POLYMER GROUP LTD
SOLUTIONS FOR EXTREME ENVIRONMENTS

Product data sheet

ENDURATHANE 3325S

Climate Friendly Injection Foam System

INJECTION FOAM SYSTEM

DESCRIPTION:

ENDURATHANE 3325S is a formulated polyol blend designed to react with Endurathane Part A or Suprasec 5005 isocyanate to produce a polyurethane foam system.

ENDURATHANE 3325S is a ***Climate Friendly,*** injection foam formulated with HFO as the blowing agent which has ***zero ozone depleting potential***, ***extremely low GWP*** and the foam system ***utilises both recycled industrial plastics and consumer scrap bottles***.

ENDURATHANE 3325S is a low density, highly energy efficient, injection insulation and buoyancy foam for machine application.

ENDURATHANE 3325S is a fire retarded grade with good self-extinguishing properties. It does not contain halogenated (chlorine) fire retardants and has been especially formulated to minimise long term corrosion.

Typical liquid properties at 21°C:

Test:	Part A	Part B
Viscosity: (cPs)	200-250	350-400
Specific Gravity:	1.24	1.13
Appearance:	Brown liquid	Amber liquid

Typical Laboratory Reaction:

Cream Time (20°C) 24-27 secs
Gel Time 130-150 secs
Rise Time 175-210 secs

Mix Ratio: 100A:100B parts by volume

TYPICAL CURED PROPERTIES

Density	32-35 kg/m³
Thermal Conductivity	0.023 W/mK
Compressive Strength	120 kPa
Closed cells	90 – 95%
Dimensional Stability	
24 hrs @ 100°C	1 to 5%
24 hrs @ -40°C	0%
24 hrs @ 70°C/100% RH	0 to 5%
Water Absorption (23°Ckgs/m²)	0.49
Flammability DIN 4102	B3 rating
ASTM D-1692	self-extinguishing

Theoretical Usage 1 kg of expanded foam occupies 0.03 m³. Make adequate allowance for losses.

TYPICAL RECYCLED CONTENT ON SYSTEM (%by weight):

Pre Consumer:	4.53%
Post Consumer:	3.97%
Total:	8.50%

ENDURATHANE 3325S has an ultra-low global warming potential utilising HFO-1233ze(E) which has a GWP of <1.0 resulting in an insulation foam <99% of traditional HFC blown foams.

RECOMMENDED USES:

Applications include:- Wall and door cavity insulation, pipe insulation, buoyancy chambers, insulated building panels, refrigerated transport trailers, refrigerated containers, commercial display cabinets, walk-in coolers/freezers, fish holds & freezers and laminated composites for light weight spandrels, low cost insulation boards, roofing panels and partition panel systems.

LIMITATIONS

Although **Endurathane 3325S** contains fire retardant, all polyurethane foam insulation will burn when exposed to fire. For interior building applications, a protective thermal barrier equal in resistance to 13mm gypsum board should be used over the insulation to protect the foam insulation from all sources of ignition. For clarification refer to a building consent authority or consult a fire engineer.

Service Temperature:
For hot applications such as heated tanks, the cured insulation may be used at continuous service temperatures of up to 85ºC.

PACKAGING

Part A: Nett 250 kg per 200 litre drum.
Part B: Nett 228 kg per 200 litre drum.

OPTIMUM FOAM YIELD: @ 33kg/m³

478 kg kit 14.5 m³

HFO – Ultra-Low Greenhouse Gas Emissions

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APPLICATION DATA

ENDURATHANE 3325S is machine-applied through 2-component polyurethane application equipment such as ***Graco Reactor*** with ***Fusion AP, Probler P2*** or similar. Please consult your representative for advice regarding any equipment application questions you may have.

Equipment:	***Graco Reactor***	
Pre-heat:	Part A [isocyanate]	35-45°C
	Part B [polyol]	35-45°C
Hose Temperature:		40-50°C

Optimum temperatures will vary with equipment, substrate temperature and ambient conditions generally. Check and maintain correct output ratio to ± 2%. Ensure metering is accurate by regular ratio checks and monitoring of line pressures to gun. Operator must have adequate product knowledge to recognise faulty foam so remedial action can be taken.

Substrates:
Endurathane 3325S may be applied to most surfaces. Substrates must be clean and dry.
Ambient and surface temperatures should be above 15°C. **Low temperatures will decrease yield markedly.**

Theoretical Coverage:
Always check yield and application rates at start of job and then regularly to ensure product usage is as expected. ***Adequate allowance must be made for over-packing, especially when cavities are narrow or foam has a long flow path.***

HEALTH AND SAFETY ADVICE

Refer to Polymer Group Safety Data Sheets for individual products.

Component A [isocyanate] contains methylene bisphenyl di-isocyanate [MDI]. It is moderately toxic. **Avoid contact with skin or eyes, avoid breathing vapour** and use only in well ventilated areas.

Component B [polyol] contains HFO volatile blowing agent. It is a mild irritant. In confined spaces it may displace sufficient air to be hazardous. Provide ventilation or use only in well ventilated situations.

STORAGE AND HANDLING PRECAUTIONS

ALL CHEMICALS MUST BE USED BY TRAINED PERSONNEL.

Component A [isocyanate] contains methylene bisphenyl di-isocyanate [MDI] and is moisture sensitive. Keep moisture out after use and use a dryer system. It must be stored securely and not available to the public.

Component B [polyol] contains HFO volatile blowing agent. To prevent loss of HFO by evaporation, and to prevent ingress of moisture, drums must be kept tightly sealed when not in use. When opening a container, care must be taken to release any internal pressure slowly.

Provide ventilation or use only in well ventilated situations.

Always wear **eye and breathing protection** (half or full face respirator) and suitable **protective clothing** ie, disposable overalls, gloves and boots.

Flush splashes to the skin or eyes with copious quantities of water.

Clean up:
Owing to the chemical resistance of polyurethane products it is important to clean up any overspray as quickly as possible. Methyl Proxitol is suitable for general cleaning and methylene chloride can be used as a line flush.
Wear suitable protective clothing, goggles and gloves at all times when cleaning.
Greasing components beforehand assists with contamination removal.

Storage Stability
Recommended storage temperature is 10-25°C in tightly closed containers to prevent moisture and other contamination. Under these conditions this product has a storage stability of at least 6 months.

Store out of direct sunlight and away from all sources of heat.

HFO – Ultra-Low Greenhouse Gas Emissions

PROPERTIES AND SUSTAINABILITY OF POLYURETHANE FOAM

Polyurethane rigid foams have a closed cell structure and high cross-linking density give them the characteristics of good heat stability, high compressive strength and excellent insulation properties.

PU insulation has a very low thermal conductivity, starting from as low as 0.017 W/m.K, making it one of the most effective insulants available today for a wide range of applications.

All types of insulation can also play a role in improving the energy efficiency of buildings and reducing CO_2 emissions.

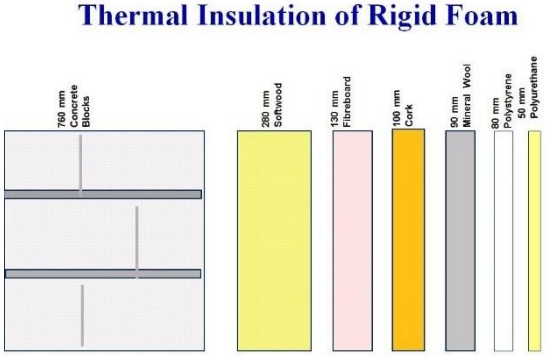
The environmental impact Polyurethane offers is as follows:

- Excellent thermal efficiency – leading to optimum energy savings and reduced CO_2 emissions.
- Relatively low environmental impact at the building level – the product saves more than 100 times the energy than is used in its manufacture.
- Durability – leading to long term performance and reducing the need for replacement, therefore saving energy.

The economic impact from polyurethane is:

- Increased energy efficiency – leading to immediate savings for the end user.

Ref: PU Europe Sustainability and polyurethane insulation.



λ INFORMATION ON THERMAL CONDUCTIVITY (K-FACTORY OR λ) TESTING

To test the insulation properties of foam we test the thermal conductivity or K-factor, which is a measure of a materials ability to transfer heat through conduction and therefore is the principle property of an insulation material.

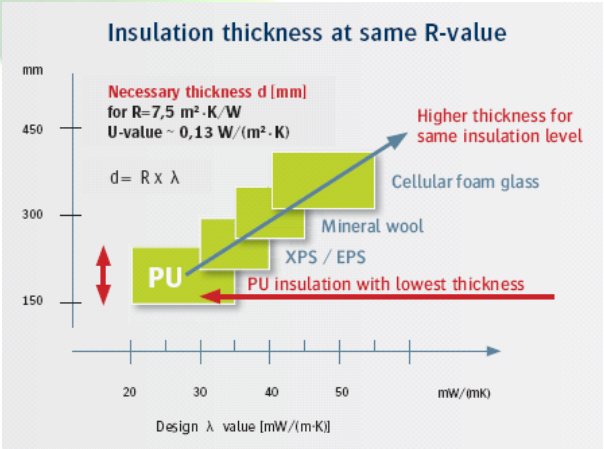
Typical values of insulating materials are:

Material	Density (kg/m³)	k-factor (W/mK)
Polyurethane foam closed cell	32	0.023
Polyurethane foam open cell	10-12	0.035
Polystyrene foam	16	0.035
Rockwool	100	0.037
Glasswool	65-160	0.041
Timber – white pine	350-500	0.112

Insulation materials are then normally reported in terms of their R-value, which is a measure of the thermal resistance.

ENDURATHANE 3325S with the above k-factor result would give an estimated R-value of 2.17 m^2 K/W @50mm thickness.

The following graph shows the thickness of insulation materials needed to get an R-value of 7.5 m^2 K/W with standard PU foam. As seen, PU offers the best insulation at lowest thickness.



Reference: Insulation for sustainability: A guide, XCO2 Conisbee 2002

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