



DIVERSE URETHANES

PRODUCT DATA SHEET

PBS 2000u Polyurea Spray System

1. INTRODUCTION

PBS 2000U is a formulated two component, solvent free 100% polyurea spray elastomer.

It is a fast reacting system formulated to be sprayed through high pressure equipment at pressures of at least 2000 psi. PBS2000u is based on aromatic polyurea chemistry and will change colour with long term exposure to UV.

2. APPLICATIONS

PBS 2000U is suitable for commercial and industrial applications where the benefits of polyurea chemistry is known. The longer curing cycle allows for better intercoat adhesion, better self-leveling and allows for textured or smooth finish depending on the requirements by means of non-slip media to be added.

3. CONSIDERATIONS

As with all polyureas, the product has excellent abrasion and chemical resistance. The highest temperature at which the product should be used is 80°C in order to maintain the full physical properties. The material can tolerate short periods of exposure to temperatures up to approximately 100°C without permanently impairing any of the physical properties.

During processing, the material will experience around 1% volume shrinkage due to the heat of reaction. It is imperative to store PBS 2000U in a sealed container in order to prevent the absorption of atmospheric moisture which would cause the mixed product to foam.

4. POLYOL PHYSICAL PROPERTIES: PBS 2000U

Appearance : Clear Amber liquid

5. ISOCYANATE PHYSICAL PROPERTIES: PBS 2000u Iso

Appearance : Clear, pale yellow
Viscosity at 25°C : 230

6. **PROCESSING**

Mix ratio	:100 Parts PBS 2000U : 120 parts PBS 2000u Iso by Mass
	; 1:1 by volume
Pot life at 30°C (hand-mix)	:approx. 15 seconds
Density at 20°C	:1,05 - 1,15 gcm ³
Hardness (Shore A)	: 77 – 85 Shore A 53505 DIN
Tensile Strength MPa	: 9.2
Angle Tear (kN/m)	: 44.5
Trouser Tear (kN/m)	: 23
Elongation at break	: 415
Density (g/cm ³)	: 0.961

- 6.1 Stir polyol well before use. This material contains a desiccant which may settle out. Always replace the lid after use to exclude atmospheric moisture.
- 6.2 Mix components together thoroughly without entraining air.
- 6.3 Coating thickness of approximately 0.5 – 1 mm per pass is recommended. Several Millimeters can be achieved very quickly by allowing 50 – 60 seconds cooling between passes. This product has been designed to spray thicker sections up to 12 mm thick.
- 6.4 Optimum properties are obtained after a further 24 hours at room temperature, it is advisable not to walk on it for 24 hours.

7. **PACKAGING**

200 kg drums.

8. **STORAGE**

8.1 **PBS 2000U**

Should be stored in a dry environment at ambient temperatures.

8.2 **PBS 2000U ISO**

Should be stored at 20 - 30°C. Crystallization may occur after prolonged storage at temperatures below 0°C. Should this take place, heat the material to 70 - 80°C to melt out, then agitate thoroughly to ensure homogeneity.

9. **HANDLING / TOXICITY**

9.1 **PBS 2000U**

PBS 2000U does not present a significant health hazard to users under normal conditions of industrial exposure.

9.2 **PBS 2000U ISO**

PBS 2000U ISO is an MDI type isocyanate and is considered hazardous by inhalation. Avoid skin contact.

10. **FIRST AID MEASURES**

10.1 **PBS 2000U**

PBS 2000U is believed to be non-dermatitic and to exhibit a low order of oral toxicity. However, since it is possible that certain individuals may be unusually sensitive to these materials, it is recommended that all users wash thoroughly and avoid prolonged and repeated skin contact with the material. Eye contamination will cause severe irritation and pain. Immediate rinsing with water must be initiated and continued for at least 10 minutes.

10.2 **PBS 2000U ISO**

In the case of skin contact with PBS 2000U ISO, the affected area must be washed with soap and water. Eye contamination should be treated by rinsing with running water for at least 10 minutes. Seek medical assistance.

11. **FIRE**

Keep drums cool by spraying them with water if they are exposed to the fire. Extinguish with dry chemical, sand, foam or water spray.

12. **SPILLAGES AND WASTE DISPOSAL**

PBS 2000U ISO

Decontamination can be affected by overnight contact with liberal amounts of a solution containing methanol (30 parts), water (70 parts), and concentrated ammonia (1 part). Drums must not be resealed until decontamination is complete. (See attached safety data sheet on details for dealing with larger spills.)

PBS 2000U ISO is an isocyanate containing material and is considered hazardous by inhalation.

The information provided in this data sheet and otherwise supplied to users, is based on our general experience and upon tests which are believed to be reliable. However, because we have no control over the exact manner in which the information is used, we cannot guarantee the results to be obtained. Furthermore we make no express or implied warranty of merchantability or fitness of the product for a particular use.

The information contained in this data sheet is correct and accurate to the best of our knowledge but without warranty or liability.

PBS 2000U ISO**SAFETY DATA SHEET****1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY / UNDERTAKING:**

Product Name : PBS 2000u Iso

Address : Diverse Urethanes,
2A High Street, Modderfontein
1645

Emergency Telephone No : (011) 608-2584

2. COMPOSITION/INFORMATION ON INGREDIENTS**Product Description**

Diisocyanato diphenylmethane (MDI) based composition.

<u>Hazardous</u>	<u>Cas No.</u>	<u>% (w/w)</u>	<u>Symbol</u>	<u>R Phrases</u>
Diphenylmethanediisocyanate, isomers and homologues	009016-87-9	>25	Xn	R20 R42 R36/37/38

3. HAZARDS IDENTIFICATION

Harmful by inhalation.

This product is a respiratory irritant and potential respiratory sensitiser: Repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitised persons. Irritating to eyes and skin.

Repeated and/or prolonged contact may cause skin sensitisation.

Irritating to eyes and skin.

Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

4. **FIRST AID MEASURES**

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation

Remove patient from exposure, keep warm and at rest. Obtain medical attention. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is laboured, oxygen should be administered by qualified personnel. Apply artificial respiration if breathing has ceased or shows signs of failing.

Skin Contact

Remove contaminated clothing. Wash immediately with water followed by soap and water. If symptoms develop, obtain medical attention. Contaminated clothing should be thoroughly cleaned.

Eye Contact

Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain immediate medical attention.

Ingestion

Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Do not induce vomiting. Obtain immediate medical attention.

Further Medical Treatment

Symptomatic treatment and supportive therapy as indicated. Following severe exposure the patient should be kept under medical review for at least 48 hours.

5. **FIRE-FIGHTING MEASURES**

Not classed as flammable.

If involved in a fire, it may emit noxious and toxic fumes.

Containers may burst if overheated.

Due to reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN.

Extinguishing Media

Foam, CO₂ or dry powder. Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses, keep fire exposed containers cool by spraying with water

Fire Fighting Protective Equipment

Suitable respiratory protection with full face piece and positive air supply. PVC boots, gloves, and protective clothing should be worn.

6. **ACCIDENTAL RELEASE MEASURES**

Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection.

Evacuate the area. Prevent further leakage, spillage or entry into drains.

Absorb spillages onto sand, earth or any suitable absorbent material. Do not absorb onto sawdust or other combustible materials. Shovel into open-top drums for further decontamination. Wash the spillage's area clean with liquid decontaminant. Test atmosphere for MDI vapour.

Neutralise small spillage's with decontaminant. Remove and dispose of residues.

The compositions of liquid decontaminants are given in Section 16.

See also brochure PU 193-1 (see section 16).

7. **HANDLING AND STORAGE**

7.1 **Handling**

Do not breathe vapour/spray. Avoid contact with skin and eyes. Atmospheric concentrations should be minimised and kept as low and reasonably practicable below the occupation exposure limit. The efficiency of the ventilation must be monitored regularly because of the possibility of blockage.

When the product is sprayed or heated, suitable respiratory protection equipment with positive air supply may be required. Keep equipment clean. A basic essential in sampling, handling and storage is the prevention of contact with water.

Keep stocks of decontaminant readily available. The compositions of liquid decontaminants are given in section 16. See also brochure PU 193-1 (see section 16).

7.2 **Storage**

Keep containers properly sealed and store indoors in a well ventilated area. Keep away from frost. Keep away from moisture. If a container is contaminated, do not reseal it. Due to reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

Unsuitable containers : copper, copper alloy and galvanised surfaces.

Suitable containers : stainless steel or mild steel.

Storage Temperature : 15 - 35°C.

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION**

Wear suitable protective clothing, gloves and eye/face protection. MDI can only be smelled if the occupational exposure limit has been exceeded considerably. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit.

Medical supervision of all employees who handle or come in contact with respiratory sensitisers is recommended. Personnel with a history of asthma-type conditions, bronchitis or skin sensitisation conditions should not work with MDI based products.

The Occupational Exposure Limits listed below do not apply to previously sensitised individuals. Sensitised individuals should be removed from any further exposure.

Respirators

Suitable respiratory equipment with positive air supply should be used in cases of insufficient ventilation or where operational procedures demand it.

Eye Protection

Chemical safety goggles. Full face shield if splashing is possible.

Gloves

The following protective materials are recommended:

- Neoprene.
- Nitrile butadiene rubber.
- Butyl rubber.
- PVC (Heavy duty).

Thin disposable gloves should be avoided for repeated or long term use.

Other

Overalls (preferably heavy cotton) or Tyvek-Pro Tech "C", Tyvek-Pro "F" disposable overall. Contaminated clothing should be thoroughly cleaned before re-use.

Occupational Exposure Limits

Hazardous Ingredient(s)	LTEL	8hr	TWA	STEL		Notes
	ppm		mg/m ³	ppm	mg/m ³	
Isocyanates, all (as -NCO) (Diphenylmethane 4,4'diisocyanate)	-		0.02	-	0.07	MEL Sen

9. **STABILITY AND REACTIVITY**

Incompatible materials and conditions: water, alcohol's, amines, bases and acids. Avoid high temperatures.

Hazardous Reactions

Stable at room temperature. Reaction with water (moisture) produces CO₂-gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents.

Hazardous Decomposition Product(s)

Highly unlikely under normal industrial use

10. **TOXICOLOGICAL INFORMATION**

This health hazard assessment is based on information available on similar products.

Inhalation

This product is a respiratory irritant and potential respiratory sensitiser; repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. Symptoms may include irritation to the eyes, nose, throat and lungs, possibility combined with dryness of the throat, tightness of chest and difficulty in breathing. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitised persons.

Median Lethal Concentration (4 hrs) (respirable aerosol) : 490 mg/m³ (rat).

Skin Contact

Moderate irritant.

Repeated and/or prolonged contact may cause skin sensitisation.

Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitiser including diisocyanates. These results emphasise the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

Dermal Median Lethal Dose : > 5000 mg/kg (rabbit).

Eye Contact

The vapour, aerosol and liquid are irritant.

Ingestion

Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Oral Median Lethal Dose > 5000 mg/kg (rat).

Long Term Exposure

Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m³), there was a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours at 1 mg/m³ and no effects at 0.2 mg/m³. Overall, the tumour incidence, both benign and malignant, and the number of animals with the tumours were not different from controls. The increased incidence of lung tumours is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumour formation will occur. Industrial experience in humans has not shown any links between MDI exposure and cancer developments.

There are reports that chronic exposure by inhalation may result in permanent decrease in lung function.

No birth defects were seen in two independent animal (rat) studies. Foetal toxicity was observed at doses that were extremely toxic (including lethal) to the mother. fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.

There is no substantial evidence of mutagenic potential.

11. **ECOLOGICAL INFORMATION**

Environmental Fate and Distribution

By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise.

Persistence and Degradation

Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino - diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, by calculation and by analogy with related diisocyanates.

Toxicity

By comparison with an analogous product, the following values are anticipated.

LCO (zebra fish) > 1000 mg/1
EC50 (Daphnia magna) (24 hour) > 1000 mg/1
EC50 (E.Coli) > 100 mg/1

The measured ecotoxicity is that of the hydrolysed product, generally under conditions maximising production of soluble species. Even so, the observed ecotoxicity is low/very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora in all trophic levels (including fish). no detectable diaminodiphenylmethane (MDA), and no evidence of bioaccumulation of MDI or MDA.

12. **DISPOSAL CONSIDERATIONS**

The generation of waste should be avoided or minimised wherever possible. Disposal should be in accordance with local, state or national legislation. Untreated material is not suitable for disposal. Waste, even small quantities, should never be poured down drains, sewers or water courses.

Small quantities and empty drums - pretreat to neutralise prior to disposal.

Large quantities - incinerate under approved controlled conditions, using incinerators suitable for the disposal of noxious chemical waste. Empty drums should be decontaminated and either passed to an approved drum reconditioner or destroyed.

See also brochure PU 193-1 (see section 16).

13. **TRANSPORT INFORMATION**

Not classified as dangerous for transport.

14. **REGULATORY INFORMATION**

EC Classification	:	HARMFUL
Hazard Symbol	:	Xn
Risk Phrases	:	R20 - Harmful by inhalation. R36/37/38 - Irritating to eyes, respiratory system and skin.
	:	R42 - May cause sensitisation by inhalation.
Safety Phrases	:	S22 - Do not breathe dust. S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28 - After contact with skin, wash immediately with plenty of warm soapy water. S38 - In case of insufficient ventilation, wear suitable respiratory equipment. S45 - In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

15. **OTHER INFORMATION**

This data sheet was prepared in accordance with Directive 93/112/EC.

Liquid MDI decontaminants:

Decontaminant 1 :

- Water	-	90%
- Concentrated ammonia solution	-	8%
- Liquid detergent	-	2%

Decontaminant 2 :

- Water 90	-	95%
- Sodium carbonate	-	5 - 10%
- Liquid detergent	-	0.2 - 0.5%

Decontaminant 1 contains ammonia. Ammonia presents health hazards. (See supplier safety information).

Decontaminant 2 reacts slower with MDI but is more environmentally friendly than decontaminant 1.

Literature reference: PU 193-1: "MDI-Based Compositions : Hazards and Safe Handling Procedures".