# Technical Data Sheet

# Elaston-PL75

## Polyurethane Elastomer
## Designed for internal lining of ductile iron, steel and concrete pipes

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## Description

Elaston-PL75 is a 100% solids (solvent and phthalate-free) two-component polyurethane elastomer suitable for lining the internal surfaces of ductile iron and concrete pipes. It exhibits high resistance to inorganic acids and alkalis and has high abrasion resistance. It gels within a few minutes to form a thick vice-like grip to most surfaces. It protects against wear, abrasion, chemical attack and corrosion and forms a durable membrane safe for use with drinking water. Unlike paint or epoxy, Elaston-PL75 is elastomeric and remains permanently flexible and stretchy, moving and conforming to subtle changes in the substrate without cracking or flaking. Use of Aralox primer may enhance its adhesion to concrete. Once cured it forms a high-strength, smooth, durable, seamless easy-to-clean cream-coloured lining. It exhibits excellent adhesion to freshly-blasted ductile iron with or without primers.

## Technical Information

Elaston-PL75 is a polyurethane elastomer that is the result of a reaction between an isocyanate component and a resin blend made with hydroxyl containing resins, polyether resins, amine chain extenders and MDI prepolymers. With the absence of VOCs Elaston-PL75 is safe to apply in almost all situations. Elaston-PL75 gels in minutes and cures quickly. As such it can only be applied using specialised plural component equipment. The system is sensitive to moisture and therefore the substrate needs to be dry or well sealed using Aralox resin or similar material prior to application. Even when Elaston-PL75 is exposed to temperatures as high as 80$^{o}$C and intermittent temperatures up to 90$^{o}$C it maintains high flexibility and high impact / toughness and still has excellent heat distortion resistance. Elaston-PL75 has an extremely low moisture vapour transmission rate which makes it ideal for lining iron and concrete water & wastewater pipelines. It is also resistant to most petroleum-based chemicals, such as gasoline, hydraulic fluid, diesel fuel, motor oil and toluene. Inorganic acids and alkalis such as sulphuric acid, hydrochloric acid, sodium hydroxide, potassium hydroxide and hydrogen sulphide are also well tolerated. Its high tolerance to Sulphuric Acid, Hydrogen Sulphide and Sodium Hypochlorite make it particularly suitable for use in protecting and sealing sewerage and water assets.

## Typical Uses

- Internal lining of ductile iron, steel and concrete pipes
- Internal lining of pipes used for potable water
- Internal lining of wastewater pipelines and sewerage pipelines
- Bridging hairline cracks inside pipes to prevent leakage

## Advantages

- The exceptionally high tensile strength, hardness and elongation of this product provide protection from mechanical damage and resistance to puncture and compression
- Excellent heat distortion resistance
- 100% solids
- Extremely low moisture vapour transmission rate
- Resistant to most petroleum-based chemicals, such as gasoline, hydraulic fluid, diesel fuel, motor oil and toluene. Inorganic acids and alkalis such as sulphuric acid, hydrochloric acid, sodium hydroxide, potassium hydroxide and hydrogen sulphide are also well tolerated.
- Its high tolerance to sulphuric acid, hydrogen sulphide and sodium hypochlorite make it particularly suitable for use in protecting and sealing sewerage and water assets.
- Abrasion Resistance - the balance of physical properties inherent in this elastomer provides outstanding abrasion resistance.
- Potable water - this product is suitable for lining tanks used to store water intended for human consumption
- Increased Productivity and Economy- this product may be applied to thicknesses exceeding 1mm at a time and cures within minutes of application.

## Typical Liquid Properties

| Property | Part A (ISO) | Part B (Resin) |
|---|---|---|
| Appearance | Amber Clear Liquid | White Opaque Liquid |
| Density (kg/L) | 1.2 | 1.05 |
| Viscosity - Mpa | 920 | 720 |
| Pack size (steel drums) | 225kg | 200kg |

## Cured Physical Properties

Once Elaston-PL75 gels it becomes quite brittle and remains like that for up to 36 hours. Care should be taken during this time if handling or working on it. After 36 hours it continues to toughen up until full cure is achieved after 14 days.

| | |
|---|---|
| Abrasion – ASTM D4060, CS17, 1kg | <20mg |
| Colour | White/Cream |
| Elongation - ASTM D 412-92 | >20% |
| Hardness – ASTM D 2240-91 | 75 Shore D |
| Specific Gravity | 1.13 |
| Tensile – ASTM D 412-92 | 21 MPa |
| Tear - ASTM D 624-86 | 110 N/mm |
| Adhesion (Mpa) | >10 |
| Impact Resistance | TBA |

## Chemical Resistance Tests (ISO 62:2008)

| Material Tested | British Standard BS EN 156655:2009 | Actual Mass Gained % | Weight loss after drying % |
|---|---|---|---|
| Water | <15 | 1.26 | 0.24 |
| $H_2SO_4$ 10% | <10 | 2.54 | 0.19 |
| NaOH 2.5% | N/A | 1.2 | 0.15 |
| NaOH 10% | N/A | 2.54 | 0.17 |

### APPLICATION TECHNIQUES

Refer to Liquimix for specific recommendations but in general the following methods apply.

**CONCRETE**
To avoid delamination, never apply Elaston-PL75 or Primers directly to smooth shiny concrete. Always abrasive blast smooth concrete to an 80 grit finish or better followed by correct priming and if necessary rendering to provide an even uniform finish. Fill all big holes and remove all protrusions and grind sharp 90º obtuse angles back to a 45º, 5mm finish. Old concrete must be either water blasted (4,000psi, 20 LPM with turbo nozzle) or abrasive blasted to remove old weakened cement and sludge. Exposed aggregate must be rendered using a mixture of Aralox and sand to restore its original profile. Correct priming techniques will ensure high adhesion and eliminate pin holes (refer Liquimix for specifications). Conduct adhesion and spark tests for each pipe and if necessary adjust methods until adhesion is at specification (greater than 3.5MPa in most circumstances), correct thickness is achieved and no pin holes appear. Only then should the next pipe be started. It is better to adjust application techniques and methods earlier than later. Prior to applying Elaston-PL75 over older previously applied Elaston-PL75 it is important to follow recommended repair procedures. If Aralox primer is left for more than 12 hours it will need to be re-activated with another coat of Aralox prior being over-coated with Elaston-PL75.

**IRON**
Grit blast or grind internal surfaces of Iron pipe to remove rust, mill scale and any other impurities that may compromise adhesion. A class 2 blast is sufficient followed as soon as possible by application of Elaston-PL75 directly to the freshly blasted, clean Iron. Ensure all protrusions and sharp edges are removed. Sharp 90º acute angles should be coved using single pack moisture cure urethane joint sealant.

Prior to coating the Iron remove any settled dust using dry, clean compressed air. It is important to follow recommended repair procedures. Adhesion testing should indicate 4MPa minimum. Higher adhesion up to 8MPa is often recorded. Spark testing should indicate a sound, pinhole free lining. Using the correct mix chamber and pour nozzle combination will result in a smooth, uniform, seamless finish.

**Recommended application thickness**
Recommended thicknesses as follows...

- High Abrasion Resistance > 4mm
- Tanking Potable Water > 2mm
- Corrosion & Chemical > 2mm

**Colour**
Elaston-PL75 is supplied with white pigment in the B component. Following application this will turn to a light cream colour making it easy to detect problems using remote internal pipeline inspection equipment. The cream colour may yellow over time. This does not affect the long term physical properties of the lining.

**Agitating precautions**
The B component must be agitated prior to and during use to avoid settling of components and pigments. Using the correct style of agitator will help minimise air entrapment during this procedure.

**Service temperature**
Samples exposed to a continuous temperature of 80$^{o}$C for 3 days showed no significant loss of tensile strength or elongation. Intermittent temperatures of up to 90$^{o}$C will also be tolerated.

# Equipment and mixing instructions

This coating is designed for application through specialised plural component meter mix equipment. Ideally the material should be heated to around 40$^{0}$C before and during use. Liquimix C25 low pressure equipment fitted with static mixing tube and moisture lock hoses works well. Graco also makes an excellent range of machines fitted with Fusion AP, Fusion CS or similar impingement mix guns are also suitable.

**Line Pressure & Temperature.** This application calls for low pressure dispensing at around 40$^{0}$C. Always consult with Liquimix prior to using Elaston-PL75 outside recommended parameters.

**EQUIPMENT SPECIFICATION**

**Mix Ratio**
Elaston-PL75 requires 1:1 (A:B v/v) mix ratio pumps.

**Drum Heaters**
Flexible 1,000W adjustable band heaters can be used to condition materials in drums to the optimum temperature of around 40$^{O}$C

**Drum Transfer System**
Liquimix equipment has on-board hoppers that should be filled directly from 20L pails or from 200L drums using transfer pumps of at least 2:1 ratio.

**Proportioning Pump**
A plural, 1:1 ratio, proportioning pump capable of developing at least 800psi pressure is required. Ensure that operators are fully trained and certified as “Authorised Elaston-PL75 Applicator”. Elaston-PL75 can be applied equally well through either low-pressure or high-pressure plural component equipment such as

LiquiMIX or Graco. Choice of equipment will depend on your target market. Low pressure equipment is simple to use and maintain in warm climates and requires only compressed air. It is most suitable for because of its mobility and 20m of light, easy-to-handle moisture-lok hoses. It uses mixing tubes and to mix and dispense the Elaston-PL75. LIQUIMIX equipment has on-board material hoppers, making it easy to fill from 20L drums but it can also draw directly from 200L drums or IBC's. The LIQUIMIX C25 unit is sold widely throughout warmer regions in Australia and overseas. High pressure equipment produces best results for high abrasion situations and critical applications and may produce a slightly better pour pattern but is more complex to use and maintain and requires 415v power as well as compressed air. It uses impingement to mix the two components and an "airless" self-atomising pour tip. In cold climates high pressure equipment, with its inherent heaters, is mandatory. Only trained applicators should be allowed to apply Elaston-PL75.

**Material Protection**
Moisture vapour entering the resin drum through the small bung hole, which is normally used as a vent, can cause unwanted blowing or microcellular structure in the pour film. Moisture vapour entering the isocyanate drum can cause formation of solid contaminants. To avoid this, use a desiccant dryer system to remove most of the moisture from the air as it enters to equalise the pressure in the container as material is used.

**Drum Agitator**
Mixing is not required for Elaston-PL75 part A. However mixing is required for part B when pigments are added. See previous section under Colour.

**PROCEDURE**

**Pre-conditioning**
The materials should be maintained prior to application at an optimum temperature of 40$^{o}$C. This will help the primary heaters to reach and maintain the proper application temperature 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.

**Setting Up to Pour / Start-Up Procedures**
Follow the equipment manufacturer's instruction manual. For new equipment individual components should be connected as previously described. Be sure to lubricate all pumps as per manufacturer's instructions. Ensure the Iso side wet cup reservoir is filled with fresh LiquiLube plasticiser. Check and clean all fluid filters. Check and clean all air traps and filters. Check electrical system to ensure proper power requirements are satisfied and there is complete continuity in all circuits. For existing equipment thoroughly clean the system including the line filters. For new equipment decide which side will contain the isocyanate component and which side will contain the resin. Mark all isocyanate pumps, inlets, outlets, heaters, hose fittings and gun inlets "A side" or mark with Red tape. Mark all B side pumps, inlets, outlets, hose fittings, and gun inlets "B side" or mark with Blue tape. Retain this identification and use only as indicated to avoid cross contamination. Pressurise the system and test pour to ensure proper operation. Always pour off the project first to check proper operation and cure of materials. Have another operator check that while the the "on/off" valves are being activated, both A & B pressure gauges at the machine are equal. Observe the poured material and if necessary make additional equipment adjustments, then proceed with the project.

**Pouring**
To help maintain uniform coating thicknesses move the dispensing head faster or slower and vary the spin rate of the pipe. Whenever there is even a small change in pressure, pour pattern, colour or consistency of the material, the pourer should stop immediately and troubleshoot the equipment.

Mesh strainers fitted to the equipment should be checked periodically for any blockages.

**Shutting Down the Plural Component Equipment**
Follow the equipment manufacturer's instruction manual for both the Machine and the Gun. Soak any parts covered with cured Elaston-PL75 in SWELL. Drop all gun mix chambers, pour tips, gun covers etc into SWELL so that they will be easy to clean the next time you go to use them.

**Equipment Clean-Up**
Methylated Spirits, Acetone or PC Solvent may be used for general cleanup of equipment and hoses. For soaking of contaminated metal parts use SWELL. Keep gun A side components in soak containers on the left side of the work bench and all B side components on the right side of the work bench. The use of plastic soak containers with clip on lids and removable baskets makes the job easier. Replace the SWELL regularly as soon as it starts turning cloudy and dirty.

## Storage and handling precautions

Under normal storage conditions and in properly sealed containers, both the isocyanate and resin have a storage life of 18 months. Protect from frost. If crystallisation occurs, heat the material to 80°C whilst agitating to melt it. On no account should the materials be heated above 80°C. Storage temperatures above 50°C are not recommended since they can accelerate the formation of insoluble solids and also increase the rate of viscosity increase on extended storage. If either component is opened and partially used, it should be purged with nitrogen and resealed.

## Approvals and testing

Note: Once pour trials have been completed, Elaston-PL75 will be submitted for testing to AS/NZS 4020-2005 as follows...

**Australian Water Quality Council**
- Potable water: Elaston-PL75 is approved for use in contact with drinking water to AS/NZS 4020-2005 at an exposure of 2000mm2 per Litre
- Cytotoxicity test (readings in water taken every 24, 48, 72 hours). No cell damage when mixed with mammalian cells (monkey kidney cells)
- Aesthetics test – No colour transferred from Elaston-PL75 to water
- Microorganism test – Does not support growth of microorganisms
- Mutagenicity test – Is not Carcinogenic in any way

**BRITISH STANDARD BS EN 15655:2009**
Elaston-PL75 exceeds all requirements for above standard.

**TESTING OF INSTALLED LINING SYSTEM**
The installed Elaston-PL75 system should be tested for the following...
1. Porosity – Use a high voltage porosity tester fitted with an internal pipeline brass brush to the Australian Standard
2. Adhesion – Use an Adhesion tester to ensure specified MPa adhesion is achieved
3. Thickness – Use a non-destructive thickness tester to ensure minimum specified thickness is achieved

## Important Notice

*The information contained herein is offered without charge and is for use by technically qualified personnel at their own risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto.*

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