

## FE 348<sup>®</sup> 2.8 Series ROOFING MATERIAL

### DESCRIPTION:

**FE 348-2.8** is an HFC-blown, Zero Ozone-Depleting (Zero-ODP), spray polyurethane foam (SPF) system designed for roofing applications.

### ADDITIONAL TESTING APPROVALS & CERTIFICATIONS:

#### UL723 / ASTM E-84\*

SPF Thickness – 2.0 inches  
Flame Spread Index – 55  
Smoke Development Index – >500

#### FM Global

Class 4470/4880

#### Florida Building Code

Approval #FL 1493.1

#### Dade County Approvals

07-1120.02 Steel  
07-1120.03 Concrete  
07-1120.04 Recover  
07-0402-03 Wood

#### ICC Evaluation Service, Inc.

ESR-2298M

#### UL790

##### Non-Combustible Decks

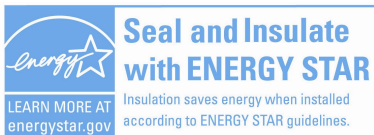
Class A at any SPF thickness  
Silicone, acrylic or urethane coatings  
Up to 3 : 12 incline  
Granules at 35 lbs per square (100 ft<sup>2</sup>)  
depending on configuration

##### Combustible Decks

Class B at 1 inch SPF thickness  
Silicone, acrylic or urethane coatings  
½ : 12 incline  
Granules optional

For more detailed information on Approvals and Certifications with regard to specific roofing constructions and applications, please contact a BASF technical service representative.

\* - This numerical flame spread rating does not reflect hazards presented by this or any other material under actual fire conditions. Polyurethane foam systems should not be left exposed in interior applications and must be protected by a minimum of a 15-minute thermal barrier.



**FE 348-2.8 SERIES  
ROOFING MATERIAL  
ICC-ES ESR-2298M**

**TYPICAL PROPERTIES <sup>(3)</sup>**

| <b>PROPERTY</b>   | <b>VALUE</b>                      | <b>TEST METHOD</b> |
|---|-----------------------------------|--------------------|
| <b>As Supplied</b>  |                                   |                    |
| Specific Gravity @ 70°F   | 1.18                              | ASTM D 1638        |
| Viscosity @ 70°F (cps)  | 500 - 800                         | Brookfield         |
| <b>As Cured</b>   |                                   |                    |
| Mix Ratio (volume:volume)   | 1:1                               |                    |
| Density (pcf)   | 2.7 – 2.9                         | ASTM D 1622        |
| Compressive Strength (psi)  | 50 <sup>+/-</sup> 5% <sup>^</sup> | ASTM D 1621        |
| Tensile Strength (psi)  | 60 – 80                           | ASTM D 1623        |
| Shear Strength (psi)  | 40 – 60                           | ASTM C 273         |
| Closed Cell Content (%)   | >90                               | ASTM D 6226        |
| Aged k-factor (Btu in/ft <sup>2</sup> hr °F)  | 0.158 (R=6.3/in) <sup>***</sup>   | ASTM C 518         |
| Permeance (perms)   | 1.97                              | ASTM E 96          |
| Permeability (perm inch)  | 2.58                              |                    |
| Dimensional Stability (% Volume Change)   |                                   |                    |
| Dry Age 28 Days (158°F)   | 0.69%                             | ASTM D 2126        |
| Freeze Age 14 Days (-20°F)  | 0.25%                             | ASTM D 2126        |
| <p><i>** - These physical property values are typical for this material as applied at our development facility under controlled conditions or statistical measurement. SPF performance and actual physical properties will vary with differences in application (i.e. ambient conditions, process equipment and settings, material throughput, etc). As a result, these published properties should be used as guidelines solely for the purpose of evaluation. Physical property specifications should be determined from actual production material.</i></p> <p><i>The above data was collected from samples prepared using the following equipment configuration:</i></p> <ul style="list-style-type: none"> <li>• Gusmer<sup>®</sup> H-20/35 proportioner set at 1:1 volume ratio with 50 ft of heated delivery hose</li> <li>• GX-7 spray-gun configured with a #1 mix module and #70 Pattern Control Disc (PCD)</li> <li>• Process temperature settings: Isocyanate 130°F; Resin 130°F; Hose 130°F</li> <li>• Process pressure: 1000 psig minimum during dispensation</li> </ul> <p><i>Every job site and set of ambient /substrate conditions are different; therefore, one set of process settings may not work for every situation. It is the responsibility of the applicator to evaluate the on-site conditions then choose the appropriate SPF reactivity and process settings.</i></p> <p><i>***The chart shows the R-value of this insulation. "R" means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation will depend upon the climate, the type and size of your house, and the fuel use patterns and family size. If you buy too much insulation it will cost you more than what you will save on fuel. To achieve proper R-values, it is essential that this insulation be installed properly.</i></p> |                                   |                    |

While descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be used without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the description, designs, data or information given or results obtained, all such being given and accepted at the reader's risk.

Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

Revision Date: February 15, 2011

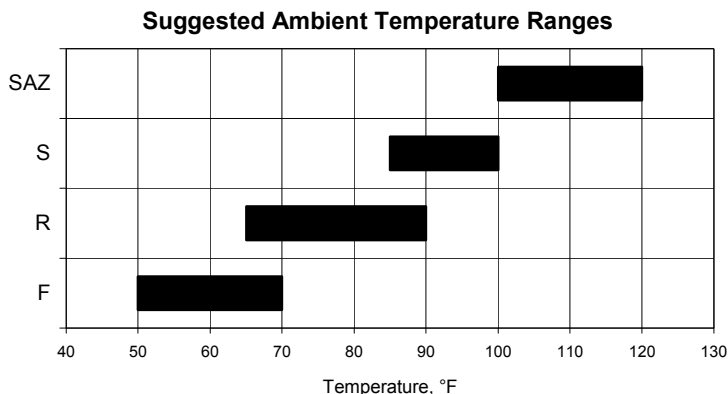
Page 2 of 4

**FE 348-2.8 SERIES  
ROOFING MATERIAL  
ICC-ES ESR-2298M**

**GENERAL INFORMATION:**

**FE 348-2.8** is a technically advanced SPF system intended for use by qualified contractors trained in the processing and application of SPF roofing systems as well as the plural-component polyurethane dispensing equipment required to do so. Contractors and applicators must comply with all applicable and appropriate storage, handling, processing and safety guidelines. BASF technical service personnel should be consulted in all cases where application conditions are questionable.

The **FE 348** Series SPF roofing system is available in several reactivity “grades”: SAZ (Slow Arizona), S (Slow), R (Regular) and F (Fast). Some suggested ambient temperature ranges for each of the reactivity grades is included below.



The temperature ranges pictured above are meant as general suggestions only. Ultimately, the experience of the applicator should determine which reactivity grade is best suited for any specific combination of substrate (composition, location, color, etc.) and ambient conditions. Please contact your BASF representative with any questions or for more specific assistance.

**CAUTIONS AND RECOMMENDATIONS:**

**FE 348-2.8** is designed for an application rate of ½ inch minimum to 2 inches maximum. Once installed and material has cooled, it is possible to add additional applications in order to increase the overall installed thickness of SPF. This application procedure is in compliance with the SPFA industry guidelines for the application of SPF.

**FE 348-2.8** is **NOT** designed for use as an **INTERIOR** insulation system. BASF offers a separate line of products for interior insulation applications. For more information please contact your sales representative.

Cold-storage structures, such as refrigerators and freezers demand special design considerations with regard to thermal insulation and moisture-vapor drive. **FE 348-2.8** should **NOT** be installed in these types of constructions unless the structure was designed by a design professional for specific use as cold storage.

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

In addition to reading and understanding the MSDS, all contractors and applicators must use appropriate respiratory, skin and eye Personal Protective Equipment (PPE) when handling and processing polyurethane chemical systems. Personnel should review the following documents published by Spray Polyurethane Foam Alliance (SPFA):

*AY-104 Spray Polyurethane Foam Systems for New and Remedial Roofing*

*AX-171 Course 101-R Chapter 1: Health, Safety and Environmental Aspects of Spray Polyurethane Foam and Coverings.*

The following document is available from the Center for the Polyurethanes Industry (CPI):

*Model Respiratory Protection Program for Compliance with the Occupational Safety and Health Administration's Respiratory Protection Program Standard 29 C.F.R. §1910.134*

While descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be used without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the description, designs, data or information given or results obtained, all such being given and accepted at the reader's risk.

Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

**FE 348-2.8 SERIES  
ROOFING MATERIAL  
ICC-ES ESR-2298M**

---

As with all SPF systems, improper application techniques such as: excessive thickness of SPF, spraying into or under rising SPF and off-ratio material. Potential results of improperly installed SPF include: dangerously high reaction temperatures that may result in fire and offensive odors that may or may not dissipate. Improperly installed SPF must be removed and replaced with properly installed materials.

LARGE MASSES of SPF should be removed to an outside safe area cut into smaller pieces and allowed to cool before discarding into any trash receptacle.

AIR INTAKE UNITS SHOULD BE SHUT DOWN AND VENTS SEALED DURING POLYURETHANE SPRAY APPLICATIONS.

SPF insulation is combustible. High-intensity heat sources such as welding or cutting torches must not be used in contact with or in close proximity to FE 348-2.8 or any polyurethane foam.

**SHELF LIFE AND STORAGE CONDITIONS:**

**FE 348-2.8** has a shelf life of approximately three months from the date of manufacture when stored in original, unopened containers at 50-80°F. As with all industrial chemicals this material should be stored in a covered, secure location and never in direct sunlight. Storage temperatures above the recommended range will shorten shelf life. Storage temperatures above the recommended range may also result in elevated headspace pressure within packages.

**LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY:**

The information herein is to assist customers in determining whether our products are suitable for their applications. Our products are only intended for sale to industrial and commercial customers. Customer assumes full responsibility for quality control, testing and determination of suitability of products for its intended application or use. We warrant that our products will meet our written liquid component specifications. We make no other warranty of any kind, either express or implied, by fact or law, including any warranty of merchantability or fitness for a particular purpose. Our total liability and customers' exclusive remedy for all proven claims is replacement of nonconforming product and in no event shall we be liable for any other damages, including without limitation special, incidental, punitive, or consequential damages.

---

While descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be used without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the description, designs, data or information given or results obtained, all such being given and accepted at the reader's risk.

Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

Revision Date: February 15, 2011

Page 4 of 4