



Formulated Systems

PRODUCT INFORMATION

PROVISIONAL TECHNICAL DATASHEET

4/16/2013

Introduction

HYPERLAST™ T142/95A Prepolymer is a PTMEG-based TDI (toluene diisocyanate) prepolymer. It has been formulated with a controlled structure to offer advantages in terms of occupational health and safety, by offering low odour and low free TDI monomer level, whilst retaining excellent mechanical properties in the final elastomer.

HYPERLAST™ T142/95A Prepolymer is intended for reaction with MBoCA (4,4 methylene bis(orthochloroaniline), or alternatively with Ethacure 300 (dimethylthiotoluenediamine), to produce a high performance elastomer with a hardness of 95 Shore A.

Polyurethane elastomers produced using HYPERLAST™ T142/95A Prepolymer are particularly suited to applications requiring superior dynamic performance and excellent all round physical mechanical properties.

HYPERLAST T142/95A PREPOLYMER

HYPERLAST™ T SERIES HIGH PERFORMANCE POLYURETHANE ELASTOMER SYSTEMS

Component Properties

Prepolymer Component

Product Reference	HYPERLAST™ T142/95A Prepolymer
Appearance	High viscosity liquid at 40°C
Viscosity	600 – 800 cP at 75°C 200 – 400 cP at 100°C
NCO Content	5.6 – 6.3%

Chain Extender Component

Product Reference	MBoCA	Ethacure 300
Appearance	Yellow solid at 25°C	Amber liquid at 25°C
Specific Gravity	1.22 -1.26 at 120°C	1.2 at 20°C

Mixed System

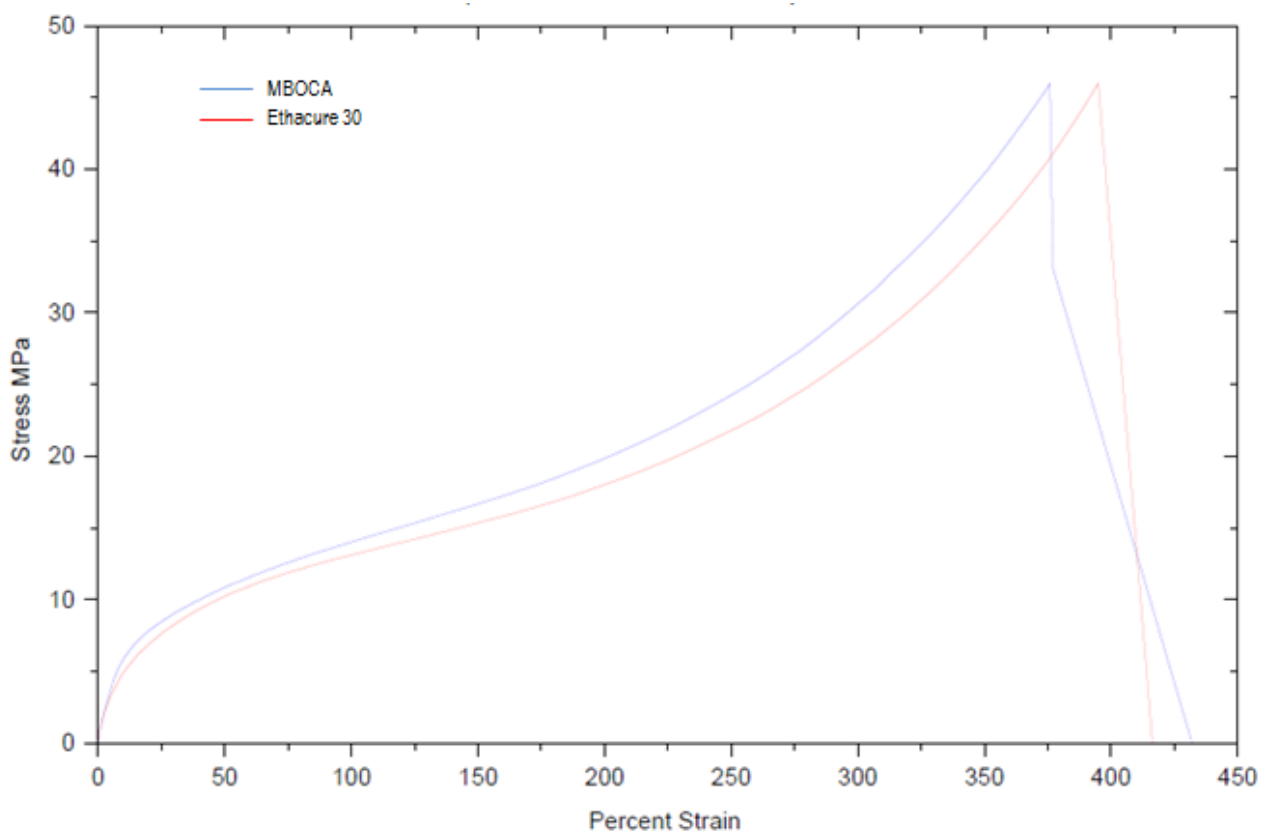
Mixing Ratio (95% Stoichiometry)	100 : 17.9 by weight (Prepolymer : MBoCA)
Gel Time	5' 00" - 7' 00" (100 g at 80°C)

Cured System – Typical Properties (based on 95% stoichiometry)

Property	Test Method	Ethacure 300 Cured	MBOCA Cured	Unit
Shore Hardness	BS 2782 Meth 365B	95±2	95±2	°A
Tensile Strength	BS 903 Pt A2	46	46	MPa
100% Modulus	BS 903 Pt A2	13.1	13.8	MPa
300% Modulus	BS 903 Pt A2	27.8	30.0	MPa
Elongation at Break	BS 903 Pt A2	395	380	%
Angle Tear strength	BS 903 Pt A3	93.5	100	N/mm
Compression Set (22Hr / 70°C)	ASTM D395	36	30	%
Resilience (Lupke Pendulum)	BS 903 Pt A8 Meth B	37	37	%
DIN Abrasion	DIN 53516	52	44	mm ³
3% Secant Modulus	BS 903 Pt A2 (100mm/min)	62	81	MPa
6% Secant Modulus	BS 903 Pt A2 (100mm/min)	50	65	MPa
10% Secant Modulus	BS 903 Pt A2 (100mm/min)	40	49	MPa

These properties are typical but do not constitute specifications.

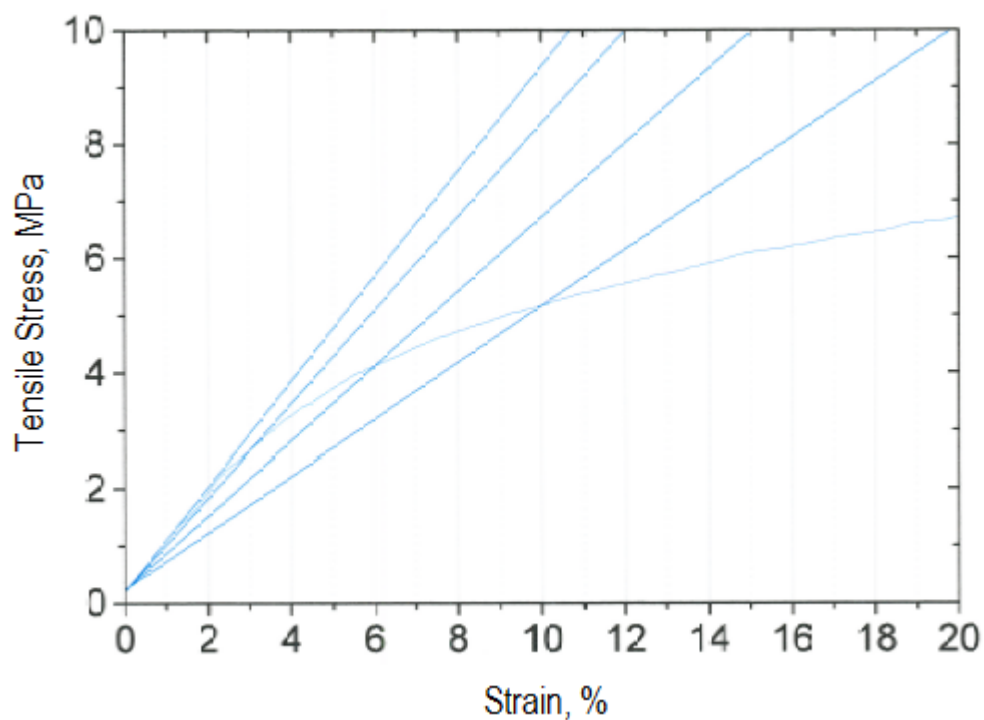
Typical Stress - Strain Graph for HYPERLAST T142/95A cured at 95% stoichiometry (BS903 Pt A2 at 500mm/minute)



These properties are typical but do not constitute specifications.

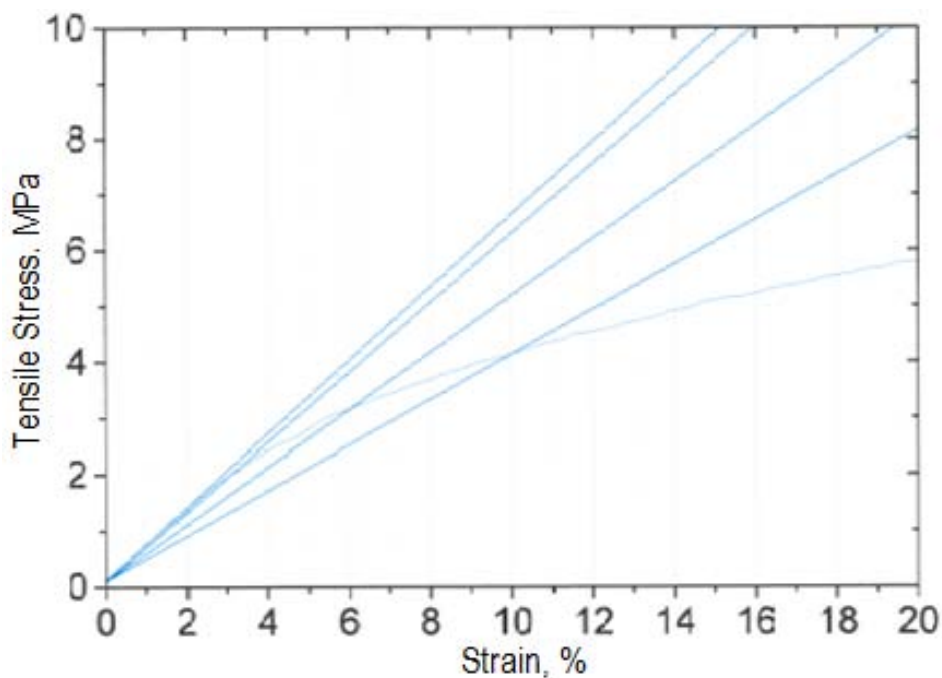
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Typical Secant Modulus Graph for HYPERLAST™ T142/95A cured with MBOCA at 95% stoichiometry



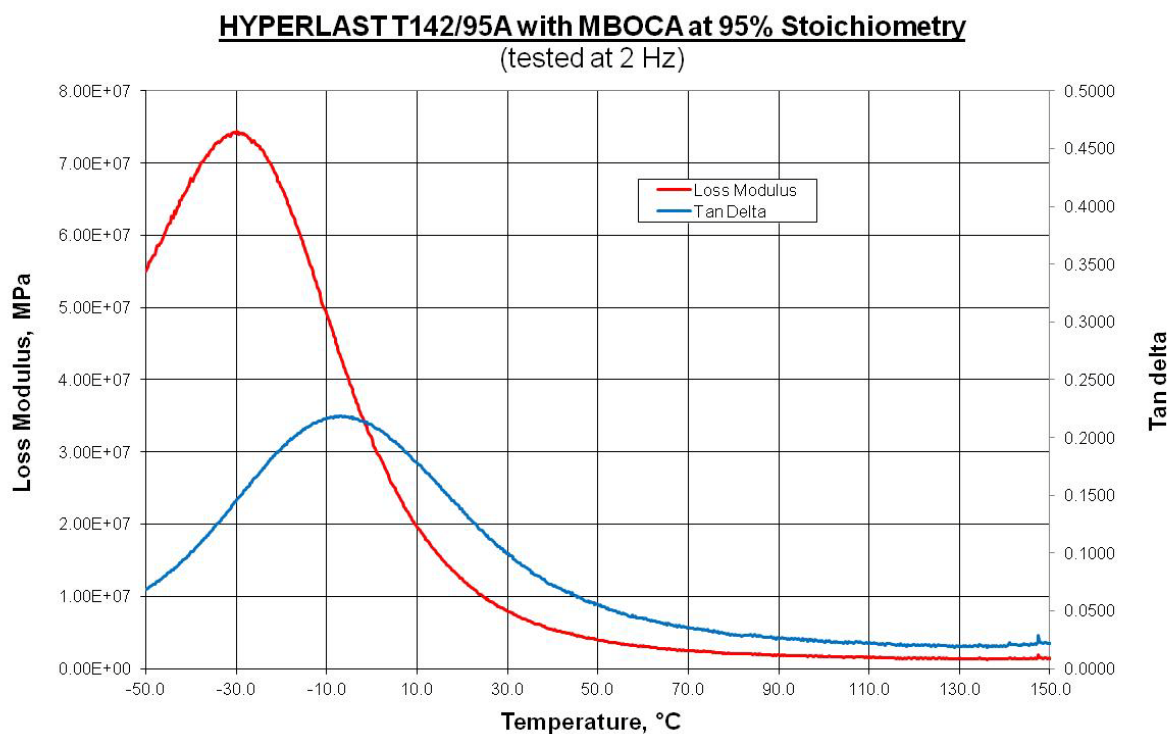
These properties are typical but do not constitute specifications.

Typical Secant Modulus Graph for HYPERLAST™ T142/95A cured with Ethacure 300 at 95% stoichiometry



These properties are typical but do not constitute specifications.

Typical DMA Profile



These properties are typical but do not constitute specifications.

Tested using single cantilever bending at a frequency of 2Hz and a temperature ramp rate of 3°C / minute.

Processing Details

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.

Calculation of Ratio

$$\text{Parts Curing Agent per 100 of prepolymer} = \frac{\text{Eq.weight of curative} \times \text{prepolymer NCO} \times \text{stoichiometry}}{42.02}$$

Typical Equivalent Weights

MBoCA - (4,4 methylene bis(orthochloroaniline)) = 133

Ethacure 300 (dimethylthiitoluenediamine) = 107

MCDEA = 187

Recommended Processing Temperatures

Prepolymer Component	75 – 80°C
MBoCA Component	115 – 120°C
Mould Temperature	100 – 110°C
Typical Demould Time	30 – 40 minutes

Recommended Cure Cycle

A post-cure of 16 hours at 100°C is recommended to help achieve optimum properties.

Machine Mixing

For optimum results, machine processing is recommended where possible. The HYPERLAST™ T series of systems are suitable for use with a wide range of low pressure metering units. Follow guidelines below to help ensure better results:

- 1) Melt the prepolymer at the recommended temperature for a limited period of time. DO NOT OVER HEAT THE PREPOLYMER FOR AN EXTENDED PERIOD OF TIME.
- 2) Clean, mould release and preheat moulds to the desired temperature.
- 3) De-gas all components in the holding (day) tanks for at least 15 – 20 minutes at approximately 1 mbr prior to calibration. The addition of a slow paddle to the holding tanks would assist in the degassing process.
- 4) Calibrate machine after components reach processing temperature.
- 5) Purge dry nitrogen in the headspace of the day tanks to avoid moisture exposure.
- 6) Turn off the heat at the end of the day to avoid over heating the materials in the day tanks.

Our Technical Service Department can discuss specific requirements and help advise on suitable equipment for evacuation.

Hand Mixing

For batch processing by hand the following procedure is recommended:

- 1) Preheat the prepolymer component to the recommended temperature to ensure a low viscosity, easily mixed liquid is achieved.
- 2) Preheat the mould to the recommended temperature.
- 3) De-gas the prepolymer component to remove any air bubbles or dissolved gases.
- 4) Melt the curative at the recommended temperature, if required. Blend the prepolymer component with required curative at the recommended ratio, in an area with suitable extraction facilities, taking care not to blend in air until homogenized. Ensure the components are well mixed.
- 5) De-gas the mixture and pour into the preheated mould.
- 6) Move the mould to an oven set at the correct temperature for curing.
- 7) Demould the part and post-cure it at the conditions specified.

Storage and Handling

		Shelf life
Prepolymer Component	HYPERLAST™ T series of polyurethane prepolymers contain an amount of free toluene diisocyanate which can cause irritation to eyes, skin, respiratory and mucous membrane. Avoid inhaling vapour, HYPERLAST T series should always be used only in an adequately ventilated area. Store in tightly sealed containers at a temperature of 0 - 30°C. Raise to the processing temperature and mix well before use. Avoid contact with moisture. In order to fully condition the prepolymer it is	12 months

Storage and Handling
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recommended to place full drums in a heat circulated oven for a period no less than 24 hrs at 80°C. Over heating could result in degradation of the prepolymer and reduce the final physical performance of the elastomer produced.

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

Packaging

Prepolymer Component 20 kg, 205 kg

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