

TECHTHANE® 380 SPRAY-APPLIED URETHANE ELASTOMER

DESCRIPTION

TECHTHANE 380 is a 100% solids, spray-applied urethane elastomer designed to protect objects from corrosion, leakage, and fine particle abrasion. It cures to form a smooth, glossy, rubbery elastomer with over 650% better abrasion resistance than steel. In the spray process, it builds and cures quickly, has a long recoat window, and is not affected by moisture as are standard-type urethanes. Primary usage is as an abrasion-resistant seamless protective lining in the mining, mineral processing, power generation, and waste/wastewater industries. Typical applications are slurry tanks, screening equipment, and other similar equipment.

PROPERTIES OF CURED LINING

Typical physical properties of TECHTHANE 380 sprayed and cured under normal conditions are as follows:

PROPERTY	VALUE ^a
Hardness, Shore A (ASTM D2240)	80
Tensile Strength (ASTM D412)	2,200 psi (15.15 MPa)
Elongation (ASTM D412)	425 %
100% Modulus (ASTM D412)	650 psi (4.50 MPa)
Tear Strength, Die-C (ASTM D624)	345 pli (60.40 kN/m)
Tear Strength, Split (ASTM D470)	60 pli (10.50 kN/m)
Resilience, Bashore (ASTM D2632)	45 %
Film Density (ASTM D792)	0.90 g/cm ³
Abrasion Resistance, fine particle slurry, % > steel (Sand Slurry)	667 %
Adhesion, linear peel, to prepared steel (ASTM D429)	60 pli (10.50 kN/m)
Surface Finish (Subjective)	smooth, gloss
Color	See 'Availability'

PROPERTIES OF LIQUID COMPONENTS

Typical properties of TECHTHANE 380'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)	8.80 (1055)	9.70 (1162)	9.25 (1109)
Viscosity, cps/mPs @ 75°F (24°C)	9,500	300	N/A
Viscosity, cps/mPs A@135°F(68°C), B@120°F(50°C)	1,200	150	N/A
Flash Point, TCC, °F (°C)	>212 (100)	>212 (100)	>212 (100)
VOC	0	0	0

APPLICATION SUMMARY (See following pages for further application information)

PROPERTY	
Application Environment	50-150°F (10-65°C), 0-95% R.H.
Application Equipment	heated, high pressure plural component
Mix Ratio, A:B	3:1 by volume
Product Application Temperature	A: 135-140°F (57-60°C) B: 120-125°F (49-51°C)
Pot Life	3 minutes @ 135°F (57°C)
Coverage	1,700 mils/ft. ² /gal. (1.10 mm/m ² /L)
Per Coat Vertical Build, DFT, stationary object, max.	40 mils (1.00 mm)
Per Coat Vertical Build, DFT, rotating object, max.	120 mils (3.00 mm)
Per Coat Horizontal Build, DFT, max.	no limit
Maximum Lining Thickness, DFT, max.	no limit
Recoat Window, direct to basecoat (w/o prep.)	12 min. - 3 hours @ 75°F (24°C)

ABRASION RESISTANCE

For fine-particle slurry and impingement abrasion resistance, TECHTHANE 380 has shown to be superior to many other lining materials in tests and practice. The figures below are results of the *Sand Slurry Abrasion Test*, the most relevant test for elastomeric materials and wet, fine-particle abrasion.^e A relative volume loss of 15 for TECHTHANE 380 in this test indicates an abrasion resistance approximately 6.7 times greater than steel:

MATERIAL	RELATIVE LOSS FROM ABRASION	RESISTANCE, AS % OF STEEL
TECHTHANE 180	5	2000
TECHTHANE 380	15	667
UHMW Polyethylene	22	454
Typical 'A.R.' Urethane	55	182
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

CHEMICAL COMPATIBILITY

TECHTHANE 380 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:^d

CONTACT	BRIEF	SUSTAINED
Acid, Hydrochloric 5%	G	F
Acid, Phosphoric 10%	G	G
Acid, Phosphoric 50%	G	F
Acid, Sulfuric 5%	G	G
Acid, Sulfuric 10%	G	F
Ammonium Hydroxide	G	G
Fuel Oils	G	F
Gasoline	G	F
Water / Salt Water	G	G
Sodium Hydroxide, 10%	G	G
Solvents, Hydrocarbon	G	F
Solvents, Chlorinated	P	P

G: Good F: Fair P: Poor

TEMPERATURE COMPATIBILITY

TECHTHANE 380 is generally suitable for use in dry service up to 380°F (82°C), and wet or humid service up to 130°F (55°C). Chemicals and other variables may affect elevated temperature performance and adhesion. Although 380 becomes more rigid at lower temperatures, it remains flexible below -70°F (-57°C).

ADHESION

TECHTHANE 380 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 65-100 pli (11.50-17.50 kN/m).

COVERAGE

The coverage of airless sprayed TECHTHANE 380 is typically 1,700 mils/ft.²/gal (1.05 mm/m²/L). For example, approximate coverage is as follows:

1,700 ft. ² /gal. @ 1 mil	1.05 m ² /L @ 1.00 mm
28.3 ft. ² /gal. @ 60 mils	0.52 m ² /L @ 2.00 mm
13.6 ft. ² /gal. @ 125 mils	0.35 m ² /L @ 3.00 mm
6.8 ft. ² /gal. @ 250 mils	0.17 m ² /L @ 6.00 mm
4.5 ft. ² /gal. @ 375 mils	0.11 m ² /L @ 9.00 mm

Actual coverage rates will vary by application and equipment.

SUGGESTED LINING THICKNESS

SERVICE TYPE	THICKNESS (DFT)
sealing, general corrosion	20-40 mils (0.50-1.00 mm)
crack-bridging, light abrasion	40-60 mils (1.00-1.50 mm)
moderate abrasion, impact	100-125 mils (2.50-3.00 mm)
heavy abrasion, impact	250-375 mils (6.00-9.00 mm)

APPLICATION ENVIRONMENT

TECHTHANE 380 is best applied in ambient conditions of 50-150°F (10-65°C). TECHTHANE 380 is not significantly affected in application by humidity and can be applied with 0-95% R.H. (Substrate corrosion may be a problem at higher humidity levels, however).

CURE TIME

The time required for TECHTHANE 380 to cure depends on coating temperature. Cure is faster with higher temperatures and slower with lower temperatures. For reference, cure times at selected temperatures are listed below:

CURE	50°F (10°C)	75°F (24°C)	100°F (38°C)
gel (recoat minimum)	18 min.	12 min.	6 min.
tack-free, firm	35 min.	20 min.	12 min.
75%	6 days	3 days	1.5 days
95% ('full')	12 days	7 days	3 days

75% cure is normally sufficient for immersion and light impact, and 95% cure for more severe use. TECHTHANE 380 will continue to strengthen and have greater physical properties after aging several weeks. Coated items should be put into service only after sufficient cure.

Note: Cure time can be shortened by application of heat to the coated part (up to 212°F/100°C). Contact your representative for further information.

AVAILABILITY

PACKAGING: 20 and 200 gallon sets.

COLOR: Standard colors are Orange, Yellow, Black, and unpigmented clear-amber. Custom colors available.

EQUIPMENT REQUIREMENT

TECHTHANE 380 is typically applied with high pressure, fully-heated, plural component, airless/air-assist spray equipment. Following is a list of general equipment guidelines:

COMPONENT	REQUIREMENT
Spray Machine Pump	air-powered 30:1+ or gear drive
Mix Ratio	3A : 1B
Packings	Teflon or nylon
Material Supply	heated & agitated tanks or drums
Heaters A&B	supply, high pressure, & hose
Temperature	120-150°F, 155°F, 160°F
Spray Hose	heavy duty, heated, insulated
Core	Teflon or nylon
Pressure Rating	3,000 psi (20 MPa)
Size (Optimal)	A: 3/8" (9.00 mm) B: 1/4" (6.00 mm)
Spray Gun	3-line, static-mix, solvent flush
Mixer	plastic, high fold, 3/8" x 5-6"
Purge	solvent 3rd line
Tip Size	0.020"–0.028" (0.50–0.70 mm)
Flush Pump	air-powered 10:1+ or gear drive

An oven or 'hot-box' is required for pre-warming the components. A 'Jiffy Mixer' or similar on an air drill is required for pre-mixing the components.

APPLICATION INSTRUCTIONS

Surface Preparation

For proper, high adhesion, TECHTHANE 380 must 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 FG1 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.

Preparing Components

1) 24 hours prior to spraying, pre-warm the Part 'A' to 110-120°F (°C) and the Part 'B' to 90-110°F (°C) using an oven or 'hot box'. Do not overheat or keep at high temperatures for long periods.

2) Prior to pumping material or placing into tanks, re-mix the Part 'B' component thoroughly with a drill mixer, and also the Part 'A' component if it has or may have been exposed to cold temperatures. This is especially important if less than the entire container is to be used at one time.

Equipment Setup

1) Set the Part 'A' tank heater to 135-140°F (57-°C), high pressure heater to 140°F (°C), and hose heater to 140°F (71°C). Set Part 'B' tank heater to 115, high pressure heater to 120, and hose heater to 125. If using supply drums with drum heaters, set them to 120°F (50°C), unless the entire drum is to be used within one day, than it can be heated up to 135°F (57°C). If not using drum heaters, the drums must be pre-warmed enough to maintain 120°F (50°C) throughout the spray process.

2) Turn on tank / drum agitators.

3) Verify each component is up to proper temperature. If either is below its minimum temperature, recirculate it through the high pressure heater until it is achieved.

4) Verify all gauges are showing the correct pressure.

5) Set the spray machine to the lowest possible pressure that gives a good spray pattern with the spray tip being used (typically ~60 psi with a 0.021" tip).

6) Test spray. Verify that Parts 'A' and 'B' are pumping properly. Verify the solvent flush line is working.

Application

1) Thoroughly purge solvent from static mix tube with material into a pail or other container. *Be sure that all solvent is out of the wand before spraying the intended surface. The spray wand should also be hot to the touch before spraying.*

2) Apply coats to the prepared surface in a smooth and even, overlapping manner. Thoroughly wet-out each coat, but avoid runs and sags that occur when areas are applied too thick. If coating stationary objects, start from the bottom and work upwards. Apply between 10-40 mils (0.25-1.00 mm) per coat on vertical surfaces and any thickness on horizontal surfaces. Allow each coat to solidify before applying additional coats. Continue building coats until the desired thickness is achieved.

Note: See 'RECOAT TIME AND PREPARATION' for recoat windows and surface preparation requirements for extended recoats.

3) When finished coating, let the coated surface properly cure prior to handling or placing into service.

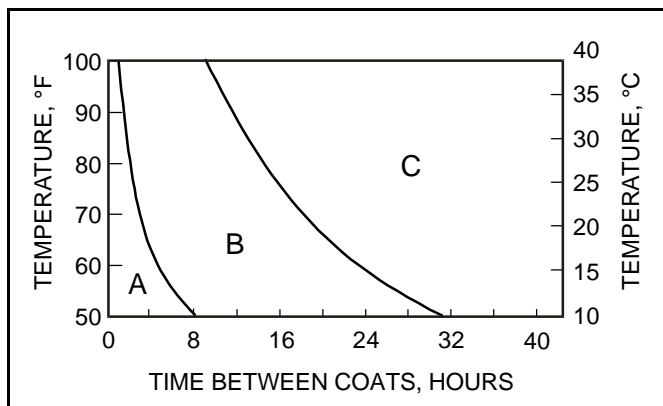
Recommendations:

- Smoothen tight corners with TECHTHANE T150 caulk prior to coating.
- Rotate moveable objects on a turning fixture for fastest build, most consistent thickness & coverage, and best surface finish
- Overlap flange and lip edges.
- Avoid having coated–uncoated interfaces exposed to service.
- Use wire masking tape to make trimming easier and faster.

Note: Do not apply 380 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 380 to get reliable, strong adhesion. In most cases (under 4 hours @ 75°F (24°C)), 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. Due to the severe applications in which TECHTHANE 380 is typically used, only the highest level of preparation is recommended. 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	Buff, prime with TECHGRIP E1, allow to dry to firm tack

CLEAN UP

Use toluene or xylene to clean uncured TECHTHANE 380 from mixing and application equipment. Cured 380 must be soaked for removal. To ensure continued proper application of 380, spraying and mixing equipment should be flushed and cleaned immediately after use to prevent build-up of cured 380 on internal parts. Additional required cleaning procedures include disassembly and thorough cleaning of all parts per manufacturer's guidelines.

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

STORAGE AND SHELF LIFE

Store TECHTHANE 380 containers in a cool, dry area away from potential exposure to high heat, direct sun, high humidity, or large variations in temperature. Under these conditions, the shelf life of unopened containers is 1 year minimum from date of shipment. Part 'A' is moisture-sensitive - reseal opened containers quickly; purge with nitrogen gas prior to resealing if the contents are not to be used within 24 hours.

SAFETY

TECHTHANE 380 Part 'A' contains isocyanates, 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 www.urethane.com/msds.htm or 888-TECHFACTS / 540-667-2664 (MSDS # 220, 221).

FOR INDUSTRIAL USE ONLY.

a) Figures are based on sprayed specimens of 90–125 mils (2.25–3.10 mm) DFT, cured 7–14 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' sprayed 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) Average weight. Exact weight varies by color choice.

c) Total thickness can be greater by applying thinner coats and/or allowing extra time between each coat. Contact your representative for more information.

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

e) 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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