



Formulated Systems

PRODUCT INFORMATION

PROVISIONAL TECHNICAL DATASHEET

5/31/2013

Introduction

HYPERLAST™ 101 is a polyether based prepolymer intended for reaction with the HYPERLAST C101 range of curatives to offer high performance polyurethane elastomers in the hardness range 60 - 95 Shore A.

HYPERLAST™ 101 Prepolymer can be reacted with HYPERLAST C101/60 Polyol curative to produce an elastomer at 60 Shore A and with increasing quantities of DIPRANE™ C chain extender as a three component system to produce elastomers of up to 95 Shore A hardness. These polyurethane elastomers offer excellent properties including good tensile strength, excellent resilience and low temperature flexibility as well as outstanding hydrolytic stability.

The HYPERLAST™ 101 series offers specific processing advantages over more traditional high performance polyurethane casting systems. These include:

- Low ratio mixing
- Low viscosity at processing temperature
- Low temperature processing and curing
- Polyol based curatives offering lower toxic hazard than many diamine cured systems.

Applications

HYPERLAST™ 101 systems may be processed in the temperature range 40 – 50°C. At this temperature the viscosity of the mixed system is extremely low, making it suitable for open casting and compression moulding.

Typical uses for HYPERLAST™ 101 based elastomers include:

- Slurry pump impellers
- Chute and hopper linings
- Seals and gaskets
- Wheels and rollers
- Pipe lining

HYPERLAST 101 Series Three Component High Performance Polyurethane Elastomer System

Component Properties

Polyol Component

Product Reference	HYPERLAST™ C101/60 Polyol
Appearance	White solid at 25°C
Viscosity	200 – 300 cP at 40°C
Specific Gravity	0.97 – 0.99 at 40°C

Isocyanate Component

Product Reference	HYPERLAST™ 101 Prepolymer
Appearance	Pale straw liquid at 25°C
Isocyanate Content	16.35 - 16.75%
Viscosity	500 - 1000 cP at 40°C
Specific Gravity	1.10 – 1.14 at 40°C

Chain Extender Component

Product Reference	DIPRANE™ C
Appearance	Whitish, crystalline solid below 20°C Colourless, clear liquid above 20°C
Viscosity	90 – 100 cP at 25°C
Specific Gravity	1.01 - 1.02 at 20°C

These are typical values and should not be construed as specifications.

Mixing Ratios

HYPERLAST™ curatives can be blended in the following proportions to offer a range of hardness from 60°A to 95°A

Hardness (Shore A)	60	65	70	75	80	85	90	95
HYPERLAST C101/60 Polyol	150	134	115.3	102.6	87.6	72.9	57.2	44.9
DIPRANE C	-	1.8	3.9	5.4	7.1	8.8	10.6	12.1
HYPERLAST 101 Prepolymer	100	100	100	100	100	100	100	100

NB: The above ratios are in parts by weight and should be measured to an accuracy of $\pm 1\%$.

HYPERLAST™ C101 curatives can be supplied ready blended in the above hardness grades for use as two component systems. They should be thoroughly mixed before use as separation will occur on standing.

Cured System – Typical Properties

	Test Method	60	65	70	75	80	85	90	95
Hardness (Shore A)	ISO 868	60	65	70	75	80	85	90	95
Tensile Strength (MPa)	ISO 527 – Type 5 @ 2mm thick	14.5	20	22	28	30	34	34	30
100% Modulus (MPa)	ISO 527 – Type 5 @ 2mm thick	1.8	2.0	2.6	3.4	4.4	6.2	9.0	10.3
300% Modulus (MPa)	ISO 527 – Type 5 @ 2mm thick	3.6	4.3	6.3	8.0	9.5	14	16	17
Elongation at Break (%)	ISO 527 – Type 5 @ 2mm thick	470	470	470	450	475	450	450	450
Angle Tear Strength N/mm	ISO 34 – Pt B, Proc A	26	30	38	44	60	80	95	105
Compression Set 25% (22Hr/70°C) (%)	ASTM D395	35	35	25	27	20	40	26	33
Rebound Resilience (%)	ISO 4662	72	67	67	63	57	50	51	47
DIN Abrasion (mm ³ loss)	ISO 4649	85	75	60	50	45	45	45	45

These are typical values and should not be construed as specifications.

Processing Details

Please Note: It is essential that the polyol component is thoroughly rolled / mixed before use. Strong turbulence and mixing with air should be kept to a minimum by adopting a careful mixing technique (e.g. drum/keg rolling) or using low air introducing mixers. It is recommended that any air introduced during mixing is subsequently removed through degassing by either machine or vacuum chamber. It is the responsibility of the customer to ensure that the product is mixed and degassed sufficiently for use.

The following information is given as a guide to processing this product. It is recommended that optimum conditions for a specific application are determined experimentally. Our Technical Service Department can offer more detailed advice.

Recommended Processing Temperatures

Polyol Component	35 – 40°C
Isocyanate Component	25 – 40°C
Chain Extender Component	20 – 30°C
Mould Temperature	The mixed components should be cast into pre-released moulds heated to a temperature of approximately 80°C.
Gel Time	4'30" – 8'00" minutes (100 g at 40°C)
Typical Demould Time	20 – 30 minutes

These are typical values and should not be construed as specifications.

Recommended Cure Cycle

To ensure rapid attainment of physical properties the demoulded article should be post-cured at 80°C for 16 - 24 hours in an evenly heated oven.

Additional Processing Details

Machine Mixing

Our Technical Service Department can offer advice on suitable two or three component polyurethane dispensing equipment for processing HYPERLAST™ 101 series elastomers.

Hand Mixing

- 1) Pre-heat the HYPERLAST™ C101/60 curative to 35 – 40°C, and the DIPRANE™ C to 20 – 30°C. HYPERLAST 101 Prepolymer may be used at ambient temperature to avoid any vapour hazard.
- 2) HYPERLAST™ C101/60 curative should be mixed by rolling the drum before use.
- 3) Accurately weigh the required quantities of HYPERLAST™ C101/60 and DIPRANE™ C curative into the mixing vessel and mix together.
- 4) Weigh the required amount of HYPERLAST™ 101 Prepolymer into the vessel and mix together thoroughly for approximately one minute.
- 5) Place the mixed components in a vacuum chamber and thoroughly de-gas for up to two minutes at 5 torr (minimum).
- 6) Cast the reacting mixture into moulds which have been pre-heated to approx 80°C and treated with mould release agent.

Storage and Handling

		Shelf life
Polyol Component	HYPERLAST™ C101 curatives are sensitive to atmospheric moisture and drums should be used in such a way as to minimise contact with air. Part used drums should ideally be purged with dry nitrogen before re-sealing. When stored in sealed containers at a temperature below 30°C, HYPERLAST C101 curatives have a minimum shelf life of 12 months. HYPERLAST™ C101 curatives are mixtures which will slowly separate upon standing and may begin to crystallise below 30°C. If the material has been allowed to crystallise it can be melted out by leaving for 12 - 24 hours at 40°C. The material should be drum rolled to ensure good mixing prior to use.	12 months
Isocyanate Component	HYPERLAST 101 Prepolymer is sensitive to atmospheric moisture and drums should be used in such a way as to minimise contact with air. Part used drums should be purged with dry nitrogen before resealing. HYPERLAST 101 should be stored at approximately 15 - 30°C. Storage at elevated temperatures should be kept to the minimum possible for processing. Storage at temperatures below 5°C may lead to partial crystallisation of the isocyanate. This can be remelted by heating the sealed containers at 60 - 70°C in a well ventilated oven and following the procedures laid down in the information sheet 'Safe Handling – Pure, Modified and Polymeric MDI' Form No. 109-01224X-1009P&M. Under ambient conditions the material has a shelf life of six months.	6 months

Storage and Handling

Shelf life

Chain Extender Component Store in tightly sealed containers at a temperature of 15 – 30°C. Raise to the processing temperature and mix well before use. Avoid contact with moisture.

12 months

More detailed information on the storage and handling of polyurethane components can be obtained by contacting Dow Technical Service Department.

Packaging

Polyol Component 25 kg, 200 kg
Isocyanate Component 25 kg, 200 kg
Chain Extender Component 25 kg, 205 kg, 1000 kg

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