



DIVERSE URETHANES

DIV 103

1. INTRODUCTION

DIV 103 is a polyether based prepolymer used as the sole film former in a one component moisture curing systems where highly flexible films are required.

2. APPLICATIONS

DIV 103 is particularly recommended for use as an elastomeric binder for crumb rubber.

3. CONSIDERATIONS

As with all polyurethane products, the product should not be exposed to very strong acids or bases. The highest temperature at which the product should be used is 80 to 85°C in order to maintain the full physical properties. The material can tolerate short period temperature increases up to approximately 120°C without permanently impairing any of the physical properties.

4. DIV 103 PHYSICAL PROPERTIES

Appearance	:	Straw coloured viscous liquid
Viscosity at 25°C (cps)	:	3500 - 4500 ASTM D1638
Free NCO content (%)	:	10,0 - 12,0 ASTM D1638
Non volatile content (%)	:	100
Specific Gravity	:	1,08 - 1,12

5. PROPERTIES AND USES

One pack surface coatings

DIV 103, when applied as a film in either the solid state or in solution with solvents, will react with moisture from the atmosphere and convert from a liquid to a solid in one or two days. Optimum properties are reached over a seven day period. Temperatures, either high or low, do not influence the reaction which is more dependent on conditions of humidity and film thickness. The by-product of this NCO/moisture reaction is carbon dioxide which is liberated from the film before gelation occurs. It has been known under conditions of high humidity which accelerates the gel time, for carbon dioxide to become trapped in the film. This problem may be overcome by incorporating suitable high boiling solvents which hold the film "open" for some time.

Pigments and fillers may be dispersed in DIV 103 provided they are substantially water free i.e. below 0,05%. The same water level must be observed when extending DIV 103 with rubber crumb. Moisture may be selectively absorbed by incorporating

scavengers such as molecular sieves. A pre-reaction step with a mono or diisocyanate has also proved to be an effective method of neutralising undesirable reactive groups contained in pigments, fillers and solvents.

The curing time can be shortened by the addition of $\pm 0,1\%$ m/m of an amine type catalyst. The physical properties of the bound rubber article may be enhanced by heating the partially cured article to 90 - 100°C for 30 minutes to 3 hours, shortly after demould.

6. **PACKAGING**

Standard packs consist of 220kg steel drums.

7. **SHELF LIFE**

Should be stored between 20 - 30°C in a dry environment. Prolonged or repeated heating of the material will accelerate decomposition. Partly used containers should be resealed immediately after use.

8. **HANDLING**

DIV 103

DIV 103 is an isocyanate containing material and normal standards of industrial hygiene should be observed during its handling. Safety goggles, gloves and overalls should be worn, and the material should preferably be used in a well ventilated area. Inhalation of its vapours should be avoided.

9. **TOXICITY**

DIV 103 does not present a significant toxicity risk to users of the product.

10. **FIRST AID MEASURES**

DIV 103

DIV 103 may be dermatitic and exhibit a low order of oral toxicity, however, since it is possible that certain individuals may be unusually sensitive to this material, it is recommended that all users wash thoroughly and avoid prolonged and repeated contact. Eye contamination, will cause severe irritation and pain. Immediate rinsing with water must be initiated and continued for at least 10 minutes. (See attached Safety Data Sheet.) Seek medical assistance.

11. **FIRE**

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

12. SPILLAGES AND WASTE DISPOSAL

12.1 DIV 103

Decontamination can be affected by overnight contact with liberal amounts of a solution containing methanol (30 parts), water (70 parts), concentrated ammonia (1 part) and detergent (1 part). Drums should not be resealed until decontamination is complete. (See attached Safety Data Sheet on details for Dealing with Larger Spills). See Section 15.

12.2 Waste Disposal

Customers are advised to check their local, provincial or national legislation governing the disposal of waste material.

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.

All sales of this product shall be subject to Diverse Urethanes Standard Conditions of Sale.

SAFETY DATA SHEET

DIV 103

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY / UNDERTAKING:

Product Name : DIV 103
Address : DIVERSE URETHANES
No: 2A High Street
Modderfontein
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 spillage's should wear full protective clothing including respiratory protection.

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

Absorb spillage's 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.

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 15.

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 ppm	8hr TWA mg/m³	STEL ppm mg/m³	Notes
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. Fetotoxicity 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.

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.