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POURING FOAM

NON-CFC RIGID LOW DENSITY
POLYURETHANE FOAM SYSTEM

DESCRIPTION

Pouring Foam is a flame retarded, NON-CFC, two pack rigid polyurethane foam system producing foam with a nominal freerise density of 36-38 kg/m³.

Pouring Foam Polyol contains 141b - HCFC 'Blowing Agent'. The ODP factor (Ozone Depletion Potential) for 141 B is 0.11.

APPLICATIONS

Pouring Foam is recommended for use as thermal insulation in cold and hot applications, from -50°C to +85°C temperature range.

It is also suitable for use in 'buoyancy' applications ie. cavity/compartment/void filling for boats, wave-skis, canoes etc. and in building panels, moulded fibreglass systems.

It is suitable for moulding/void filling applications where low weight and increased stiffness/stability are required.

It is suitable for pour-in-place or injection use by either 'hand' mixing or machine processing.

FIRE HAZARD

It should be noted that the **Pouring Foam** Polyol component contains flame retardant chemical additives at a low level. **It is not fire-rated and foam produced from this system will burn while in contact with a flame or under high temperature conditions.**

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

TECHNICAL DATA

Mix Ratio

One (1) Part of Polyol **Pouring Foam** to One (1) part Iso **Pouring Foam** (or equivalent) by weight or 1:1 by volume.

Reactivity Profile

The figures set out are the laboratory quality control specification for the system at 200C based on 200gms of total mix mixed with a 50mm Disc Stirrer at 2,800 RPM.

| | |
|-------------------|--------------------------|
| Mix Time | 20 Seconds |
| Cream Time | 36 ± 4 Seconds |
| Gel Time | 170 ± 10 Seconds |
| Tack Free Time | 200 ± 20 Seconds |
| Free-Rise Density | 36 ± 1 kg/m ³ |

For application, a temperature of 25C is suggested for both Polyol & Iso. Each manufactured batch of Polyol is tested to comply with these QC Standards before it is released for sale. Any variation in standard performance should be investigated and corrected before processing.

Specific Gravity of Components

| | |
|--------|------------------|
| Polyol | 1.14 g/ml (25°C) |
| Iso | 1.2 g/ml (25°C) |

Physical Properties of Cured Foam (under laboratory test conditions)

| | |
|--------------------------------------|-------------------------|
| Free-Rise Density | 35-37 kg/m ³ |
| Closed Cell Content | > 88% |
| Thermal Conductivity - Initial Value | |
| k factor W/m.K (typical result) | 0.020/0.022 |

| | | |
|----------------------|------------------|-----------------------|
| Foam Test | Parallel to Rise | Perpendicular to Rise |
| Density | | |
| 37 kg/m ³ | > 240 kPa | >100kPa |
| 50 kg/m ³ | >285 kPa | >245 kPa |

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Notes on Thermal Conductivity

In applications where impermeable facings are in place or applied to both faces eg. metal sheeting, metal foils, fibreglass lay-up construction, and is adhered firmly over the whole surface of both sides of the foam, the foam will retain its **Initial k factor of typically 0.017/0.018 W/(m.K) [0.015/0.016 kcal/(mh°C)]**

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

| Pouring Foam Thickness mm | R Value* m2 K/W |
|---------------------------|-----------------|
| 100 | 4.76 |
| 50 | 2.38 |
| 25 | 1.19 |

(* at k = 0.018 W/m.K)

Bayer AG 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/M3 . The variations due to differences in density are less than those caused by variations in the composition of the cell gas".

Comparison of Units - Thermal Conductivity - k

| | | | |
|-----------------|---------------------|-------|-------|
| 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/ft2h°F | | |
| 1 Btu.in/ft2h°F | 0. 1442 W/m.K | | |
| 1 kcal/mh°C | 1. 163 W/m.K | | |

Dimensional Stability of the **Pouring Foam** System at 37 kg/m3 (based on AS2489.6)

% Change in dimension

| Dimension | 7 Days exposure at -15°C | 7 Days exposure at 95°C |
|-----------|--------------------------|-------------------------|
| Length | Nil | +2.95% |
| Width | -1.50% | +0.40% |
| Thickness | Nil | -1.70% |

USE/PROCESSING INSTRUCTIONS

The **Pouring Foam** System is designed to produce a "free-rise" foam of 37 kg/m3 (2.3lb/ft3) nominal density when the components are mixed in the correct ratio (1:1) by weight and using the prescribed temperature (25°C) and processing conditions.

Warming all mould/contact surfaces to 30-40°C will give the best results.

- In practice the density will be influenced by the configuration of the cavity in which the foaming process takes place.
- Restrictions to flow will result in increased density.
- Variations from recommended temperatures for components and moulds will also effect moulded density.

The change from F1 1 to 141 B as the Blowing Agent (from 1 January 1995) does change the recommended mixing temperature and flow characteristics of these low density foam systems. Warming of both components Polyol and Isocyanate to 25°C will significantly improve the efficiency and flow of the system

HAND MIX PROCEDURE

Calculate the volume to be filled. From this foam volume requirement, calculate system weight based on finished foam density of nominal 40 kg/M3 or imperial equivalent 2.3 lb/ft3 ie. each cubic metre nominally requires 40 kg **Pouring Foam** system made up of 20 kg Polyol and 20 kg Iso.

The quantity of system will generally be greater than the calculated quantity to allow for residues in weighing and mixing containers, the amount of overpacking required to fill the void/mould shape, and the quantity of material mixed for each pour/mix.

Procedure All materials and equipment should be prepared and set up in advance to ensure rapid and efficient sequence from the time the operation is started.

(1) Accurately weigh the required quantity per pour/mix of Polyol into a dry clean container.

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(2) Immediately add the required quantity of Iso (same weight as polyol) to the same container.

(3) Immediately mix the two components using a high speed mixing blade and as soon as mixing is complete, pour into mould/void space. Mixing time of approximately 20 seconds is normally sufficient.

Mixing A power operated mixer is essential. As a general rule minimum requirement is a speed of 2500 RPM with a blade capable of giving high shear with adequate turbulence. Mixing time must be long enough to give complete mixing, but short enough to ensure that mix and pour operations are complete within the Cream Time of the system, typically 30-35 seconds.

MACHINE MIXING

There are a number of machines from several manufacturers suitable for use with the **Pouring Foam** Series of systems. Minimum requirements are capability for accurate metering and timing of shots, and ability to maintain temperature of components within a limit of $\pm 2^{\circ}\text{C}$ of the selected temperature for each component.

For most applications a temperature of 25°C to 30°C for polyol and iso is required. Viscosities and react" figures may be changed by controlled temperature variation within operational limits.

When using the **Pouring Foam** system through polyurethane spray foam equipment, Gusmer/Grayco or similar, in 'injection' applications similar temperature settings are used. The application conditions are important in determining the appropriate temperature settings for the two components.

MOULDS

Suitable moulds can be made from sheet metal, fibreglass (fro) or filled epoxy systems. To facilitate release, mould surfaces must be smooth and polished and a coating of release agent must be applied between each process.

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 bituminous types.
 - ❖ application of a Fibreglass/Polyester Resin FRP 'skin'.
 - ❖ application of metal sheeting or other weatherproof treatment.
- In specific temperature and humidity conditions the effects of water vapour 'drive' must be considered in system design and application requirements.
- 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 foaming process. Use only in well ventilated areas according to Safety and Handling guidelines as set out in the Material Safety Data Sheets.
- Use only in temperature condition where the **maximum** contact surface temperature is $+85^{\circ}\text{C}$ and the **minimum** contact surface temperature is -50°C .
- Special precautions need to be taken in regard to system design and specification under possible water vapour condensation temperature conditions, or in conditions of high levels of water vapour/high humidity conditions.
- All polyurethane & 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 Foam 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 direction.

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STORAGE AND HANDLING

Drums should be stored on pallet/s. Do not store/stand drums directly on cold concrete floors.

Both product containers must be kept sealed.

Both components are moisture sensitive.

The Polyol component (Part B) is hygroscopic (will absorb water vapour from the air) which affects its reaction with the Iso (part A) component.

The Iso component will react with absorbed water vapour resulting in crystallisation.

Always wipe the threads of the Iso container clean with a clean rag prior to replacing the screw lid. Failure to do so will result in the Iso acting as a glue and "gluing" the lid to the container.

The Polyol component (Part B) contains a blowing agent which will evaporate if the container is not kept sealed. The loss of this component will cause a reduced amount of blowing and thus the volume yield will be reduced.

If available, use a Dry Gas spray into each can prior to sealing. Use the dry gas in accordance with the directions provided with the dry gas. This will largely eliminate moisture access to the components.

Store internally at 18° C to 30° C Avoid storage near sources of radiated heat or against external walls subject to significant temperature variations.

Please refer to MATERIAL SAFETY DATA SHEETS for precautions for safe handling and working with each component of the system, danger to certain individuals and decontamination of spills.

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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