FLEXITUFF® PU-1

Polyurea Elastomer Coating — PC 390

FEATURES
- OUTSTANDING ABRASION RESISTANCE
- SUITABLE FOR POTABLE WATER
- EXCEPTIONALLY HIGH TENSILE STRENGTH AND ELONGATION
- EXTREMELY HIGH IMPACT AND ABRASION RESISTANCE
- 100% SOLIDS

USES FLEXITUFF® PU-1 is a two component polyurea elastomer formulated for protection against impact, abrasion and corrosion. FLEXITUFF® PU-1 PU-1 offers a seamless, rubbery finish that absorbs impact and is extremely difficult to tear or scratch. FLEXITUFF® PU-1 is designed specifically for use in mining and process industries as a highly resilient lining for hopper cars, conveyers, tanks, slurry systems and various equipment parts that are subject to extreme abrasion. It is also suitable for use in sewerage and waste treatment plants on walls and rake arm assemblies in settling tanks, clarifiers and filters. FLEXITUFF® PU-1 provides excellent protection when sprayed directly to pipe or urethane foam pipe insulation, as it withstands rough installation treatment and burial in soil without the need for graded back fill.

SPECIFICATIONS AS/NZS 4020:2018 - compliant for use in potable water when used in conjunction with a certified coating system. Refer to a Dulux® Protective Coatings Consultant for details of the system.
Tested in accordance with ASTM G8 Method A for use with Cathodic protection systems when used with Durepon® FRX.

RESISTANCE GUIDE

WEATHERABILITY	Will yellow with time and chalk on exterior exposure. Neither yellowing nor chalking detracts from the protective properties of the coating.	**SOLVENTS**	Poor, not recommended for areas subject to splash and spillage of aromatic hydrocarbon solvents, esters, ketones or alcohols
HEAT RESISTANCE	Up to 120°C dry heat	**WATER**	Excellent resistance to immersion in fresh and salt water
SALTS	Unaffected by splash and spillage of neutral and alkaline salt solutions	**ALKALIS**	Suitable for splash and spillage of strong alkalis
ACIDS	Suitable for splash and spillage of mild inorganic acids	**ABRASION**	Outstanding abrasion resistance

TYPICAL PROPERTIES AND APPLICATION DATA

CLASSIFICATION	Pure polyurea elastomer coating
FINISH	Semi Gloss
COLOUR	Natural Cream
COMPONENTS	Two
VOLUME SOLIDS	100%
VOC LEVEL	< 1%
FLASH POINT	>100°C
POT LIFE	Plural Component Only
MIXING RATIO V/V	Part A : 1 Part B : 1
THINNER	Do not thin
PRODUCT CODE	499-84745 Part A 976-84746 Part B

APPLICATION CONDITIONS

	Min	Max
Air Temp.	5°C	50°C
Substrate Temp.	2°C	50°C
Relative Humidity		85%
Concrete Moisture		<6%

COATING THICKNESS (MICRONS)

	Min	Max	Recommended
Wet film per coat (µm)	1,000	>10,000	2,000
Dry film per coat (µm)	1,000	>10,000	2,000

SUITABLE SUBSTRATES	Suitably primed steel, aluminium or concrete
PRIMERS	Durepon® EZP, Durepon® 66, Luxepoxy® Sealer
TOPCOATS	Not applicable
APPLICATION METHODS	Heated plural component airless spray

DRYING CHARACTERISTICS AT 2,000 µm DRY FILM THICKNESS*

					OVERCOAT	
Temperature	**Humidity**	**Touch**	**Handle**	**Full Cure[1]**	**Min**	**Max**
25° C	50%	30-60 Seconds	1 Hour	24 Hours	See OVERCOATING section	

* These figures are a guide only, as ventilation, film thickness, humidity, thinning and other factors will influence the rate of drying.

1 At this time the coating can be put into service, however coating properties will continue to develop and will reach full performance in 7 – 10 days. The coating MUST be fully cured prior to being placed in immersion service. Once the coating has been left longer than 24 hours the surface must be abraded with 60 grit paper. See OVERCOATING section.

SPREADING RATE ASSUMING NO LOSSES
0.5 square metres per litre equals 2,000 µm dry film thickness
NOTE: Practical spreading rates will vary depending on such factors as application method, ambient conditions, surface porosity and roughness.

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TYPICAL SYSTEMS

This is a guide only and not to be used as a specification. Your specific project needs must be discussed with a Dulux Protective Coatings Consultant.

SURFACE	ENVIRONMENT	PREPARATION GUIDE	SYSTEM		DFT (µm)
STEEL – NEW	Immersion or Chemical	Abrasive blast clean AS1627.4 Class 3.0, 75-100 microns profile	1st Coat 2nd Coat	Durepon® EZP FLEXITUFF® PU-1	75 µm >2000 µm
STEEL – NEW	Abrasion	Abrasive blast clean AS1627.4 Class 3.0, 75-100 microns profile	1st Coat 2nd Coat	Durepon® EZP FLEXITUFF® PU-1	75 µm >3000 µm
CONCRETE	Chemical	Remove release agents and other surface contaminants	1st Coat 2nd Coat	Luxepoxy® Sealer FLEXITUFF® PU-1	40 µm >2000 µm
CONCRETE	Abrasion	Remove release agents and other surface contaminants	1st Coat 2nd Coat	Luxepoxy® Sealer FLEXITUFF® PU-1	40 µm >3000 µm

SURFACE PREPARATION	Specifiers should follow the surface preparation guidelines from the data sheet for the primer or first coat selected. The surface must be clean, sound and free from moisture, grease, oil, dirt, rust, loose paint, and other contaminants and abraded to provide a suitable key for the coating system. If application of the second coat has exceeded the recoat window of the first coat (refer to data sheet) then the entire surface MUST be abraded.
APPLICATION	This coating is designed for application through heated, plural component, high pressure airless spray equipment capable of supplying material at the spray gun at a minimum of 2000 psi spray pressure and material temperature of 55-60°C. It has been successfully sprayed through Graco Reactor machine using a Fusion spray gun.
EQUIPMENT	
DRUM HEATERS	Flexible 1000W adjustable band heaters can be used to condition materials in drums to the optimum temperature.
TRANSFER SYSTEM	The proportioner should be supplied by a transfer pump such as a Graco 2:1 Piston Pump. Normally a 3m (10 foot) long 19mm (3/4") I.D., 500 psi rated, nylon lined transfer hose connects each pump to the proportioner. There should also be a screen filter of about 40 mesh in place between the transfer pump and the proportioner.
PROPORTIONING PUMP	A plural (1:1) proportioning pump, such as a Graco Reactor E-XP2 or A-XP2, capable of developing a minimum of 2000 psi pressure.
MATERIALS OR PRIMARY HEATERS	Material heaters are necessary in the system to reduce and maintain material viscosities at optimum levels. These primary heaters are usually mounted on the proportioner and are connected in line after the proportioning pump. These heaters should be capable of raising the temperature of the material 30°C at the flow rate during normal application. They should be rated to withstand the maximum pressures the system can develop. These heaters are more effective if they are controlled accurately by a thermostat incorporated into the heater.
HEATED HOSE ASSEMBLY	Nylon lined hoses for each component rated for the proportioning pumps maximum pressure are used to transfer the material under pressure from the pump to the spray gun. These hoses should be heated and controlled thermostatically by temperature controls at the proportioner. The hose heat should be capable of maintaining the material temperature set by the primary heaters to the spray gun. The hose assembly is usually insulated with flexible pipe insulation and the airline necessary for the operation of the spray gun is incorporated into the package. These hoses are usually 10mm (3/8") I.D. with the air feed hose to the gun being 6mm (1/4") hose. A short section of hose assembly (3-15') of 6mm (1/4") hose is usually attached to the gun end of the hose to aid in the maneuvering of the spray gun in application. This assembly should also be heated. The Graco HP Reactor Heated Hose should be suitable.
SPRAY GUN	Plural component spray gun utilising impingement mixing and a mechanical purge. Further, the spray gun should be designed to spray coatings with a flat spray pattern and be rated for the proportioning pumps maximum pressure. Suitable guns are the Graco Fusion Gun AP or MP.
MATERIAL PROTECTION	Moisture vapour entering the drum through the small bunghole, which is normally used as a vent, can cause unwanted blowing or microcellular structure in the spray film. The nitrogen gas purge system slightly pressures the container and prevents air from entering the container. As a secondary method, a desiccant drier system will remove most of the moisture from the air as it passes through the desiccant to equalise the pressure in the container as material is used.
OTHER EQUIPMENT	Agitators of 1/2 HP or greater, such as a Graco Twistork Agitator, should be available and used for the Part B to thoroughly mix the material prior to any application. The agitator should be designed for the container in which it will be used.
AIRLESS SPRAY	
PRE-CONDITIONING	The materials should be maintained prior to any application at an optimum temperature of 24-27°C. This may mean heating the material in the drum if the surrounding ambient temperature is much below 24°C. This will allow the pre-heaters to reach and maintain the proper application temperatures of the materials.
THINNING	**Absolutely no solvent should be allowed to come in contact with or be added to 100% solids coatings.** Viscosity can be reduced by an increase of temperature.

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SETTING UP TO SPRAY/START UP PROCEDURES

For new equipment, individual components should be connected as previously described. Be sure to lubricate all pumps as per manufacturer's instructions. Use plasticiser for the wet cups. Check and clean all fluid filters, air traps and filters. Check electrical system to insure proper power requirements are satisfied and there is complete continuity in all circuits.

For existing equipment thoroughly clean the system including the line filters. Flush the system and fill (using transfer pumps) with inert plasticiser such as DPGDB (Dipropylene Glycol Dibenzoate, eg Benzoflex 988) or DIOP (Di-Iso-Octyl Phthalate, eg Palatinol AH) and test by slowly bringing the unit up to full pressure and heat.

For new equipment decide which side will contain the isocyanate component and which side will contain the polyol. Mark all isocyanate pumps, inlets, outlets, heaters, hose fittings, and gun inlets "A side". Mark all polyol pumps, inlets, outlets, hose fittings, and gun inlets "B side". Retain this identification and use only as indicated to avoid cross contamination.

Turn on the heaters and bring the system up to temperature then purge the system of plasticiser (using the transfer pumps) with the coating material. This may result in the loss of 1-2 litres of each component.

Fully pressure the system and test spray to ensure proper operation. Always spray off the project first to check proper operation and cure of materials. Observe the material and film; make additional or final equipment adjustments, then proceed with the project.

SPRAYING

Using a 50% overlap to insure an evenly coated surface. Spray continuously as much as possible and minimise triggering the gun. Wherever there is even a small change in pressure, spray pattern, colour or consistency of the material, the sprayer should stop immediately and troubleshoot the equipment.

Filters should be checked periodically for any build-up of material. If the whip hose is unheated, the material inside the whip will cool down during periods when not spraying, and therefore will be below the temperature required to yield a satisfactory coating. Spray away from the project until this material is cleared and the warmer material sprays properly. The temperature of the material near the gun can be checked by inserting a small thermometer in the hose jacket along the hoses. Generally the material temperature is higher by 3-6°C than the reading on the thermometer.

SHUTTING DOWN THE PLURAL COMPONENT EQUIPMENT

If you are simply shutting down for a short period such as overnight, the material may be left in the system under pressure so as not to waste materials:

1. Shut off the transfer pumps and proportioner and turn off the heaters (disconnect air and power supply).
2. Depressurise the system so that a maximum of 1000 PSI remains on the fluid system.
3. Shut off all in-line valves at proportioner and gun.
4. Remove, disassemble, and thoroughly clean the spray gun and store.
5. Nitrogen purge and blanket any partially filled coating containers and seal tightly.
6. You may leave the transfer pumps wetted out in their respective materials.

If all the material was used then the transfer pumps should be wiped clean and placed in a sufficient amount of plasticiser to cover the lower portion of the pump.

If you anticipate not using the equipment for more than two or three days, then the material should be flushed from the entire system. In this case, a different set of procedures is followed:

1. Turn off the heaters, hose heat, and any drum heaters.
2. Remove the transfer pumps from their respective materials and wipe them clean. Place them in separate pails of the plasticiser to be used to flush the system.
3. Thoroughly flush the entire system with appropriate plasticiser. The transfer pumps alone should be able to flush the system. The proportioner can be used with caution to assist in the flushing process.
4. Recycle clean plasticiser through the entire system until no colour or evidence of material is left.
5. Remove and clean filters, reassemble.
6. Insure that the entire system is pressurised to 200-500 psi with plasticiser upon final shut down.
7. Shut off all air and power supplies.
8. Plug or cap any open inlets or outlets.
9. Clean gun and tip thoroughly and store.
10. Nitrogen purge and seal any partially filled material containers and store at room temperature indoors.

Caution: Prior to introducing any 100% solids coating, plasticiser such as DPGDB (Dipropylene Glycol Dibenzoate, eg Benzoflex 988) or DIOP (Di-Iso-Octyl Phthalate, eg Palatinol AH) must be used to flush the system. The system must be free of solvent to avoid any potential foaming of the coating resulting from the reaction of solvent with the solventless coating.

PRECAUTIONS

FLEXITUFF® PU-1 is an industrial product designed for use by experienced Protective Coating applicators. Where conditions may require variation from the recommendations on this Product Data Sheet contact your nearest Dulux® Representative for advice prior to painting. Do not apply in conditions outside the parameters stated in this document without the written consent of Dulux® Australia. The rate of cure is dependent upon temperature. Do not apply at temperatures below 1°C. Do not apply at relative humidity above 85% or when the surface is less than 3°C above the dewpoint. The coating MUST be fully cured prior to being placed under immersion conditions.

FLEXITUFF® PU-1 MUST NOT be thinned. Prior to introducing FLEXITUFF® PU-1 or any 100% solids material, plasticiser such as DPGDB (Dipropylene Glycol Dibenzoate, eg Benzoflex 988) or DIOP (Di-Iso-Octyl Phthalate, eg Palatinol AH) must be used to flush the system. The system must be free of solvent to avoid any potential foaming of the coating resulting from the reaction of solvent with FLEXITUFF® PU-1.

The resin has a nominal storage life of 12 months at a recommended temperature of 20-25°C. The isocyanate should be kept properly closed and stored indoors in a well-ventilated area under normal factory conditions. Storage at 20-25°C also provides a convenient viscosity for handling. Do not store at low temperatures (below 10°C), especially frosty conditions, as this may cause crystallisation. Avoid storage above about 50°C as this can accelerate the formation of insoluble solids and increase the viscosity.

If crystallisation does occur, heat the material to 70-80°C to melt it, and thoroughly agitate to distribute heat uniformly and ensure homogeneity. Drum heaters may be used with the heat setting at low. Agitate the material to distribute the heat uniformly. Do not heat the material above 80°C.

Under the recommended storage conditions and in properly sealed containers, the isocyanate has a nominal storage life of 6 months. If either component is opened and partially used, it should be purged with nitrogen or desiccated air and resealed or refilled into smaller containers to their maximum volume and tightly sealed.

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CLEAN UP	Glysolv DPM may be used for general clean up of equipment and hoses. Allow unit to cool before cleaning
OVERCOATING	The minimum applied thickness of FLEXITUFF® PU-1 is 1mm for the initial coat and 0.5mm for subsequent coats applied within 10 minutes and while the first coat is still warm. Once FLEXITUFF® PU-1 has cooled and within 24 hours of application, the surface must be washed with MEK and the minimum applied thickness is 1mm. Once FLEXITUFF® PU-1 has been left longer than 24 hours, the surface must be abraded with 60 grit paper and the minimum applied thickness is 1mm.
SAFETY PRECAUTIONS	**Read Data Sheet, SAFETY DATA SHEET and any precautions on container labels. SAFETY DATA SHEET is available from Customer Service (13 23 77) or www.duluxprotectivecoatings.com.au**
STORAGE	Store as required for a flammable liquid Class 3 in a bunded area under cover. Store in well-ventilated area away from sources of heat or ignition. Keep containers closed at all times.
HANDLING	As with any chemical, ingestion, inhalation and prolonged or repeated skin contact should be avoided by good occupational work practice. Eye protection approved to AS1337 should be worn where there is a risk of splashes entering the eyes. Always wash hands before smoking, eating, drinking or using the toilet.
USING	Use with good ventilation and avoid inhalation of spray mists and fumes. If risk of inhalation of spray mists exists, wear combined organic vapour/particulate respirator. When spraying, users must comply with their respective State Spray Painting Regulations.
FLAMMABILITY	This product is flammable. All sources of ignition must be eliminated in, or near the working area. DO NOT SMOKE. Fight fire with foam, CO_2 or dry chemical powder. On burning will emit toxic fumes.
WELDING	Avoid inhalation of fumes if welding surfaces coated with this paint. Grind off coating before welding.

TEST RESULTS

TEST	TEST METHOD	RESULT
Tensile Strength	ASTM D412-92	16.5 MPa
Elongation @ 24°C	ASTM D412-92	427%
Tear Strength	ASTM D624-86	50 N/mm
Hardness	ASTM D2240-91	78 Shore A
Abrasion Resistance	ASTM C501-84	50mg, H18 wheel, 1,000 rev, 1,000g
Early Fire Hazard	AS1530 Part 3 (1989) – Ignitability (0-20) – Spread of Flame (0-10) – Heat Evolved (0-10) – Smoke Developed (0-10)	2mm sample 16 8-9 9-10 7
Early Fire Hazard	ASTM D1692-68	Self Extinguishing
Potable Water	AS4020	7,500mm^2 per Litre

CHEMICAL RESISTANCE

The following table shows the chemical resistance for fully cured FLEXITUFF® PU-1 after two months immersion at room temperature

CHEMICAL	RESISTANCE
ACIDS	
10% Acetic Acid	Excellent
50% Acetic Acid	Fair
10% Hydrochloric Acid	Excellent
10% Sulphuric Acid	Excellent
Ca. 40% Sulphuric Acid	Excellent
10% Nitric Acid	Excellent
20% Nitric Acid	Poor
Hydrofluoric Acid	Excellent
20% Phosphoric Acid	Excellent
47% Phosphoric Acid	Fair
Lactic Acid	Poor
Oleic Acid	Poor

CHEMICAL	RESISTANCE
OTHER	
25% Ammonia	Excellent
46% Sodium Hydroxide	Excellent
Methylated Spirits	Poor
Kerosene	Fair
Methylene Chloride	Poor
Glycerine	Excellent
Diethylene Glycol	Excellent
Methyl Ethyl Ketone	Poor
Ethyl Acetate	Poor
Formaldehyde	Excellent
Transmission Fluid	Excellent
Saturated Salt Solution	Excellent

COMPANY INFORMATION

Dulux Protective Coatings a division of

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PACKAGING, TRANSPORT AND STORAGE

PACKAGING	Available in 425 kilo kits
TRANSPORTATION WEIGHT	1.10 kg/litre (Average of components)
DANGEROUS GOODS	Part A: Non Dangerous Good Part B: Class 8 UN 2735