AUSTHANE SFE 282
Rigid Polyurethane Insulation Foam System

PRODUCT DESCRIPTION

AUSTHANE SFE 282 is a rigid low density flame retarded polyurethane insulation foam system with a nominal applied density of 32 - 37 kg/m^3.

- **SFE 282** Polyol is formulated with ***ecomate®*** a **Zero ODP[1], Zero GWP[2]**, and **VOC[3] exempt [USA]** environmentally friendly foam 'blowing agent'.
- **SFE 282** is not a "water" blown foam system.
- **SFE 282** Polyol contains a chlorinated organic phosphate flame retardant at a low level.

The system provides highly efficient long-term insulation for roofs, walls in industrial / agricultural buildings and sheds, tanks and other similar applications.

It is spray applied in-situ resulting in a continuous, seamless system.

If used externally it must be protected from direct weather exposure with a spray applied elastomeric membrane or similar protective barrier.

Laboratory QA Results for SFE 282 Spray Foam System

Test / Property	Typical Results
Free Rise CORE Density	26 - 28 kg/m^3
Laboratory Reactivity Profile @ 20℃	
Cream Time	3 - 4 seconds
Gel Time	7 - 8 seconds
Tack Free Time	9 - 10 seconds
Viscosity @ 25℃ [Brookfield # 3 @ 30 rpm]	280 ± 50 cPs
Nominal Sprayed Density	32 - 37 kg/m^3
Closed Cell Content @ Free Rise Density (26 kg/m^3)	> 96%
Compressive Strength @ 10% Deformation @ Free Rise Density (26 kg/m^3)	Parallel to Rise: > 240 kPa Perpendicular to Rise: > 160 kPa
Dimensional Stability	***Length*** ***Width*** ***Thickness***
70ºC / 7 days [168 hours]	***< - 0.5 %*** ***< - 0.5 %*** ***< - 0. 5 %***
– 20 ºC / 14 days [336 hours]	***No measurable change***

[1] ***ODP*** = *Ozone Depletion Potential*
[2] ***GWP*** = *Global Warming Potential*
[3] ***VOC*** = *Volatile Organic Compound*

PROPERTIES OF SFE282 SPRAY FOAM SYSTEM

Thermal Insulation Properties

Rigid Polyurethane Foam has the most efficient thermal insulating value of any insulating material used in general building construction.

Thermal Conductivity – **k** factor	
Initial **k** factor	0.021 - 0.023 W/m.K at 15℃.
Aged **k** factor	0.025 - 0.030 W/m.K

The 'Aged' **k** factor means the Thermal Conductivity value that the foam layer will exhibit under 'diffusion' conditions, that is, when one or both sides (not edges) of the foam layer is exposed to air.

The **R-value - Thermal Resistance** on this basis is set out below -

SFE 282 PUR FOAM **Thickness mm**	**R value** - m^2 .K/W **(* k = 0.028 W/m.K)**
100	3.6
75	2.7
50	1.8
25	0.9

Note: Information on conversion to alternative units Is set out at end of this Product Data Sheet.

As the System is sprayed in-situ, it forms a continuous thermal barrier - no 'thermal bridging' from gaps, fasteners, etc. can occur.

Seamless, Durable & Waterproof

The sprayed in-place **SFE 282** System is seamless as applied. It is self-flashing, and allows application to almost any configuration of substrate. The Closed cell nature of the foam structure prevents the passage of liquid water. See Specific notes under Limitations and Hazards section of this Product Bulletin regarding water vapour.

The **SFE 282** PUR Foam surface provides an ideal base for the direct application of elastomeric membranes - acrylic or polyurea /polyurethane types.
This coating system provides the benefits of a seamless continuation of the waterproofing property of the system over adjoining construction materials.

Excellent Strength to Weight Ratio

The **SFE 282** PUR System when applied weighs approximately 0.9 kg/m^2 at 25 mm thickness. Its lightweight allows a reduction of structural requirements, plus the rigidity of the system adds significant strength to the construction. It will prevent vibration of sheeting and 'deaden' sound transmission.

AUSTHANE SFE 282 is not recommended in roofing / tanking applications where foot traffic is anticipated.
The higher density foam **AUSTHANE SFE 329** is recommended for these situations.

FIRE RATING AND BUILDING CODES

AUSTHANE SFE 282 contains fire retardant chemical additives at a low level. The type and level of the Flame retardant of chemical, incorporated in the Polyol component is only sufficient to cause the foam to self-extinguish once the flame source is removed form the foam's surface.

Although **AUSTHANE SFE 282** Polyol contains fire retardant, foam produced from this system will burn while in contact with a flame or under the high temperature and combustion conditions that occur in building fires.

The **Building Code of Australia** sets out the requirements/use conditions and guidelines for the use of these systems in building applications.

APPLICATION CONDITIONS / GUIDELINES

Recommended Applied Thickness / Recoat Time

- The minimum recommended nominal thickness for general applications is 20 - 25 mm. This product shall generally be applied in one or more passes at typically 20 - 50 mm and no less than 10 mm per pass. Each pass should be allowed to cure before the next pass is applied. The time frame will be dependant on the ambient conditions. Feathering of thicknesses less than 10 - 15 mm should be avoided at edge terminations.
- If higher Thermal Insulation performance is required then increased thicknesses can be applied. When increased foam thickness is required the application rate must be monitored to prevent excessive exotherm / temperature increase in the applied thickness per pass.

Application Conditions / Guidelines continued

- The thickness of PUR foam applied in specific situations, e.g. around roof / wall penetrations, for process equipment or for storage tank insulation applications should be specified by a design engineer.
- If additional foam thickness is to be applied after initial foam application the only consideration is to ensure the ambient conditions are suitable and the foam surface is free of any contamination, surface degradation or moisture absorption.

Machine Processing Conditions

Temperature Settings for processing through Graco / Gusmer equipment

Primary Heater/s	45 - 50ºC
Dual Heated Hose	45 - 50ºC

The actual machine temperature settings will be influenced by the Gun set-up / Dynamic Pressure setting.

Spray Pressure Setting

Dynamic Spray Pressure > 1200 psi [83 bar]

Substrate Surface Temperature / Ambient conditions

- the substrate temperature should be a minimum of 15℃ to achieve good foam adhesion and effective product yield.
- do not apply spray foam insulation to damp substrates.
- check the atmospheric conditions to ensure the temperature of the surface to which the product is to be applied is a **minimum of 3℃ above the Dew Point** at the time of application.
- the product should not be applied in windy conditions due to potential application losses, possible contamination of surrounding areas / surfaces from wind-borne spray and the lack of application control resulting in variable applied thickness and surface evenness / irregularities.
- the product can be applied in temperatures of up to 35℃ +, so long as Dew Point conditions are met and the applied thickness and rate of application are controlled.

In-Service Temperature Range

- The maximum recommended continuous in-service temperature the **AUSTHANE SFE 282** System should be used at is 85°C.
- If the 'contact side' temperature of the foam is likely to 'cycle' above this temperature due to process control conditions then further details should be discussed with Australian Urethane Systems Technical personnel.
- The minimum in-service temperature for spray systems is **-** 50°C.
- Special precautions need to be taken in regard to system design and specifications under possible water vapour condensation conditions, or in conditions of high humidity, or high water vapour concentration conditions.

Primer Recommendations

Use a single pack polyurethane (or alternate recommended) Primer System over plywood, particleboard, concrete and fibrecement sheet.

Metal surfaces require specific surface preparation and / or priming with selected primers.
Consult Australian Urethane Systems for recommendations.

In all cases the substrate should be free of grease, oil, solvent or other contaminants which will interfere with proper adhesion and / or quality of the applied insulation.

Membrane Selection

In all external exposure and some internal applications the PUR foam surface must be protected from weathering/physical deterioration by

- the application of a selected elastomeric membrane coating - typically acrylic, polyurethane or polyurea types.
- application of a Fibreglass / Polyester Resin FRP 'skin'
- application of metal sheeting or other weatherproofing treatment.

In specific temperature and humidity conditions, the effects of water vapour 'drive' must be considered in system design and application / use environments.

Component Storage / Conditioning

- SFE 282 Polyol Component has a nominal storage life of 3 months at 15 - 25°C.
- precondition the SFE 282 Polyol Component to 20 - 25°C, then stir / recirculate the Polyol Component product in the supply drum prior to using the product. It is recommended that both components are preconditioned to 20 - 25°C before use.
- keep the temperature of both the components in the drums above 10°C. It is recommended the drums are stored on pallets in a designated storage facility at 15°C to 25°C. Do not store drum directly on cold concrete floors.
- keep the supply drums sealed unless processing the product. The **SFE 282** Polyol Component contains ***ecomate***® Blowing Agent which will evaporate from the product if the drum is not tightly sealed.
- the MDI Isocyanate Component is sensitive to moisture. If the product is not sealed the effect of atmospheric moisture will be to cause crystallisation in the product. If the product is to be stored for any length of time the ullage space above the liquid level should be purged and filled with Dry Air or Nitrogen Gas.

Limitations and Hazards

- In all external exposure and some internal applications the PUR foam surface **must be protected** from weathering / physical deterioration by the application of a selected elastomeric membrane coating typically acrylic, polyurethane or polyurea types or if required for specific application/s a Fibreglass / Polyester Resin FRP 'skin'.
- In specific temperature and humidity conditions the effects of water vapour 'drive' must be considered in system design and application requirements. This is also important under possible water vapour condensation temperature / humidity conditions.
- When spraying or pouring, excessive thickness should not be applied as the exotherm of the reaction may lead to spontaneous combustion, excessive pressure build up or thermal expansion from the significant heat developed in the foaming reaction.
- Irritating vapours may be generated from both the ingredients during the foam process. Use only in well-ventilated areas according to the Safety and Handling guidelines as set out in the individual liquid Component MATERIAL SAFETY DATA SHEETS.

Limitations and Hazards continued

- Use foam only in temperature conditions where the **maximum** contact surface temperature is **+ 85°C** and the minimum contact surface temperature is **– 50°C**.
- All polyurethane and polyisocyanurate foams may present a FIRE HAZARD in certain applications if exposed to fire and / or excessive heat, eg. welding, and cutting torches in the presence of oxygen or air. The use of polyurethane foams in interior applications, may present an unreasonable fire hazard, unless the foam is protected by an approved fire resistive thermal barrier. **Consult Building Code of Australia** for specific regulations.

Notes on Thermal Conductivity

In applications where impermeable facings are applied to both faces i.e. where metallic sheeting / foils are adhered firmly over the whole surface of the foam to both surfaces (edges are not significant if < 10% of total surface area), then there is no Aging / diffusion effect on the foam cell composition and the foam will retain its initial **k** factor.

• Influence of Foam Density (kg/m^3)

Technical Literature indicates that at normal exposure temperature conditions:

> "*variations in thermal conductivity cannot be detected experimentally between (foam densities of) 30 and 60 kg/m^3. The variations due to differences in density are less than those caused by variations in the composition of the cell gas.* "

• General Information – Thermal Conductivity

Typical R Values of common Building Products

Material at 100mm Thickness	**Thermal Resistance R value** (m^2. K/W)
Airspace (typical vertical reflective)	0.6*
Cellulose fibre (loose fill)	2.5*
Glass-fibre batt (8kg /m^3 density)	2.0*
Polystyrene (rigid low density EPS)	3.3*
Polyurethane (rigid block [aged] 35 kg /m^3)	3.6
Rockwool batt (40 kg /m^3)	2.8*

(* Source – CSIRO Building Technology File No.4, June 1995)

Comparison of Units - Thermal Conductivity k factor

W/(m.K)	0.017	0.023	0.029
kcal/(mh°C)	0.015	0.020	0.025

1 W/m.K	=	6.933 Btu.in/ft^{2}h°F
1 Btu.in/ft^{2}h°F	=	0.1442 W/m.K
1 kcal/mh°C	=	1.163 W/m.K

Surface Coefficients for Various Coatings / Claddings*

Reflective Cladding - Silver Foil	5.7 W/m^{2}K
White Membrane Coating (new)	6-7 W/m^{2}K
Zincalume / Galvanised Steel	6.3 W/m^{2}K
Dark Coloured Paints	10 W/m^{2}K

Note 1: Still air conditions, for ambient temperatures not exceeding 45°C.

* Source Publication - Industrial Insulation Design Guide - Page 3 - **CSR BRADFORD INSULATION**

EXCLUSION OF WARRANTIES

THESE SYSTEMS ARE NOT INTENDED FOR USE BY NON-PROFESSIONAL OR INEXPERIENCED DESIGNERS AND APPLICATORS.

The information presented in this bulletin requires experience and background knowledge for correct interpretation and application.

The potential user must perform any pertinent tests in order to determine the product's performance and suitability in the intended application since determination of fitness of the product for any particular use is the responsibility of the buyer.

The data, information and suggestions covered in this data sheet, are given on the basis that the materials will be used correctly and professionally and at the sole risk of the user.

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