Neuthane 200 Series

TDI –Ester (& Caprolactone Ester) Prepolymers

Contents

Neuthane 200 Series

TDI – Ester Prepolymers (MOCA Cured)

Quick Guide to Hardness Range:

The following data is, unless otherwise stated, based on the hardness obtained when cured with MOCA. Other amine curatives are available and the hardness may differ from the values quoted
Lower hardness can be achieved with TMP cures, plasticiser/FP and with Neuthane 260

Hardness		Neuthane Grade
Shore A	Shore D	
<30	-	
40	-	
50	-	
55	-	
60	-	
65	-	
70	-	
75	-	**Neuthane 225** = 76A
80	-	
85	-	**Neuthane 235S** = 85A, **Neuthane 235** = 86A
90	37	**Neuthane 242S** = 92A, **Neuthane 242** = 93A
95	43	**Neuthane 254** = 95A
	60	
	65	
	70	
	75	
	80	
	85	

Neuthane 200 Series

TDI – Ester Prepolymers (76 – 95 Shore A with MOCA)

Properties

The Neuthane 200 series are high performance TDI – ester prepolymers designed to produce items for use in arduous application areas

They offer:

- a high level of physical properties
- good cut and abrasion resistance
- good chemical resistance
- hardness range from 75 - 95A (MOCA)
- hardness range from <40 – 60A (TMP)

Typical Applications

- Medium load roller coverings (e.g. steel industry – dry application areas)
- Roller coverings where lubricants are present (e.g. aluminium manufacture)
- Wheels (e.g. pallet truck)
- Mining and quarrying (e.g. screen decks, scraper blades)
- Oil and gas industry (e.g. gaskets, pipe pigs)
- Press blocks
- Paper converting (e.g. anvil rollers)

Processing

Processing can be by hand or by dispensing machine.

Hand Processing

- Melt prepolymer at 50-70°C for 12-24 hours (as a guide the grades with the lower NCO value will take longer to melt than those with higher NCO values)
- Heat the prepolymer and curative to the recommended temperature
- Add pigments and Antifoam, as applicable, whilst mixing
- It is recommended that air be removed from the prepolymer under vacuum prior to addition of the curative
- Add the curative and thoroughly mix ensuring that no unmixed material is left on the container sides (if necessary the mix can be transferred to a second clean container and mixed again)
- Remove air under vacuum
- Cast into moulds, preheated to the recommended temperature
- Cure as recommended

Special Considerations

Processing

- Avoid prolonged storage of prepolymers at elevated temperatures. This will result in low hardness and lower properties of the cured material
- Avoid moisture contamination of all materials
- Part used containers should be flushed with dry nitrogen and resealed immediately after use

Alternatives

- ***Humid/Wet*** - PTMEG ether based systems should be considered: Neuthane 100 [TDI], Neuthane 600 [MDI] or Neuthane 500 [Aliphatic]
- ***Dynamic/Resilience*** - PTMEG ether based materials should be considered: Neuthane 100 [TDI], Neuthane 600 [MDI] or Neuthane 801 [MDI Quasi]
- ***Non MOCA*** - MDI based systems should be considered: Neuthane 700 [Prepolymer] and 802 [Quasi]

COST	PROCESSING	ABRASION	DYNAMIC	RESILIENCE	SOLVENT	HUMID/WET	TEMPERATURE	UV STABILITY

Neuthane 200 Series

TDI – Ester Prepolymers (70 – 86 Shore A)

Neuthane		223	225	235S	235
%NCO	%	2.3	2.5	3.5	3.5
Curative		**MOCA**	**MOCA**	**MOCA**	**MOCA**
Optimum Stoichiometry	%	95	95	95	95
Mix Ratio Curative per 100 Parts Resin	by weight	6.95	7.5	10.6	10.6
Resin Temperature Curative Temperature	°C °C	85 110	85 110	85 110	85 110
Recommended Mould Temperature	°C	95	95	95	95
Viscosity @ 100°C	cps	640	1350	1050	950
Pot life (on a 500g mix)	minutes	15	17	15	7.5
Recommended Cure Temperature	°C	95	95	95	95
Recommended Cure Time	hrs	16	16	16	16

Hardness	**DIN 2240-91**	**Shore A**	**70**	**76**	**85**	**86**
	DIN 2240-91	**Shore D**	**-**	**-**	**-**	**-**
100% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	380 (2.62)	480 (3.3)	760 (5.2)	840 (5.8)
300% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	500 (3.45)	770 (5.3)	1030 (7.1)	1140 (7.9)
Tensile Strength	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	4500 (31.08)	5400 (37.3)	7080 (48.8)	7160 (49.4)
Elongation at Break	BS 903 Pt A2 - ISO 37	%	800	750	670	710
Tear Strength	BS 903 Pt A3 - ISO 34-1	lb/in (KN/m)	280 (49.03)	340 (59.5)	430 (75.3)	480 (84.0)
Compression Set	BS903 Pt A6 - ISO 815	%	34	27	37	35
Abrasion loss	DIN 53516	mm³	45	43	42	40
Resilience	ASTM D 2632-92	%	35	40	30	36
Specific Gravity		g/cm³	1.23	1.23	1.24	1.24

Neuthane 200 Series

TDI – Ester Prepolymers (92 – 95 Shore A)

Neuthane		242S	242	254
%NCO	%	4.2	4.2	5.4
Curative		**MOCA**	**MOCA**	**MOCA**
Optimum Stoichiometry	%	95	95	95
Mix Ratio Curative per 100 Parts Resin	by weight	12.7	12.7	16.3
Resin Temperature Curative Temperature	°C °C	80 105	80 105	80 110
Recommended Mould Temperature	°C	95	95	95
Viscosity @ 100°C	cps	1050	1150	730
Pot life (on a 500g mix)	minutes	8	5	4.5
Recommended Cure Temperature	°C	95	95	95
Recommended Cure Time	hrs	16	16	16

Hardness	**DIN 2240-91**	**Shore A**	**92**	**93**	**95**
	DIN 2240-91	**Shore D**	**-**	**-**	**45**
100% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	1330 (9.2)	1400 (6.7)	2020 (13.9)
300% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	2050 (14.1)	2220 (15.3)	3750 (25.9)
Tensile Strength	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	7330 (50.6)	7550 (52.1)	8500 (58.6)
Elongation at Break	BS 903 Pt A2 - ISO 37	%	530	580	500
Tear Strength	BS 903 Pt A3 - ISO 34-1	lb/in (KN/m)	605 (105.9)	620 (108.6)	720 (126.1)
Compression Set	BS903 Pt A6 - ISO 815	%	32	28	29
Abrasion loss	DIN 53516	mm³	42	40	38
Resilience	ASTM D 2632-92	%	25	27	30
Specific Gravity		g/cm³	1.27	1.27	1.28

Quick Guide to Hardness Range:

The following data is, unless otherwise stated, based on the hardness obtained when cured with TMP and varying levels of plasticiser. Other polyol curatives are available and the hardness may differ from the values quoted
Higher hardness can be achieved with MOCA cures

Hardness		Neuthane Grade
Shore A	Shore D	
<30	-	
40	-	
50	-	**Neuthane 260** with Neuthane CA8 or CA9 = <10-50A, **Neuthane 242** with **FP** = 50A
55	-	**Neuthane 235** TMP cured with plasticiser = <40-55A
60	-	**Neuthane 234, Neuthane 242** TMP cured with plasticiser = <40-60A
65	-	
70	-	
75	-	
80	-	
85	-	
90	37	
95	43	
	60	
	65	
	70	
	75	
	80	
	85	

Neuthane 200 Series

TDI – Ester Prepolymer (40 - 60 Shore A with TMP & Plasticiser)

Properties

The Neuthane 200 series cured with TMP and plasticised produces low hardness polyurethanes with (in the case of Neuthane 234 and 242) exceptional solvent swell resistance.

They offer:

- long pot life
- excellent solvent swell resistance
- good cut resistance
- hardness range from <40-60A
- the option to be combined with fillers to reduce cost and improve grinding characteristics (Neuthane FP)

Typical Applications

- Lacquer and paint applicator rollers and wheels (Neuthane 235, 234 & 242)*
- Isostatic bags (Neuthane 235)
- Printing rollers

* See information in technical library section

Processing

Processing can be by hand or by dispensing machine.

Hand Processing

- Melt prepolymer at 60-70°C for 16-24 hours
- Heat the prepolymer and curative to the recommended temperature
- Remove moisture from plasticiser or FP (after blending) under vacuum at 110-120°C
- Add pigments and plasticiser, as applicable, whilst mixing
- Add the curative and thoroughly mix ensuring that no unmixed material is left on the container sides (if necessary the mix can be transferred to a second clean container and mixed again)
- If using more than one mix, blend to ensure homogeneity and mix again.
- Remove air under vacuum
- Cast into moulds, preheated to the recommended temperature
- Cure as recommended

Special Considerations

Processing

- Avoid prolonged storage of prepolymers at elevated temperatures. This will result in low hardness and lower properties of the cured material
- Avoid moisture contamination of all materials.
- Part used containers should be flushed with dry nitrogen and resealed immediately after use

Alternatives

- ***Abrasion/Cut Resistance*** – Neuthane 802 system [MDI Quasi] will offer an advantage
- ***Humid/Wet*** - PTMEG ether based systems should be considered: Neuthane 801 [MDI Quasi] or Neuthane 600 [MDI Prepolymer with Neuthane CA curative]

COST	PROCESSING	ABRASION	DYNAMIC	RESILIENCE	SOLVENT	HUMID/WET	TEMPERATURE	UV STABILITY

Neuthane 200 Series

TDI – Ester Prepolymer (40 - 60 Shore A with TMP & Plasticiser)

Neuthane		235S	235S	235S	242	242	242	242
%NCO	%	3.5	3.5	3.5	4.2	4.2	4.2	4.2
Curative		**TMP**	**TMP**	**TMP**	**TMP**	**TMP**	**TMP**	**TMP**
Mix Ratio Curative per 100 Parts Resin	**by weight**	**3.75**	**3.75**	**3.75**	**4.5**	**4.5**	**4.5**	**4.5**
Neuthane Plasticiser per 100 Parts Resin	**by weight**	**0**	**10**	**30**	**0**	**20**	**40**	**0**
Neuthane FP per 100 Parts Resin	**by weight**	**0**	**0**	**0**	**0**	**0**	**0**	**100**
Resin Temperature Curative Temperature Plasticiser / FP Temperature	°C °C °C	85 70 -	85 70 85	85 70 85	90 70 -	90 70 90	90 70 90	90 70 90
Recommended Mould Temperature	°C	110	110	110	110	110	110	110
Viscosity @ 100°C (prepolymer)	cps	1050	1050	1050	1150	1150	1150	1150
Pot life (on a 500g mix)	minutes	60+	90+	90+	60+	90+	90+	90+
Recommended Cure Temperature	°C	110	110	110	110	110	110	110
Recommended Cure Time	hrs	20	22	24	20	22	24	24

Hardness	**DIN 2240-91**	**Shore A**	**55**	**50**	**40**	**60**	**50**	**40**	**50**
	DIN 2240-91	**Shore D**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Specific Gravity		g/cm³	1.2	1.19	1.18	1.23	1.21	1.20	1.40

Neuthane 200 Series

TDI – Ester Prepolymer (35 - 50 Shore A with TMP & Plasticiser)

Neuthane		**234**	**234**	**234**
%NCO	%	3.4	3.4	3.4
Curative		**TMP**	**TMP**	**TMP**
Mix Ratio Curative per 100 Parts Resin	**by weight**	**3.65**	**3.65**	**3.65**
Neuthane 234 Plasticiser per 100 Parts Resin	**by weight**	**0**	**10**	**15**
Resin Temperature Curative Temperature Plasticiser Temperature	°C °C °C	85 70 -	85 70 85	85 70 85
Recommended Mould Temperature	°C	110	110	110
Viscosity @ 100°C (prepolymer)	cps	1050	1050	1050
Pot life (on a 500g mix)	minutes	60+	90+	90+
Recommended Cure Temperature	°C	110	110	110
Recommended Cure Time	hrs	20	22	24

Hardness	**DIN 2240-91**	**Shore A**	**50**	**40**	**35**
	DIN 2240-91	**Shore D**	**-**	**-**	**-**
Specific Gravity		g/cm³	1.27	1.28	1.29

Quick Guide to Hardness Range:

The following data is, unless otherwise stated, based on the hardness obtained when cured with MOCA. Other amine curatives are available and the hardness may differ from the values quoted

Hardness		Neuthane Grade
Shore A	Shore D	
<30	-	
40	-	
50	-	
55	-	
60	-	**Neuthane 232** with TMP = 60A
65	-	**Neuthane 230** = 65A
70	-	
75	-	
80	-	**Neuthane 232** = 80A
85	-	
90	37	
95	43	
	60	
	65	
	70	
	75	
	80	
	85	

Neuthane 200 Series

TDI – Caprolactone Ester Prepolymer (60 – 80 Shore A)

Properties

The Neuthane 200 Caprolactone series are high performance TDI – ester prepolymers designed to produce items for use in arduous application areas. They offer advantages over conventional ester TDI prepolymers in several key areas.

They offer:

- a high level of physical properties
- good cut and abrasion resistance
- good chemical resistance
- good low temperature flexibility
- low viscosity and long pot life*
- improved hydrolysis resistance*
- improved dynamic performance*
- low hardness with MOCA

* Compared with conventional TDI ester prepolymers

Typical Applications

- Medium load roller coverings (e.g. steel industry)
- Roller coverings where lubricants are used (e.g. Dioctyl Sebacate)
- Mining and quarrying (e.g. screen decks, scraper blades)
- Oil and gas industry (e.g. gaskets)

Processing

Processing can be by hand or by dispensing machine.

Hand Processing

- Melt prepolymer at 50-70°C for 12-24 hours (as a guide the grades with the lower NCO value will take longer to melt than those with higher NCO values)
- Heat the prepolymer and curative to the recommended temperature
- Add pigments and Antifoam, as applicable, whilst mixing
- It is recommended that air be removed from the prepolymer under vacuum prior to addition of the curative
- Add the curative and thoroughly mix ensuring that no unmixed material is left on the container sides (if necessary the mix can be transferred to a second clean container and mixed again)
- Remove air under vacuum
- Cast into moulds, preheated to the recommended temperature
- Cure as recommended

Special Considerations

Processing

- Avoid prolonged storage of prepolymers at elevated temperatures. This will result in low hardness and lower properties of the cured material
- Avoid moisture contamination of all materials
- Part used containers should be flushed with dry nitrogen and resealed immediately after use

Alternatives

- ***Humid/Wet*** - PTMEG ether based systems should be considered: Neuthane 100 [TDI], Neuthane 600 [MDI] or Neuthane 500 [Aliphatic]
- ***Dynamic/Resilience*** - PTMEG ether based materials should be considered: Neuthane 100 or 2100 [TDI], Neuthane 600 [MDI] or Neuthane 801 [MDI Quasi]
- ***Cost*** – Conventional ester based systems will offer a price advantage: Neuthane 200 [TDI], Neuthane 802 [MDI Quasi]
- ***Solvents*** – For certain application areas (e.g. lacquer application) conventional ester TDI offer the best performance

COST	PROCESSING	ABRASION	DYNAMIC	RESILIENCE	SOLVENT	HUMID/WET	TEMPERATURE	UV STABILITY

Neuthane 200 Series

TDI – Caprolactone Ester Prepolymer (60 - 80 Shore A)

Neuthane		230	232	232
%NCO	%	3.45	3.2	3.2
Curative		**MOCA**	**TMP**	**MOCA**
Mix Ratio Curative per 100 Parts Resin	by weight	10.4	3.4	9.7
Optimum Stoichiometry	%	95	100	95
Resin Temperature Curative Temperature	°C °C	100 110	80 70	80 110
Recommended Mould Temperature	°C	110	110	90
Viscosity @ 100°C (prepolymer)	cps	650	860	860
Pot life (on a 500g mix)	minutes	18	50+	14
Recommended Cure Temperature	°C	110 - 115	110	95
Recommended Cure Time	hrs	18	24	18

Hardness	**DIN 2240-91**	**Shore A**	**65**	**60**	**80**
	DIN 2240-91	**Shore D**	**-**	**-**	**-**
100% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	250 (1.7)	-	560 (3.9)
300% Modulus	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	460 (3.2)	-	1150 (7.9)
Tensile Strength	BS 903 Pt A2 - ISO 37	lb/in² (Mpa)	4760 (32.8)	-	6340 (43.7)
Elongation at Break	BS 903 Pt A2 - ISO 37	%	550	-	550
Tear Strength	BS 903 Pt A3 - ISO 34-1	lb/in (KN/m)	215 (37.6)	-	360 (63.0)
Compression Set	BS903 Pt A6 - ISO 815	%	30	-	39
Abrasion loss	DIN 53516	mm³	48	-	49
Resilience	ASTM D 2632-92	%	36	-	42
Specific Gravity		g/cm³	1.14	1.10	1.14