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# TECHNICAL DATA SHEET

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13/03/2015			NATIONAL URETHANE INDUSTRIES
TECHNICAL DATA:		<b>PolyShield® 400P003T</b>	

## PRODUCT DESCRIPTION

**POLYSHIELD® 400P003T** is part of a two component, solvent free, medium performance polyurethane “bakkie” spray system. The second component is **POLYSHIELD® 500P228M**. The combination of these two components through a suitable dispensing machine produces a urethane elastomer with good physical properties, abrasion, and hydrolysis resistance.

COMPONENT DESCRIPTION	PolyShield® 400P003T	PolyShield® 500P228M
Appearance	Black pigmented liquid	Clear to slightly cloudy, light brown liquid.
Viscosity Cps 25 °C	600 - 1 700	500 - 1 100
Density 25 °C	1.00 (± 0.02)	1.21 (± 0.02)

\* Both components are liquid above 5°C.

TYPICAL VISCOSITIES AT 10 - 25°C		
10°C	± 2 355 cps	± 2 940 cps
15°C	± 1 600 cps	± 1 785 cps
20°C	± 1 265 cps	± 1 080 cps
25°C	± 1 005 cps	± 605 cps

## PROCESSING

Even though both components are liquid at room temperature it is recommended that, if ambient temperatures are below 20°C, the components be warmed to 25°C before spraying. **Lower ambient temperatures would result in higher viscosity of the components as well as poor compatibility.** This can be seen in the figures shown above. Higher spray temperatures would result in better compatibility between the two components, giving improved mixing and superior end properties.

Both components should be well agitated immediately before decanting and processing. The spray machine holding tanks should be equipped with agitators.

It is important that, before decanting, **POLYSHIELD® 400P003T** be well mixed for at least 5 minutes using a mechanical stirrer, as some of the components may separate, causing the sprayed product to be off ratio. Dry air or nitrogen should be used to pressurise the holding tanks.

MIX RATIO	PolyShield® 400P003T	PolyShield® 500P228M
Parts by Volume	1	1
Parts by Mass	100	121

## RATIO CHECKS

- Ratios should be checked under back pressure on a daily basis. This should be logged and kept as part of the in-house quality system.



- A minimum of three ratio checks (cup tests) should be done during the spraying of a bakkie, to make sure that the spraying machine is running on-ratio.
- Ratio calculation:  
Weight of Iso  
Weight of Resin
- This ratio should fall within the following limits: 1.15 – 1.23.

The components are ideally combined in a 1 to 1 volumetric mix ratio through one of the following spray units:

- Unipre
- 2 KM
- Binks
- Graco
- Any suitable 1 : 1 gear pump spray machine

Intimate mixing is essential to produce a satisfactory elastomer. High application pressures and elevated temperatures will assist in this regard.

When experiencing cold weather conditions, the following corrective action must be taken to ensure that a good quality product is being sprayed:

- Heating both components to 25°C
- Adding **ULTRACAT 650E** catalyst to the polyol component (**400P003T**) for faster reactivity
- Ensuring the substrate temperature is above 20°C

### CATALYST ADDITIONS

**ULTRACAT 650E (catalyst)** can be added to **POLYSHIELD® 400P003T**. The catalyst should be mixed in very well before further processing.

#### Typical catalyst additions per 25 kg of 400P003T:

- ± 6 ml ULTRACAT 650E: ± 5 seconds faster at 25°C
- ± 15 ml ULTRACAT 650E: ± 10 seconds faster at 25°C

The above additions serve as a guideline only, as batch-to-batch variations as well as varying ambient and resin temperatures will affect the reactivity of the system. It is recommended to start with a low addition level and, if needed, to increase the catalyst gradually until a satisfactory cure time is obtained.

When sprayed with both components at 25°C, the product will gel within ± 30 seconds. Colder temperatures will slow down the gel time. Longer gel times can be due to:

- A thin coat of material sprayed onto a cold metal surface, or
- Colder material temperatures and/or ambient spray temperatures e.g. 15 - 20°C

Elastomeric properties will develop after 25 minutes – 1 hour (depending on ambient temperatures). The elastomer should however be left for a minimum of 24 hours before being placed under load.

The coating thickness will depend on the end application. Typically, 3 – 6 mm is adequate for most applications, and this can be achieved in one continuous build-up.

Physical properties and adhesion are normally strong enough after 24 hours cure for light duty applications, but for heavy-duty applications we recommend a 7 – 14 days cure.

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As there are many variables such as type of substrate, strength of substrate, ambient conditions, primers used, etc., customers are strongly advised to carry out their own tests to establish suitability of the system for the intended application.

### PIGMENTATION

Usually, POLYSHIELD® 400P003T is supplied pre-pigmented black. If needed, an extra 1 % non-reactive pigment paste concentrate may be incorporated into POLYSHIELD® 400P003T. It is advised that not more than 1 % additional pigment is added, as this can lead to product being off ratio when sprayed.

### PIGMENTATION

It is advised that, if the material is over-coated, it be done within 10 - 20 minutes of the initial material being sprayed. If this time period is exceeded, it is recommended that the cured material be treated as follows before over-coating:

1. Dry abrade the surface thoroughly with sandpaper to provide a mechanical key and wash down with MEK or Methylene Chloride immediately before applying the subsequent material.
2. Wet abrade the surface with MEK or Methylene Chloride and waterpaper immediately before applying the subsequent material. Do not use water.

It is also recommended that a suitable primer be used to ensure good bonding between the layers of material. NUI technicians can be contacted to assist in this regard.

**NOTE:** Elbow length GLOVES and GOGGLES must be worn when working with the above solvents.

### ELASTOMER PROPERTIES

Entrapment of air will tend to vary the density of the elastomer. This, as well as the degree of mixing obtained, will in turn affect the physical properties.

### TYPICAL TEST RESULTS

SPECIFIC GRAVITY (Cure + 24 h @ 70°C)	± 1.11 (Spray density may be lower)
SHORE A HARDNESS (Cast)	88 - 97
SHORE A HARDNESS (Sprayed)	80 - 90
TENSILE STRENGTH MPa	14 - 20
ELONGATION %	120 - 170
TEAR RESISTANCE N/mm (DIN 53515)	± 27
TABER ABRASION* (1000 cycles, H18 abrasion wheel, 500 g load)	0.05 g
WATER VAPOUR TRANSMISSION (ASTM E96)*	2.25 g/m <sup>2</sup> (24 hr)
WATER VAPOUR PERMEANCE (ASTM E96)*	0.004 g/(s.MN)

\* Full report available on request

### STORAGE AND STABILITY

POLYSHIELD® 400P003T is hygroscopic and must be stored with seals intact. Partially used containers must be tightly resealed and used before opening fresh containers. Any material decanted for processing should be used immediately and not be allowed to stand open and exposed to air. Foaming, when mixed with POLYSHIELD® 500P228M, is an effective indicator that moisture has been absorbed. **The storage life of POLYSHIELD® 400P003T is 6 months from date of delivery in unopened containers when stored at normal, in-door ambient temperatures (20 - 25°C).** The material should be thoroughly mixed before decanting. Protective clothing should be worn and contact with the eyes and skin avoided.

POLYSHIELD® 500P228M is a diphenylmethane diisocyanate prepolymer and will react with moisture generating carbon dioxide. The containers should be stored with the seals intact and opened containers

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used first. The reaction with moisture/water can lead to dangerous build-up of pressure in the drums. Therefore, partially used containers must be tightly re-sealed after use to prevent ingress of moisture. It is recommended that these drums be purged with dry air or nitrogen. Empty drums should not be closed and for safety reasons a hole should be made in the container. **POLYSHIELD® 500P228M** has a storage life of 6 months from date of delivery in unopened containers when stored at normal, in-door ambient temperatures (20 - 25°C).

### SAFETY AND HANDLING

Although **POLYSHIELD® 400P003T** is considered practically non-toxic, the usual precautions for handling chemicals should be observed. Protective clothing should be worn and contact with the body avoided.

**POLYSHIELD® 500P228M** should be treated as diisocyanate and the usual precautions should be exercised when handling this family of chemicals. Protective clothing should be worn and contact with the body avoided. Inhalation of fumes must be strictly avoided and a protective mask, preferably with a remote clean air supply should be worn while spraying.

### HEALTH AND SAFETY INFORMATION

In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. If inhaled move to fresh air. Consult a physician after significant exposure. If swallowed, clean mouth with water and drink afterwards plenty of water. Do not induce vomiting without medical advice. In case of skin contact, take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician when in contact with existing open wounds.

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent **Material Safety Data Sheet** containing physical, ecological, toxicological, and other safety-related data.

The Material Safety Data applicable to the handling of urethane raw materials should be read, understood, and rigidly adhered to. These are available on request from **NATIONAL URETHANE INDUSTRIES (Pty) Ltd.**

In accordance with ISO 9001:2015 and the Occupational Health and Safety Act (Act 85 of 1993), herewith Product and Safety Data Sheet.

We hereby confirm that we have received a Product and Safety Data Sheet for **PolyShield® 400P003T** system and are returning the obsolete copies.

COMPANY NAME:	
SIGNATURE:	
NAME:	
DATE:	

### CAUTION

The information contained in this bulletin is to the best of our knowledge true and accurate but any recommendations or suggestions, which may be made, are without guarantee since the conditions of use are beyond our control. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

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