

TECHTHANE[®] ES-125, ES-129 TDI POLYESTER PREPOLYMERS**DESCRIPTION**

TECHTHANE ES-125 and ES-129 are high performance polycaprolactone polyester TDI prepolymers, which, when reacted with 4,4-Methylene-bis-[ortho-chloroaniline] (MBCA), yield an elastomer of approximately 60 and 77 Shore A hardness. Notable characteristics are their combination of low hardness, high physical properties, high abrasion resistance, high resistance to oils and solvents, and excellent hydrolysis resistance for polyesters. Typical applications are severe abrasion mining wear parts - particularly those with larger, dry aggregate.

PROPERTIES OF LIQUID PREPOLYMER

PROPERTY	ES-125	ES-129
Available Isocyanate Content	3.20-3.50	3.20-3.50
Liquid-Solid Transition Point	110°F (43°C)	110°F (43°C)
Viscosity Brookfield @ 212°F (100°C)	700 cps (700 mPs)	700 cps (700 mPs)
Specific Gravity @ 75°F (24°C)	1.16	1.16
Specific Gravity @ 212°F (100°C)	1.12	1.12

PROPERTIES OF CURED ELASTOMER

PROPERTY	ES-125	ES-129
Hardness, Shore A (ASTM D2240)	60	77
Tensile Strength (ASTM D412)	3500 psi (24.13 MPa)	5200 psi (35.85 MPa)
Elongation (ASTM D412)	540 %	480 %
100% Modulus (ASTM D412)	280 psi (1.93 MPa)	535 psi (3.67 MPa)
300% Modulus (ASTM D412)	440 psi (3.03 MPa)	1165 psi (8.03 MPa)
Tear Strength, Die-C (ASTM D624)	210 pli (36.70 kN/m)	355 pli (62.15 kN/m)
Tear Strength, Split (ASTM D470)	35 pli (6.13 kN/m)	73 pli (12.78 kN/m)
Rebound, Bashore (ASTM D2632)	31 %	
Compression Set, 22 hrs. @ 158°F, %, Method B	7	
Specific Gravity (ASTM D792)	1.15	
Bell Brittle Point, °F (°C) (ASTM D746)	<-80 (-65)	<-80 (-65)

INFORMATION BASED 212°F (100°C) PROCESSING AND 240°F (115°C) CURE.

PROCESSING SUMMARY

PROPERTY	ES-125	ES-129
MBCA level, pph, approximate	10.10	10.10
Prepolymer temperature, °F (°C)	212 (100)	212 (100)
Mold temperature, °F (°C)	240 (115)	240 (115)
Pot Life @ 212°F (100°C)	12 minutes	8 minutes
Cure @ 240°F (110°C)	1-2 hours	1 hour
Post Cure @ 212°F (100°C)	16 hours	16 hours

INFORMATION BASED ON 92% THEORY

PROCESSING

Thawing

TECHTHANE ES-125 and ES-129 will solidify at approximately 110°F (43°C). If solidified, pre-thawing can normally be achieved by heating the container to a maximum of 180°F (80°C) using a melting oven, thermostatically-controlled blanket heater, or other uniform heating device (heat bands are not recommended) for a period of 12--24 hours. Re-blend contents thoroughly after each thawing.

Re-blending

Prepolymers must be re-blended thoroughly prior to use to ensure homogeneity of the prepolymer. This is especially important if the prepolymer has solidified or possibly solidified, or if less than the entire quantity in the container is to be used at one time. Re-blend prior to each use for best results.

Degassing

Removal of any air which has become entrained in the prepolymer can normally be achieved either by heating the prepolymer to 180-200°F (80-93°C) for 15-20 minutes, or preferably via vacuum and agitation. Either method is complete when the majority of air is removed.

Heating

Prepolymer and MBCA should be processed at recommended temperatures to achieve proper results. Heating of components at temperatures other than recommended can result in poor physical properties, poor surface finish, and incorrect hardness. Heating to alternate temperatures must only be done after prior testing has confirmed that desired results will be achieved.

Casting

To ensure optimum physical properties and surface finish, molds should be heated to or slightly higher than cure temperature. Application of mold release agents should be in accordance with release agent manufacturer's guidelines. Mold release can be avoided by having molds Teflon® coated.

Curing

TECHTHANE ES-125 and ES-129 are highly sensitive to curing temperatures, and physical properties will vary based on specific process and cure temperature. Curing and post curing in accordance with guidelines on opposite page is recommended, and extra care should be taken to ensure temperatures are correct if the specified values are desired. Curing at lower temperatures will result in higher hardness and curing at higher temperatures will result in lower hardness.

Note: If using curatives other than MBCA such as Ethacure® 300 or Techcure 915B, refer to curative manufacturer's suggested cure cycles.

AVAILABILITY

TECHTHANE prepolymers are packaged in 44 lb. (20 kg) pails and 451 lb. (205 kg) drums. Specific quantities and special packaging are available by request.

STORAGE AND SHELF LIFE

TECHTHANE prepolymers are packaged sealed under an argon gas blanket. Containers should be kept in this condition and stored in a cool, dry area that is protected from direct sunlight until they are to be used. A container that has been opened should be resealed immediately, and if its contents are not to be used within 24 hours, it must be purged with argon or clean dry nitrogen to prevent moisture contamination.

In the absence of heat and moisture, TECHTHANE prepolymers are stable and have a shelf life of a minimum of 1 year. In the presence of heat, however, the NCO of all prepolymers decreases, affecting their reactivity. The following is a summary of the maximum recommended time that prepolymers should be maintained at the given temperature without significant decrease in NCO:

TEMPERATURE	MAXIMUM STORAGE TIME
90°F (32°C)	6 weeks
180°F (82°C)	36 hours
200°F (93°C)	12 hours
212°F (100°C)	8 hours

SAFETY

TECHTHANE prepolymers, in their uncured liquid form, contain a small amount of free toluene-diisocyanate (TDI) which can cause severe irritation to the eyes, skin, respiratory system, and mucous membranes. Contact by inhalation, skin, eye, or ingestion must be avoided. All guidelines for handling TDI-containing materials must be followed when using TECHTHANE prepolymers.

To avoid inhalation, forced air ventilation must be used for all indoor applications. When working in tanks and other confined areas, or anywhere the TLV is exceeded, fresh air breathing equipment must be worn. Chemical cartridge masks suitable for organic vapors and approved by MSHA/OSHA may be used under some conditions with adequate ventilation. To avoid contact with skin or clothing, protective clothing must be worn at all times.

Refer to the Material Safety Data Sheet (MSDS) for further information prior to use of this material.

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