RTC Polyurethane Foams

ENERGY STAR PARTNER

PERMAX® SPRAY SYSTEM

RT 2035 SERIES

TECHNICAL INFORMATION

DESCRIPTION

RT 2035 is a technologically advanced HFC-245fa, sprayable polyurethane foam for roofing systems, classified and listed by Underwriter's Laboratories, Inc. The Underwriter's Laboratories Inc. has classified RT 2035 series spray foams with numerous elastomeric roof coatings. A complete list of classified compositions is available from Resin Technology Company or by consulting the Underwriter's Laboratories Building Materials Directory.

TYPICAL PHYSICAL PROPERTIES

	ASTM Method	RT 2035-2.5	RT 2035-3.0
Nominal Density	D 1622	2.5 pcf	3.0 pcf
Compressive Strength	D 1621	40-45 psi	45-50 psi
Tensile Strength	D 1623	55 psi	70 psi
Shear Strength	C 273	40 psi	45 psi
Closed Cell Content (min)	D 1940	90%	90%
K Factor (Aged 140°f @ 90 days)	C 518	0.153	0.149
R-Value (Aged 140°f @ 90 days)	C 518	R-6.54	R-6.71
K Factor (Aged 75°f @ 180 days)	C 518	0.143	0.145
R-Value (Aged 75°f @ 180 days)	C 518	R-6.99	R-6.89
Water Absorption (gm/cc)	D 2842	0.017	0.017
Water Vapor Transmission	C 355	1.9 perms	1.9 perms
Dimensional Stability	D 2126		
158°F/100% RH			
ΔV 1 Days		3.7%	3.1%
ΔV 7 Days		6.1%	5.5%
ΔV 28 Days		10%	10%
-10°F/Ambient RH			
ΔV 28 Days		±1%	±1%

1. This information is intended only as a guide for design purposes. The values shown are the average values obtained from sprayed laboratory samples. The test methods were performed per the ASTM Book of Standards.

2. K Factor varies depending on age and use conditions.

NOTE: These products are intended for commercial, industrial, and residential projects, and should be applied by a licensed insulation contractor who has been specifically trained in the application of polyurethane foam products.

LIQUID COMPONENT PROPERTIES

Viscosity/Specific Gravity at 70°F	RT-2035-2.5	RT-2035-3.0
Component A (cps)	200/1.24	200/1.24
Component B (cps)	500±150cps/1.20	500±150cps/1.20
Mixing Ratio by Volume		
Component A	50	50
Component B	50	50

PROCESSING CHARACTERISTICS AND RECOMMENDATIONS

RECOMMENDED PROCESSING TEMPERATURES	Preheater	Hose
Component B	110-120°F	110-130°F
Component A	100-110°F	100-110°F

These temperatures are typical of those required to produce acceptable product using conventional Gusmer or Graco equipment. Environmental conditions may dictate the use of other temperature ranges. However, under no circumstances should a temperature of 140°F be exceeded. It is the responsibility of the applicator to determine the specific temperature settings to match the environmental conditions and his own equipment.

PROCESSING CHARACTERISTICS

Machine Mix at recommended temperatures*	Winter	Regular	Summer
Cream Time	2-3 sec.	4-5 sec.	5-6 sec.
Tack Free Time	On Rise	On Rise	On Rise
Cure Time	4 Hours	4 Hours	4 Hours

Reaction times are affected by the temperature of the substrate, the type of equipment and the temperature of the components. *Sprayed through Gusmer Model H-2000 proportioner equipped with GAP Gun with a #3 tip or a GX7 Gun and #3160 module and #90 PCD at recommended processing temperatures. This system should be sprayed with a minimum static pressure setting of 1000 psi.

RECOMMENDED SUBSTRATE TEMPERATURES

At time of application	RT-2035 Winter	RT-2035 Regular	RT-2035 Summer
Minimum	40°F	50°F	95°F
Maximum	60°F	100°F	120°F

For applications below 40°F, Resin Technology Company technical personnel should be consulted. At the lower end of the indicated temperature ranges, flash passes should be avoided.

SHELF LIFE

When stored in the original unopened container at 50°F-75°F, the shelf life of the components is six months. Temperature above 75°F decreases the shelf life.

FLAMMABILITY CHARACTERISTICS*

SURFACE BURNING CHARACTERISTICS		
ASTM E-84*	2"	4"
Flame Spread*	35	35
Smoke	over 500	over 500

Sample spray applied at 1/4" Cement Asbestos Board.

*Note: This 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.

Caution: Polyurethane foam produced from these materiala 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 finish rating of not less than 15 minutes. A code definition of an approved "thermal barrier" is a material equal in fire resistance to 1/2" gypsum board. Each firm, person, or corporation engaged in the use, manufacture, production or application of the polyurethane foams produced from these resins should carefully examine his end use to determine any potential fire hazard associated with such product in a specific use and to utilize appropriate precautionary and safety measures. Consultation with building code officials and insurance agency personnel before application is recommended.

FREIGHT CLASSIFICATION

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

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PROCESSING AND APPLICATION GUIDE

DESCRIPTION
This system is a sprayable rigid polyurethane foam insulation system designed to insulate and aid in water proofing construction surfaces. The sprayed product results in a seamless, monolithic and durable insulation system.

Resin Technology Company spray systems are technologically advanced, sophisticated materials and should only be applied by qualified, experienced spray applicators.

SUBSTRATE PREPARATION
For optimum results, surfaces to receive foam should be clean and dry, free of dirt, oil, solvent, grease, loose particulates, peeling coating and other foreign matter.

Ferrometallic substrates (especially mild steel) should be sand blasted in accordance with SSPC-SP6. Sand blasted surfaces should be immediately primed with an epoxymide primer as recommended by the primer manufacturer.

Galvanized and stainless steel surfaces should be treated with an appropriate wash primer prior to application of urethane foam. Consult your primer manufacturer for specific recommendation. New plywood and other new wood surfaces should be primed with a catalyzed urethane or black neoprene primer as recommended by the primer manufacturer.

Concrete surfaces may require priming, especially if the moisture content is greater than 10% as determined by a moisture meter. Lightweight concrete decks are generally unsuitable substrates for application of urethane foam due to high moisture content. **FOR BEST RESULTS, ON SUBSTRATES WHERE THE MOISTURE CONTENT CANNOT BE DETERMINED, A SUITABLE PRIMER IS RECOMMENDED.**

SUBSTRATE TEMPERATURE
This spray system is provided in different reactivity profiles to meet varying substrate temperatures previously noted. At the lower end of the recommended temperature range, flash passes are to be avoided. RTC Technical Personnel should be consulted in all cases where application conditions are marginal.

CLIMATIC CONDITIONS
Spray Systems should not be applied when the wind velocity is greater than 15 M.P.H. to avoid over spraying of perimeter areas. Higher wind speeds also retard the exothermic reaction of foam and can lead to poor adhesion and increased density as well as poor surface texture of the foam itself.

Moisture in the form of rain, dew, frost or other sources can seriously affect the adhesion of urethane foam to the substrate or to itself. Water reacts with the mixed foam components, seriously affecting the foam's physical properties. RTC does not recommend the spraying of this system when the relative humidity exceeds 85%.

EQUIPMENT: The proportioning equipment shall be manufactured by Gusmer, Graco or Ransburg and shall be capable of metering each component within ± 2% of the metering ratio previously noted. The gun should be of the internal mix type which provides intensive and thorough blending of the components. The equipment shall be of the heated airless type capable of maintaining 110° F at the gun by use of both primary heaters and heated hoses. The use of 5:1 feeder pumps is recommended for supplying the liquid components to high output proportioners such as the Gusmer-H-II, especially for winter operations. Dry nitrogen should be employed to blanket the liquid components, especially when tanks are employed to store the components. Both components are adversely affected by moisture and humidity.

SPRAYING
This system should be sprayed with a minimum static pressure setting of 1000 psi, in uniform passes from 1/2" to 1" in thickness. The thickness of each pass is dependent upon the temperature of the substrate, the speed of application and the output of the proportioning unit and gun. It is desirable for the foam to be built to the final desired thickness before moving to another area. Foamed surfaces which have not been built to final thickness within 24 hours may require the application of a bonding primer prior to the application of additional foam to assure adequate adhesion.

Thin passes (1/4" or less) should be avoided. They may result in reduced yield and loss of adhesion.

Urethane foam must not be applied to a thickness exceeding 4 inches in 24 hours. If this thickness is exceeded, the temperature buildup within the foam may cause internal charring of the foam applied, seriously affecting the quality and physical properties of the foam. Under certain conditions, applications exceeding this maximum recommended thickness may cause spontaneous combustion of the foam to occur, often hours after the foam was applied.

PROTECTIVE COATINGS
Sprayed polyurethane foam insulation produced from these resins in susceptible to attack by ultraviolet light from the sun's rays, and must be covered by a protective coating. An appropriate coating system also protects the foam from mechanical damage as well as providing additional waterproofing protection. Many generic classifications of coatings are available to the applicator including acrylic, aromatic urethane, aliphatic urethane, butyl, synthetic rubber, hypalon and others. Selection of a coating is dependent on such factors as cost, resistance to foot traffic, resistance to ponded water, fire resistance and the existence of vapor drive. When a vapor drive exists in a structure (either in or out) vapor barrier coating system should be employed. Consult RTC Data Technical Service Personnel for specific system recommendations.

WARNING: POLYURETHANE FOAMS WILL BURN WHEN EXPOSED TO FIRE. The protective coating may also burn when exposed to fire.

FIRE AND THERMAL BARRIER
Polyurethane foam produced from these materials may present a fire hazard if exposed to fire or excessive heat (i.e. cutting torches). The use of exposed polyurethane foam in interior applications on walls or ceilings presents an unreasonable fire risk unless protected by an approved fire resistant thermal barrier with a finish rating of not less that 15 minutes. A code definition of an approved "thermal barrier" is a material equal in fire resistance to 1/2" gypsum board.

STORAGE OF RAW MATERIALS
All materials should be stored in their original containers and away from heat and moisture, especially after the seals have been broken and the materials have been opened. Both components should be stored indoors at a temperature between 50° F and 75° F. Temperatures above 75° F may decrease the shelf life. Containers should be opened carefully to allow any pressure buildup to be vented safely. Extensive venting of the B component may result in higher density foam and reduced yield. Temperatures below 50° F tend to increase the viscosity of the components.

SAFETY, HEALTH and TOXICITY INFORMATION

A material safety data sheet on this product is available from Resin Technology Company upon request. Users of this product should read and understand the MSDS before use.

Protective Equipment
Spraying of polyurethane foam results in the atomizing of the components to fine mist. Inhalation and exposure to the atomized particles should be minimized. The following protective equipment is recommended:

a. Fresh air full face mask or hood with fresh air source.
b. Fabric coveralls
c. Fabric gloves

Physical Examination of Personnel
All personnel to be employed in the spraying of these materials should have a complete physical examination prior to starting spray operations. Periodic checkups are recommended if the personnel continue to spray these materials. Personnel with the following conditions should avoid the spraying of these components:

a. Asthma or chronic bronchitis.
b. Chronic respiratory disorders.
c. Sensitization to chemical substances including polymeric isocyanates.

Outdoor Application Precautions
The area surrounding the spray operation should be protected from overspray and exposure of individuals not involved in the spray operations as follows:

a. Post warning signs a minimum of 100 feet from all work areas.
b. Close all air intake vents on air handling equipment on the building.
c. Limit spectators to a minimum.
d. No welding, smoking or open flame.

Indoor Application Precautions
Indoor applications are generally more hazardous than outdoor applications. All personnel in the spray area must be equipped with a fresh air supply mask or hood. Additional precautions include:

a. Seal off the work area from adjacent rooms and ventilation ducts.
b. Restrict the access of non-application personnel.
c. No welding, smoking or open flame.

Dermal Exposure
If a major splash or spill of the isocyanate component comes in contact with the skin, the affected area should immediately be washed with copious amounts of water from a safety shower or other water source. Contaminated clothing should be removed and the skin wiped with a clean dry cloth to remove residual isocyanate. The affected area should then be wiped with a 70% solution of rubbing alcohol (isopropanol) followed by repeated washing with soap and water. If a rash develops, a physician should be consulted immediately.

Eye Exposure
Splashes of either component into the eyes should be flushed immediately with copious amounts of water for at least 15 minutes. CONSULT TRAINED MEDICAL PERSONNEL IMMEDIATELY.

Inhalation
Symptoms of vapor inhalation are characterized by coughing, tightness in the chest, and shortness of breath. Excessive exposure can produce serious, possibly irreversible lung damage. Smoking in the area of application increases the risk of pulmonary injury and must be prohibited. High concentrations of isocyanate may cause symptoms and problems to appear immediately. However, chronic exposure may also lead to the same symptoms and problems. IF BREATHING HAS STOPPED, ARTIFICIAL RESPIRATION MUST BE PROMPTLY APPLIED. If breathing is short, oxygen (if available) should be administered by trained medical personnel. OBTAIN MEDICAL ATTENTION IMMEDIATELY.

Clean Up
Non flammable solvents should be used for clean up. Consult your solvent manufacturer for handling precautions.

Incompatible Materials
The isocyanate component (A component) is incompatible with strong bases, tertiary amines or water. These materials may cause rapid, spontaneous polymerization with subsequent generation of heat and gas.

Decontamination of Spills
In the event of a major isocyanate spill, the area should be immediately evacuated. Only personnel equipped with appropriate respiratory and eye equipment should remain. If the spill occurs indoors, the area should be ventilated and leaking containers should be taken outdoors and the remaining isocyanate transferred to other containers.

The spill should be covered with sawdust, Ekoperl, vermiculite, fullers earth or the other oil-absorbed material should then be treated with a dilute solution of ammonium hydroxide/detergent. The neutralized material should be swept up and placed in a suitable container. The material should then be disposed of by a standard method consistent with good industrial practice and accordance with environmental protection regulations in your area. Where permissible, sanitary landfill disposal is recommended.