.0 | ✓ | White, Tan, Gray, Light Gray, Custom Colors |
| Permax 500 – aromatic urethane base coat w/ accelerator. Use with Permax 600 top coat | | Black |
| Permax 600 – aromatic urethane top coat w/ accelerator | | White, Tan, Gray |
| Permax 700 –2-component, polyurea base-coat for urethane. Sold as special 2 drum ‘kit’ of part-A and part-B. Top coat with Permax 800 for tank coating | | Gray, Black, Tan |
| Permax 800 – aliphatic urethane top-coat, single component. Use in multi-coat application or with base-coat of Permax 700 for maximum durability. | | White, Tan, Gray |
| Permax 2000 - solvent based silicone coating. Durable and ice/snow resistant roof coating. UL and CRRC listed | ✓ | White, Gray, Light Gray, Dark Gray |

All coating systems require either a 2-coat or 3-coat application to SPF surfaces. Permax acrylic coatings are specified with PERMAX White Roofing Granules for hail resistance and added durability. Refer to individual coatings technical data sheet or PERMAX Roofing Installation Manual for details on coating application to SPF.

Precautions

Read and understand the Material Safety Data Sheet for this product before use. The numerical flame spread and all other data presented is not intended to reflect the hazards presented by this or any other material under actual fire conditions. Polyurethane foam may present a fire hazard if exposed to fire or excessive heat (i.e. cutting torches). The use of polyurethane foam in interior applications on walls or ceiling presents an unreasonable fire risk unless protected by an approved fire resistant thermal barrier with a fire rating of not less than 15 minutes. A UBC or IRC code definition of an approved “thermal barrier” is a material equal in fire resistance to ½ inch gypsum board. Each firm, person, or corporation engaged in the use, manufacture, or production or application of the polyurethane foams produced from these resins should carefully examine the end use to determine any potential fire hazard associated with such product in a specific use and to utilize appropriate precautionary and safety measures.

Consult with local building code officials and insurance agency personnel before application. Do not re-circulate the ‘B’ component for increased storage temperature as frothing or boil-over may occur at material temperatures above 60°F. Polyurethane foams will burn when exposed to fire. Caution during application must be observed with signs posted for other trades, “**Caution Combustible Insulation, No Welding or Hot Work Allowed**”. On a daily basis remove all debris and shavings from the job site leaving a clean work area.

PERMAX 3.0 *Polyurethane Spray Foam Roof System*

Worker Exposure Hazards – Both Components A and B can cause severe inhalation and skin sensitization. For interior applications: full body protection required including air supplying respirator such as a self-contained breathing apparatus (SCBA) or a supplied air respirator (SAR) in the positive pressure or continuous flow mode (this includes air supplied hoods). For exterior applications: required either a full face air purifying respirator or half face worn in combination with chemical safety goggles. The recommended APR cartridge is an organic vapor/particulate filter combination cartridge (OV/P100). It is recommended that all applicators and workers obtain recurrent formal training before exposure to or applying this product. More product information and training materials can be found at Henry Company www.henry.com – or on SPFA or CPI websites including: www.spraypolyurethane.com, www.polyurethane.org, www.sprayfoam.org

Product Sizes

Component A – 551 lbs drums, 2500 lbs totes (disposable or returnable)
Component B - 500 lbs drums

Freight Classification

Component A - Resin Compounds Item 46030, Class 55, NOIBN Non-Hazardous
Component B - Resin Compounds Item 46030, Class 55, NOIBN Non-Hazardous

Limited Warranty

A variety of warranty options are available with terms of up to 20 years– subject to specific terms and conditions and application by a Henry Authorized Contractor. Contact Warranty Department at warranty@henry.com or location shown below, for product & systems warranty information.

STATEMENT OF RESPONSIBILITY

The technical and application information herein is based on the present state of our best scientific and practical knowledge. As the information herein is of a general nature, no assumption can be made as to a product's suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by law. The user is responsible for checking the suitability of products for their intended use. Henry Company data sheets are updated on a regular basis; it is the user's responsibility to obtain and to confirm the most recent version. Information contained in this data sheet may change without notice.