

## TECHTHANE<sup>®</sup> T90 URETHANE ELASTOMER LIQUID/PASTE/PUTTY

### DESCRIPTION

TECHTHANE T90 is a high performance, room-temperature-mix urethane elastomer liquid. With the addition of TECHTHANE Thickening Agent, it can also be applied as a paste or putty. T90 forms a medium durometer elastomer that flexes with expansion and contraction, seals seams, and bridges gaps. T90 resists corrosion from many acidic and caustic solutions, and abrasion from small particles. T90 bonds highly to prepared substrates. As an aliphatic-hybrid polyurea urethane, T90 has significantly better hydrolytic stability, UV stability, and resistance to many chemicals than aromatic urethanes, and is not affected by moisture during application. Typical applications include small cast parts, repairs to sprayed linings, and coating areas without spray equipment.

### PROPERTIES OF CURED LINING

Typical physical properties of TECHTHANE T90 prepared and cured at ambient conditions are as follows:

PROPERTY	VALUE <sup>a</sup>
Hardness, Shore A (ASTM D2240)	90
Tensile Strength (ASTM D412)	3,500 psi (24.15 MPa)
Elongation (ASTM D412)	350 %
100% Modulus (ASTM D412)	1,100 psi (7.60 MPa)
Tear Strength, Die-C (ASTM D624)	350 pli (63.00 kN/m)
Tear Strength, Split (ASTM D470)	55 pli (9.60 kN/m)
Film Density (ASTM D792)	0.97 g/cm <sup>3</sup>
Abrasion Resistance, wet fine particle (Sand Slurry)	700% > steel
Adhesion, linear peel, to prepared substrates (ASTM D429)	75 pli (13.00 kN/m)
Color	see 'Availability'

### PROPERTIES OF LIQUID COMPONENTS

Typical properties of TECHTHANE T90's liquid components are as follows:

PROPERTY	PART 'A'	PART 'B'	MIXED (A+B)
Solids Content, by volume, %	100	100	100
Weight, lbs./gal. (g/L)	8.38 (1004)	8.35 (1001)	8.00 (959)
Viscosity, cps/mPs @ 75°F (24°C)	50,000	500	35,000
Flash Point, TCC, °F (°C)	> 212 (100)	>212 (100)	> 100 (100)
VOC	0	0	0

### APPLICATION SUMMARY (See following pages for further application information)

PROPERTY	
Application Environment	50-120°F (10-48°C), 0-100% R.H.
Application Equipment	trowel/putty knife if applying as paste or putty
Mix Ratio, A:B	10:1 by volume
Pot Life	15-20 min. @ 75°F (24°C)
Coverage	200 mils/ft. <sup>2</sup> /lb. (1.05 mm/m <sup>2</sup> /kg)
Per Coat Vertical/Horizontal Build, DFT	30-125 mils (0.10-0.50 mm)+ / varies with thickener level
Maximum Lining Thickness, DFT	no limit
Recoat Window, direct-to-basecoat (unprepped)	30 min.- 3 hours @ 75°F (24°C) for ultimate adhesion 6 hours @ 75°F (24°C) for 50 pli (8.75 kN/m) +

## CHEMICAL COMPATIBILITY

TECHTHANE T90 is usable with a wide variety of chemicals and solutions, with compatibility typically best within the pH range of 2-12. Following is a brief overview of chemical compatibility:<sup>d</sup>

CONTACT	BRIEF	SUSTAINED
Acid, Hydrochloric 5%	G	G
Acid, Phosphoric 10%	G	G
Acid, Phosphoric 30%	G	F
Acid, Sulfuric 10%	G	G
Acid, Sulfuric 30%	G	F
Ammonium Hydroxide	G	G
Fuel Oils	G	G
Gasoline	G	G
Water / Salt Water	G	G
Sodium Hydroxide 10%	G	G
Solvents	G-F	F-P

G: Good F: Fair P: Poor

## TEMPERATURE COMPATIBILITY

TECHTHANE T90 is generally suitable for use in dry service up to 180°F (82°C), and wet or humid service up to 150°F (65°C). Chemicals and other variables may affect elevated temperature performance and adhesion. Although T90 becomes more rigid at lower temperatures, it remains flexible below -70°F (-57°C).

## ABRASION RESISTANCE

For fine-particle slurry and impingement abrasion resistance, TECHTHANE T90 has shown to be superior to many other materials. The figures below are results of the *Sand Slurry Abrasion Test*, the most relevant test for elastomeric materials and wet, fine-particle abrasion.<sup>e</sup> A relative volume loss of 14 for TECHTHANE T90 indicates an abrasion resistance approximately 400% greater than steel:

MATERIAL	RELATIVE LOSS FROM ABRASION	RESISTANCE, AS % OF STEEL
TECHTHANE 180	5	2000
<b>TECHTHANE T90</b>	<b>14</b>	<b>714</b>
TECHTHANE 90SS-MB	14	714
UHMW Polyethylene	22	454
A.R. Steel	62	161
304 Stainless Steel	82	122
Carbon Steel	100	100
H.D. Polyethylene	218	-218
PVC	532	-532
6061 Aluminum	1042	-1042

## ADHESION

TECHTHANE T90 requires substrates be properly prepared and primed to achieve its reliable, high adhesion. With the appropriate preparation and primer, adhesion to metal, concrete, and composite substrates is typically in the range of 70-100 pli (12.25-17.50 kN/m).

## COVERAGE

The theoretical coverage of TECHTHANE T90 is 200 mils/ft.<sup>2</sup>/lb. (1.00 mm/m<sup>2</sup>/L). For example, approximate coverage is as follows:

200 ft. <sup>2</sup> /lb. @ 1 mil	0.44 m <sup>2</sup> /L @ 1.00 mm
70.0 ft. <sup>2</sup> /gal. @ 30 mils	1.75 m <sup>2</sup> /L @ 0.25 mm
35.0 ft. <sup>2</sup> /gal. @ 60 mils	0.88 m <sup>2</sup> /L @ 0.50 mm
23.3 ft. <sup>2</sup> /gal. @ 120 mils	0.58 m <sup>2</sup> /L @ 0.75 mm

Note: Actual coverage rates vary by application and equipment.

## SUGGESTED ELASTOMER THICKNESS

SERVICE TYPE	THICKNESS (DFT)
release	
abrasion, impact	90-250 mils (2.50 mm) +

## APPLICATION ENVIRONMENT

TECHTHANE T90 is best applied between 50-120°F (10-48°C). TECHTHANE T90 is not affected in application by humidity and can be applied with 0-100% humidity (Substrate corrosion may be a problem at high humidity levels, however).

## CURE TIME

The time required for TECHTHANE T90 to cure depends on elastomer temperature. Cure is faster with higher temperatures and slower with lower temperatures. For reference, cure times at selected constant temperatures are listed below. Applicators/end users must adjust their times accordingly.

CURE	50°F (10°C)	75°F (24°C)	100°F (38°C)
gel	80 min.	30 min.	10 min.
tack-free	3 hrs.	1.5 hrs.	30 min.
75%	4 days	2 days	1.5 days
95% ('full')	9 days	6 days	3 days

75% cure is normally sufficient for immersion and light impact, and 95% cure for more severe use. TECHTHANE T90 will continue to strengthen and have greater physical properties after aging several weeks. Coated items should be put into service only after sufficient cure.

## AVAILABILITY

**PACKAGING:** 0.83, 1.65, and 6.60 lb. kits. Custom packaging available.

**COLORS:** Orange, Gray, Tan, Yellow, Blue, Green, Black, White. Custom colors available.

**ACCESSORY PRODUCTS:** TECHTHANE Thickening Agent - changes T90 consistency from liquid into thixotropic paste to putty.

## EQUIPMENT REQUIREMENT

TECHTHANE T90 is best applied with standard, industrial-grade, air-powered, airless or air spray equipment. Following is a list of general equipment guidelines:

A 'Jiffy Mixer' or similar on an air drill is required for mixing the components.

## APPLICATION INSTRUCTIONS

### Surface Preparation

For proper, high adhesion, TECHTHANE T90 should only be applied to surfaces that have been properly prepared. In most cases this means cleaning, gritblasting, re-cleaning, and priming. The following is a brief overview of surface preparation requirements – refer to the appropriate TECHGRIP™ primer's Product Data Bulletin for additional instructions.

Metal: Clean, grind down edges to a 1/8" (3.00 mm) radius, grit-blast, clean, prime with TECHGRIP M3, C2, or C1/FG1 combination.

Concrete: Detergent wash, grit- or water-blast, allow to dry, resurface with TECHGRIP C1 if needed, prime with C2 or C1/FG1 combination.

FRP/Epoxy: Clean, grind down edges to a 1/8" (3.00 mm) radius, sand or grit blast, clean, prime with TECHGRIP FG1.

Cured Urethane Elastomer: Clean with MEK or detergent, abrade, clean with MEK, prime with TECHGRIP E1.

Rubber: Detergent wash, abrade, clean with MEK, prime with TECHGRIP R1 or E1, spot test prior to full-scale use.

Fabric/Cloth: No surface preparation is normally required for clean, open-weave fabrics.

### Mixing Components

Do not open or mix Part 'A' or 'B' until ready to use. Mixing varies by desired consistency - Liquid, Paste, or Putty:

1) If the Part 'A' component has or may have been exposed to cold temperatures, re-mix it thoroughly. This is not required if the entire container is to be used at one time.

2) If using the entire amount, pour all of Part 'B' into Part 'A'. Make sure to get all of Part 'B' from its container. If using less than the entire amount, measure out ten (10) parts 'A' for each one (1) part 'B' by volume or weight, for example, 500 g Part 'A' and 50 g Part 'B'.

3) Blend the components together thoroughly in small quantities by hand and larger quantities with a jiffy-mixer on an air drill at high speed. Reach all parts of the container, taking care to blend in the material along the side walls and in the corners of the container. Half-way into the mixing process, stop, scrape the side walls, bottom, and corners of the container with a straight-edge to blend-in any unmixed Part 'A' remaining there, and

thoroughly blend the entire container once more. (Complete mixing time is normally about 3-5 minutes, depending on quantity and type of mixing used.

5) LIQUID: If pouring/casting, proceed to step 6).

PASTE/PUTTY: Add T90 Thickening Agent and mix thoroughly until the desired consistency is achieved.

6) Transfer the mixture into a neutral container. It is ready to be applied at this point.

### Pot Life

The pot life of mixed TECHTHANE T90 varies by material temperature:

TEMPERATURE	POT LIFE
50°F (10°C)	40 min.
75°F (24°C)	20 min.
100°F (38°C)	10 min.

### Application

TECHTHANE T90 must be only be applied to surfaces which have been properly prepared, and for bonding applications, primed.

LIQUID / CASTABLE: Pour into prepared mold or other object. Protect repair material from contamination until it is cured. *Lightly* sweep with hot air gun or hair dryer to remove surface bubbles. Apply heat to accelerate cure.

SEMI-THICKENED / COATING: Using a brush or trowel, apply to the prepared bonding surface in an overlapping pattern. Let base coats solidify prior to applying additional coats.

PASTE/PUTTY / REPAIR: Using a putty knife or trowel, press putty into the prepared and primed surface. Repeat application in left, right, up, and down directions to ensure thorough wetting of the entire patch area.

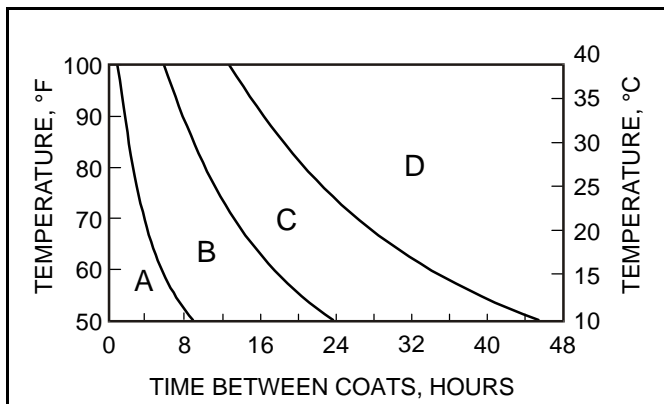
### Recommendations:

- Cover over repairs with clear tape until cured to make repair surface flush with existing surface.
- Overlap flange and lip edges.
- Avoid leaving coating-substrate interface seams exposed to service.

Note: Do not apply T90 when the temperature of the substrate is less than 5°F (2.8°C) above the dew point, when the ambient temperature is below 50°F (10°C), or when the substrate is expected to become wet prior to application.

## Recoat Time and Preparation

Elapsed time and surface temperature determine the level of surface preparation required between coats of TECHTHANE T90 to get reliable, strong adhesion. In most cases, no extra preparation is required – additional coats can be applied directly over previous coats. However, if a new coat is to be applied to an old coat outside of its 'no-prep' 'Recoat Window,' than various levels of surface preparation are required to ensure the *highest level* of adhesion. The chart below is provided as a general guide in determining the recommended preparation level. To use the chart, move up from the appropriate 'Time Between Coats' and across from the appropriate 'Temperature' listing -- the resulting point identifies what preparation is required, as stated below the chart. If in doubt, use the greater preparation level.



### AREA RECOMMENDED PREPARATION BEFORE RECOATING

A	No preparation required
B	Wipe surface with MEK, allow to evaporate
C	Wipe surface with MEK, apply TECHGRIP E1 primer
D	Buff, prime with TECHGRIP E1, allow to dry to firm tack

## CLEAN UP

Uncured TECHTHANE T90 can be removed with toluene or xylene. Cured TECHTHANE T90 can be removed with . To ensure continued proper application of TECHTHANE T90, mixing and application equipment should be cleaned immediately after use to prevent build-up of cured T90.

Dispose of used containers in accordance with local, regional, and national regulations.

## STORAGE AND SHELF LIFE

Store TECHTHANE T90 containers in a cool, dry area away from potential exposure to heat, sources of ignition, direct sun, or large variations in temperature. Under these conditions, the shelf life of unopened containers is 1 year minimum from date of shipment. Opened containers should be resealed quickly.

## SAFETY

TECHTHANE T90 Part 'A' contains isocyanates (aliphatic) and solvent, and Part 'B' contains amines. Avoid overexposure by inhalation, eye contact, skin contact, or ingestion. To reduce inhalation potential, use only in well-ventilated areas that minimize exposure to product and wear proper respiratory protection. For indoor or confined areas, forced-air ventilation is required to draw vapor away. While working in confined areas such as enclosed or narrow tanks, fresh-air breathing equipment is required. In applications with *adequate* ventilation, chemical cartridge masks designed for organic vapors are acceptable when used in accordance with their guidelines. To avoid eye contact, chemical splash goggles must be worn. To avoid skin contact, impervious protective clothing must be worn. Wash thoroughly after application.

Refer to the Material Safety Data Sheet (MSDS) for further information prior to use of this material. MSDS available 24 hrs. at 888-TECHFACTS / 540-667-2664 (MSDS # 300, 301).

### FOR INDUSTRIAL USE ONLY

a) Figures are based on small batch, drill-mixed specimens containing 3% Thickening Agent, 100-150 mils (2.50–3.75 mm) DFT, cured 7–10 days at 75°F (24°C) average, and are typical of actual applicator field results. NOTE: These figures should not be compared with 'best-case' figures or figures based on cast, poured, or thin-film/drawn-down laboratory specimens processed and cured under unrealistic, optimum conditions as done by other manufacturers.

b) Users are advised to conduct their own tests prior to use. For more extensive, general compatibility information, refer to 'Chemical Compatibility of TECHTHANE.'

c) The Sand Slurry Abrasion Test is used to estimate the abrasion resistance of materials to solutions containing fine, abrasive particles. In the test, materials are subjected to an abrasive sand/water solution for several hours. After thorough drying, their volume lost to abrasion is measured and compared to steel. Field service results show the test to be an accurate indicator of actual service performance for all fine abrasives. Note: Taber and other tests designed for hard materials and dry, sliding abrasion are not relevant to this type of product nor the type of abrasion to which they are typically subjected, and provide no useful data to this effect.

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