

# ELASTUFF 504

## ABRASION RESISTANT POLYURETHANE RUBBER

### Technical Data & Application Instructions

#### PRODUCT DESCRIPTION

ELASTUFF 504 is a two-component, high tensile strength polyurethane elastomer coating. This unique thermosetting rubber is especially formulated to achieve outstanding abrasion resistance, superior tensile strength and excellent hydrolytic stability. ELASTUFF 504 is a highly cross-linked coating exhibiting a rapid curing property through the polymerization of isocyanate and amine-terminated reactive ingredients.

#### BASIC USES

ELASTUFF 504 was specifically developed for protecting steel, concrete, and polyesters which are subject to high abrasion and impact conditions. In specific applications ELASTUFF 504 evidences a higher abrasion resistance than steel, while providing excellent release properties. Some of its more basic uses include the following: food and chemical fertilizer storage bins, chutes and conveyors, hopper beds of highway sanding trucks, earth moving buckets, industrial floors and vertical screw elevators.

ELASTUFF 504 has been used extensively in the mining industry for hopper cars, conveyors, filter equipment, and slurry tanks; in the hydroelectric industry for dam gates, trash racks, hydrobins, salt water pumps, water impellers and casings; in the pulp and paper industry for sound deadening of mechanical equipment, deflector panels and ducts; and in the agricultural industry for spiral elevators, nut production sound deadening and abrasion reduction, grape crushing hoppers and collection bins. (Also refer to separate literature entitled "Elastuff Case Histories".)

For specific applications, ELASTUFF 504 can be manufactured in a high durometer version, ELASTUFF 504 HD. This formulation exhibits increased tensile strength and hardness, as well as maximum release properties where required. ELASTUFF 504 can also be manufactured in a Super Slick formulation which exhibits optimum release characteristics.

#### TYPICAL PROPERTIES

- Mixing Ratio:**  
31 Parts A to 1 Part B by volume (31A:1B) Furnished in pre-measured units
- Mixed Usable Pot Life:**  
1 hour at 70°F (21°C), 50% R.H.
- Solids by Weight (Mixed):**  
48% (±2) [ASTM D 2369]
- Solids by Volume (Mixed):**  
43% (±2) [ASTM D 2697]
- Dry Time To Touch:**  
30 to 60 minutes at 75°F (24°C), 50% R.H.
- Cure Time:**  
60% cure: 12 hours  
90% cure: 72 hours  
Cure time at 75°F (24°C), 50% R.H. for 30 dry mils (762 microns)

#### TYPICAL PROPERTIES (CURED)\*

- Tensile Strength:**  
4400 psi (±200) [30.3 MPa]  
[ASTM D 412]
- Elongation:**  
425% (±50)  
[ASTM D 412]
- Tear Strength:**  
475 lbs. per lineal inch (±25) (83.2 kN/m)  
[ASTM D 1004]
- Hardness:**  
85 to 90 Shore A  
[ASTM D 2240]
- Permeance:**  
1.29 Perms at 35 mils; 1.04 Perms at 55 mils  
[ASTM E 398]
- Temperature Limits for Normal Dry Service Conditions:**  
-80°F to 160°F (-62°C to 71°C)

\* Properties measured from Blue Dye air-free films

## PERFORMANCE & ADVANTAGES

1. **Abrasion Resistance:** ELASTUFF 504 is far more resistant to severe abrasion than most other rubber linings and coatings. It surpasses high carbon steel in specific applications. The following is a comparison as tested on the Taber Abraser, using H-10 wheels with 1000 gm. weights at 1000 revolutions. Tested in accordance with ASTM D 4060.

### Weight Loss

AR Plate Steel.....	487 mgs
Boralloy Steel.....	430 mgs
ELASTUFF 504 .....	35-40 mgs

2. **Tensile Strength:** The superior tensile strength of ELASTUFF 504 produces outstanding resistance to abrasion and tearing. Its combination of toughness and high elongation results in excellent flexibility and impact resistance, and assures long lasting protection under severe service conditions.

3. **Elongation:** An excellent balance of elongation and tensile strength properties allows ELASTUFF 504 to expand and contract with the natural thermal variations of substrates at temperatures from -80°F to 160°F (-62°C to 71°C), and assures recovery from indentation and impact.

4. **Low Temperature Flexibility:** ELASTUFF 504 retains its ability to withstand multiple bends without cracking at temperatures to -100°F (-73°C), as tested in a mixture of dry ice and isopropyl alcohol.

5. **Adhesive Strength:** Instron Universal Testing Instrument — ELASTUFF 504 exceeds 32 lbs. per lineal inch (5.6 kN/m) when tested over United's Primer 302 and sandblasted steel. ELASTUFF 504 will reach its maximum elongation point and tear rather than break the adhesive bond to the primed surface. Tested in accordance with ASTM D 903.

ELASTUFF 504 has excellent adhesion to primed steel, stainless steel, aluminum, sealed concrete, masonry, fiberglass and wood. Refer to section entitled **Preparation** for recommended primers.

6. **Resistance to Alkaline Solutions:** 2 months immersion in 10% potassium hydroxide and 10% sodium hydroxide at 75°F (24°C). ELASTUFF 504 showed no visual effects and all elastomeric properties were retained. Tested in accordance with ASTM D 543, ASTM D 412.

7. **High Build Sprayability:** ELASTUFF 504 may be sprayed in several multi-directional coats to quickly develop high film builds. ELASTUFF 504 applied at 100 sq. ft. per gallon yields 6.8 dry mils (173 microns).

8. **Release:** It is difficult for dry foods and chemicals to adhere to the smooth, slick surface of ELASTUFF 504. It provides an excellent release for ice, cement, sand, coal, ores, grains and most chemicals.

9. **U.S.D.A Standards:** ELASTUFF 504 is authorized by the U.S.D.A. for use in Federally Inspected meat and poultry processing plants.

10. **F.D.A. Conformance:** ELASTUFF 504 may be safely used as the food contact surface for bulk quantities of **dry foods** containing no free fat or oil on the surface, according to the F.D.A. "Code of Federal Regulations," paragraph 177,1680 "Polyurethane Resins." Precautions should be taken to assure that all solvents are completely evaporated from the applied film before service contact is made with dry food products.

11. **No Heavy Metals:** ELASTUFF 504 components contain no heavy metals, and therefore will not contaminate water when used in marine or fresh water applications.

## COLORS

ELASTUFF 504 is available in standard **Blue Dye**, **Clear** and five pigmented colors: **Steel Gray**, **Flint Gray**, **Sandstone**, **Tile Red** and **Turf Green**. Limited custom colors are matched by United for the specific application. Color chips or samples must be furnished to United for custom colors.

ELASTUFF 504 **Blue Dye** is used for applications which are not exposed to ultraviolet conditions and where maximum physical properties are required. It also acts as an aid in gauging film thickness during application. The **Blue Dye** color is fugitive and will dissipate upon extended exposure to ultraviolet light. ELASTUFF 504 **Blue Dye** should not be topcoated.

When ELASTUFF 504 **Pigmented** is used for areas constantly exposed to ultraviolet light, some ambering will occur over a period of time. Exterior applications for which aesthetics is a major factor should be topcoated with **Uniflex 255**. Interior applications do not require topcoating.

## **PACKAGING**

**ELASTUFF 504** is a two-component material available in quart cans (0.95 liters), 1-gallon cans (3.8 liters) and 5-gallon pails (19 liters). The Part A containers are short-filled to allow for the addition of the Part B component in the same container. The Part B component is supplied as a pre-measured liquid solution available in 1 ounce jars (for 1 quart kits), 4 ounce cans (for 1 gallon kits) and 20 ounce cans (for 5 gallon kits).

## **MIXING**

Mix appropriate, pre-measured Part B component into Part A container. To avoid the formation of gel particles, it is recommended that the Part A be agitated prior to, as well as during, the addition of Part B. The material shall be thoroughly mixed for 2 to 3 minutes using a power mixer capable of uniformly mixing the entire container. At this point add color concentrate, if desired, and mix for an additional 2 to 3 minutes. Color concentrates are added at the rate of one pint (0.48 liter) of colorant per two gallons (7.6 liters) of mixed **ELASTUFF 504**, or one quart (0.96 liter) per 5 gallon pail (19 liters).

The **ELASTUFF 504** components shall be mixed in the following proportions:

### **Quart Kits:**

Mix one (1) unit of Part B containing 1 ounce (0.03 liter) per one (1) quart can of Part A containing 31 ounces (.92 liter).

### **One Gallon Kit:**

Mix one (1) unit of Part B containing 4 ounces (.12 liter) per one (1) gallon can of Part A containing 124 ounces (3.68 liters).

### **Five Gallon Kit:**

Mix one (1) unit of Part B containing 20 ounces (18.4 liters) per one (1) five gallon pail of Part A containing 620 ounces (18.4 liters).

Mixed usable pot life of the blended Part A and Part B components is 1 hour. Do not reduce the material.

## **STORAGE**

Shelf life of Part A and B components in unopened containers is one (1) year.

Material must be stored at temperatures between 50°F and 80°F (10°C and 27°C). Storage at higher temperatures shortens shelf life. Do not open containers until ready to use the material.

## **SURFACE PREPARATION**

All surfaces must be clean and dry, and free from any moisture, dirt, oil, grease, soapy films, surface chemicals or other foreign contaminants, as well as fabrication defects, sharp projections, ridges and loose aggregate. All previous paints or coatings on the substrate must be completely removed, even those which appear tightly adhered.

## **SURFACE PREPARATION (Cont.)**

The following cleaning procedures are provided for guideline use only. The actual surface preparation procedures which are to be followed for a specific project will depend on actual jobsite conditions. It is suggested that United's Technical Service Department be contacted for recommendations on each specific application. Refer to **ELASTUFF** Surface Preparation Guidelines for more detailed information.

### **STEEL SURFACES**

Steel surfaces must be blast cleaned to either Near-White (SP10) or White Metal (SP5) depending upon the conditions under which **ELASTUFF 504** will be subjected on a specific project.

Excessive rust scale shall be removed by mechanical means prior to blast cleaning. All oil, grease, weld flux and other surface contaminants shall also be removed by use of a solvent wash as defined in SSPC-SP1 solvent cleaning.

The blast cleaned surface shall be primed by the end of the same day, but in any event before any visible rusting or contamination occurs. If rusting or contamination occurs after blast cleaning, the surface shall be reblasted before priming.

### **CONCRETE SURFACES**

Concrete surfaces which are contaminated with oil, grease, dirt, etc. shall be cleaned using **United Cleaning Concentrate** or other biodegradable chemical cleaner and water. Rinse thoroughly with water to remove all traces of the chemical cleaner. High pressure power washing may be necessary to remove strongly adhering contaminants.

New concrete which has a light to medium broom finish shall be cleaned and etched with 10% Muriatic Acid solution. Rinse thoroughly with liberal amounts of fresh water to assure complete acid removal. Concrete surfaces having a smooth, steel trowelled finish must be acid etched or abrasive blasted to achieve a uniform surface profile of 5 to 8 mils. Blasting is the preferred method.

Patch voids and cracks using a patching material which has been approved by United.

Prior to the application of primer or sealer over any substrate, all loose material, foreign objects, dirt and dust shall be removed by use of a power vacuum.

The following primers should be used:

Steel & Stainless Steel: **Primer 302\***

Aluminum: **VBA Primer\***

Concrete, Wood & Fiberglass: **Uni-Tile Sealer\***

\*United may recommend other primers based on specific job requirements.

Refer to individual primer technical data sheets for complete application instructions.

## APPLICATION

**ELASTUFF 504** should be applied using airless spray equipment to obtain the smoothest finish for maximum abrasion resistance and release properties.

For maximum production application, any airless equipment capable of 2,000 psi (13,780 kPa) and 1 gallon per minute (3.8 l/minute) delivery should be used for applying **ELASTUFF 504**. A reversible self-cleaning spray tip with orifice size of .021" to .027" and minimum 40 degree fan angle is recommended.

**ELASTUFF 504** may also be applied using air atomizing spray equipment. Roller or brush is normally used only for limited thin film builds or touch-up work.

Coverage or total dry film thickness required will vary depending upon the type of substrate, its porosity or texture, and the degree of protection desired. The following minimum dry film thicknesses are provided for guideline use only. Due to the fact that each situation will vary in its specific requirements for protection, it is suggested that United's Technical Service Department be contacted for recommendations.

Following are recommended **dry** film thicknesses. **ELASTUFF 504** applied at the rate of one gallon per 100 sq. ft. theoretically yields 6.8 dry mils (173 microns).

### Steel and Concrete Subject to Wet or Dry Abrasion:

1. Lightweight Abrasive Materials:  
31 to 38 mils  
(787 to 965 microns)
2. Lightweight to Medium Abrasive Materials:  
42 to 68 mils  
(1067 to 1727 microns)
3. Heavy Abrasion  
70 to 100 mils  
(1778 to 2540 microns)

**ELASTUFF 504** shall be applied in a minimum of two (2) separate coats to ensure positive coverage and proper film build. Most applications will require 3 or more coats to achieve the required thickness. Successive coats of **ELASTUFF 504** should be applied perpendicular to and as soon as the previous coat has dried to touch. This is normally accomplished within 30 to 60 minutes. If any form of contamination occurs on any coated surface, it must be removed before additional coats are applied. All surfaces must be uniformly coated and free from voids, pinholes and blisters.

## CLEANUP

Clean equipment with MEK (Methyl Ethyl Ketone) or where non-flammable solvent may be desired, use Methylene Chloride. Do not leave Methylene Chloride in fluid hoses or pump for prolonged periods. It can cause swelling and deterioration of hoses and corrosion in the pump. Equipment and lines should then receive a final flush with Mineral Spirits to prevent possible deterioration of equipment and packings.

## LIMITATIONS & PRECAUTIONS

When **ELASTUFF 504 Pigmented** is used for areas constantly exposed to ultraviolet light, it will amber and in some cases should be topcoated. Contact United's Technical Service Department for recommendations.

If **ELASTUFF 504 Blue Dye** is applied in direct sunlight, slight color changes may be detected. This does not affect the physical properties. **ELASTUFF 504** should not be applied if surface temperature is greater than 100°F (38°C).

Keep containers closed to avoid moisture absorption and contamination. For further storage after opening, purge container with dry air or nitrogen, and seal.

Do not apply to damp substrates. Do not normally apply at surface temperatures below 50°F (10°C). Cold temperatures will retard cure. Condensation or frost on substrate will result in a poor, unsatisfactory bond.

Use only in a well ventilated area. Keep away from heat, sparks, open flame or lighted cigarettes. Contact with flame or hot surfaces may convert the Methylene Chloride to a toxic gas.

Avoid breathing of vapor or spray mist. For exterior applications, approved (MSHA/NIOSH) chemical cartridge respirator must be worn by applicator and personnel in vicinity of application. Check filters frequently to ensure proper protection. If used indoors, provide mechanical exhaust ventilation. During indoor spray operations, air line masks or positive pressure hose masks must be worn. Ventilate from lowest level, as vapors are heavier than air. Avoid contact with eyes and skin. Wear coveralls and gloves while working with **ELASTUFF 504**.

**For additional information on safety, refer to OSHA guidelines and ELASTUFF 504 Material Safety Data Sheet.**



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