



# E-TUFF® LV

## Structural Epoxy Adhesive for Gravity Feed or Pressure Injection of Cracks in Concrete

### 1.01 DESCRIPTION

**E-Tuff® LV** is a two component, 100% solids, low viscosity, high modulus, standard pot life, Structural Epoxy Adhesive that meets ASTM C881, Type I, II, IV, V Grade 1, Class B and C and AASHTO M235 Type I, II, IV, V, Grade 1 Class B and C. Designed to bond properly prepared cracked or delaminated concrete, vertical anchor bolts, dowels and rebar to hardened concrete, bonding dissimilar materials, such as, bonding masonry, steel, stone, wood, etc.

**E-Tuff® ULV** (Ultra Low Viscosity) Injection Structural Epoxy Adhesive which meets ASTM C881, Type I, II, IV, V, Grade 1, Class B and C. Available upon request.

**E-Tuff® ULV-LPL Ultra** (Ultra Low Viscosity, Long Pot Life) Injection Structural Epoxy Adhesive which meets ASTM C881, Type I, II, IV, V, Grade 1, Class B and C. Available upon request.

### 1.02 USES

Crack and delamination repair of Portland cement concrete. Use as an anchor adhesive, specifically for bonding bolts, dowels and rebar to hardened, structurally sound concrete. Use to bond dissimilar materials to structurally sound and properly prepared concrete items, such as, bonding masonry, steel, stone and wood. Use as a concrete "healer/sealer", as a horizontal gravity filling of crack repair material. It is highly recommended that U.S. Sieve 60 mesh uniform size, washed, dried and bagged aggregate be broadcast onto the surface.

### 1.03 FEATURES

- Excellent Adhesion
- Excellent Chemical Resistance
- Gravity Feed Or Pressure Inject For Deep Penetration
- High Modulus, High Strength Adhesive
- High Strength, Low Viscosity
- Mix Ratio 2:1 By Volume For Ease Of Use
- Quick Return To Service
- Structural Adhesive
- VOC And EPA Compliant In All States And Provinces In North America.

### 1.04 TECHNICAL DATA

Meets: ASTM C881, Type I, II, IV, V, Grade 1, Class B & C and AASHTO M235, Type I, II, IV, V, Grade 1, Class B & C.

### 1.05 COLOR

Clear Light Amber

### 1.06 PACKAGING

**3-gallon (11.36 liters) kit:** one 2-gallons pail of Side-A (7.57 liters) and one 1-gallon pail of Side-B (3.79 liters)

**15-gallon (56.78 liters) kit:** two 5-gallon pails of Side-A (37.85 liters) and one 5-gallon pail of Side-B (3.79 liters)

### CRACK REPAIR COVERAGE RATE

| Thickness of Crack Depth | Width of Crack | Linear Feet per Gallon |
|--------------------------|----------------|------------------------|
| 6 Inches                 | 0.010 mils     | 320 l/f per gallon     |
| 8 Inches                 | 0.010 mils     | 240 l/f per gallon     |
| 6 Inches                 | 0.020 mils     | 160 l/f per gallon     |
| 8 Inches                 | 0.020 mils     | 120 l/f per gallon     |
| 6 Inches                 | 0.067 mils     | 47.5 l/f per gallon    |
| 8 Inches                 | 0.067 mils     | 35.5 l/f per gallon    |
| Does not include waste   |                |                        |

**150-gallon (56.81 liters) kit:** two 50-gallon drums of Side-A (378.54 liters) and one 50-gallon drum of Side-B (189.27 liters)

**750-gallon (2839.1 liters) kit:** two 250-gallon totes of Side-A (1892.7 liters) and one 50-gallon drum of Side-B (946.35 liters)

### 1.07 ESTIMATED COVERAGE

#### 1.08 HEALER/SEALER COVERAGE

Coverage rate will vary based in method of surface preparation, porosity of concrete and the overall condition to the concrete. The coverage rate historically has been 75-200 sqft/gallon (1.84-4.90 sqm/liter). Place the material by pouring mixed material on concrete substrate, squeegee at coverage rate and scrub into the surface with a stiff bristle brush. For best results allow the material to penetrate for a minimum of 10 minutes and then redistribute the excess with squeegees or a broom leaving the minimum amount of material possible on the surface. Repeat the process if the material is rapidly absorbed. Wait a minimum of 20 minutes and broadcast dry; #20 mesh blasting sand at a rate of approximately 2 lbs/sqyd. Remove excess sand by vacuuming or sweeping prior to opening of traffic.

## ANCHOR ADHESIVE (bolts, dowels and rebar)

| All Dimensions in Inches (Centimeters) |  | Number of Holes per Gallon of Mixed Adhesive |                              |                               |                               |                               |                               |                               |
|--|--|--|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Hole Size Inch<br>(centimeter)         | Bolt, Dowel, Rebar Size Inch<br>(centimeter) | Depth<br>2 Inch<br>(5.08 cm)                 | Depth<br>3 Inch<br>(7.62 cm) | Depth<br>4 Inch<br>(10.16 cm) | Depth<br>5 Inch<br>(12.70 cm) | Depth<br>6 Inch<br>(15.24 cm) | Depth<br>7 Inch<br>(17.78 cm) | Depth<br>8 Inch<br>(20.32 cm) |
| 1/2 inch<br>(1.27 cm)                  | 1/4 inch (0.64 cm)                           | 196  | 131                          | 98                            | 78                            | 65                            | 56                            | 49                            |
|  | 3/8 inch (0.95 cm)                           | 336  | 224                          | 168                           | 134                           | 112                           | 96                            | 84                            |
| 3/4 inch<br>(1.91 cm)                  | 1/2 inch (1.27 cm)                           | 118  | 78                           | 59                            | 47                            | 39                            | 34                            | 29                            |
|  | 5/8 inch (1.59 cm)                           | 214  | 143                          | 107                           | 86                            | 71                            | 61                            | 53                            |
| 1 inch<br>(2.54 cm)                    | 3/4 inch (1.90 cm)                           | 84   | 56                           | 42                            | 34                            | 28                            | 24                            | 21                            |
|  | 7/8 inch (0.88 cm)                           | 157  | 105                          | 78                            | 63                            | 52                            | 45                            | 39                            |

### 1.09 COVERAGE RATE PER GALLON

#### 1.10 MIXING

**Hand Mixing:** Condition material for hand mixing to 65°F to 85°F (18°C to 29°C) for ease of mixing and optimum flow when using. Premix each side for thirty seconds, then place 2 parts by volume Side-A and 1 part by volume Side-B into a clean pail and mix for three minutes at a low speed using a PSI Rapid Pail Mixer or a ½ hp heavy duty drill with a Jiffy type paddle utilizing the PSI 1 Man Stand. Mix only what can be used within its pot life.

**Automatic Mixing:** Condition material for automated mixing per the manufacturer's recommendation or 75°F (23.9°C). Automatic plural component mixing and dispensing equipment. Check to make sure that volume is dispensed at the correct ratio and that the material is thoroughly mixed, before putting the equipment into service. Follow the manufacturer's recommendations.

#### 1.11 CRACK REPAIR PLURAL COMPONENT PUMP

**E-Tuff® LV** should be placed with a variable speed pump with pressure ranging from 20 psi to 300 psi (0.14 MPa to 2.07 MPa).

### APPLICATION

#### 2.01 MECHANICAL MIXING AND APPLICATION

**E-Tuff® LV** resin and hardener can be meter mixed and applied by a truck mounted resin dispensing equipment onto the concrete surface to be treated. Operations shall proceed in such a manner that will not allow the material to separate in the mixing lines, cure, dry, or otherwise impair retention bonding of the surfacing aggregate. The mixed sides shall be applied mechanically onto the prepared concrete surface at a minimum rate of 75-200 sqft/gallon (1.84-4.90 sqm/liter). After allowing to epoxy to penetrate the concrete remove excess epoxy onto untreated surface, followed by broadcasting aggregate 20 to 30 mesh on to surface at 0.5 lbs/sqft (2.4 kgs/ sqm).

#### 2.02 HAND MIXING AND APPLICATION

**E-Tuff® LV** Side-A and Side-B, shall be premixed and proportioned to the correct ratio, 2:1. Mix material using a low speed, high torque drill fitted with a Jiffy type paddle mixer or a helical paddle. This method shall be used where resin dispensing equipment is not available

because of logistics or restrictions. The mixed sides shall be hand applied onto the prepared concrete surface at a coverage rate of 75-200 sqft/gallon (1.84-4.90 sqm/liter), hand applied epoxy shall be uniformly spread onto the substrate surface by means of a notched squeegee, followed by broadcasting aggregate 20 to 30 mesh on to the surface at 0.5 pounds/sqft (2.4 kgs/sqm).

#### 2.03 CURING

**Cold Temperature Formula Available Upon Request.** It is highly recommended that all sides be conditioned in advance of use to 75°F (26.8°C). This may take 48 hours. It is to the contractor's benefit to maintain the sides at elevated temperatures. Lower temperature increases the epoxy adhesive's viscosity and increases curing time.

#### MINIMUM CURING TIME FOR EPOXY BINDER AND AGGREGATE

|               |           |
|---------------|-----------|
| 60°F (15.6°C) | 6 Hours   |
| 65°F (18.3°C) | 5 Hours   |
| 70°F (21.1°C) | 4 Hours   |
| 75°F (23.9°C) | 3 Hours   |
| 80°F (26.7°C) | 2.5 Hours |

#### 2.04 CLEAN UP

Clean tools before the epoxy adhesive sets up using acetone or PSI's EnviroClean™.

#### 2.05 STORAGE AND SELF LIFE

The material should be stored between 40°F to 95°F (5°C to 35°C), in a dry and out of direct sunlight. The shelf life of properly stored and unopened containers is 24 months. Excessive temperature differential and/or high humidity can shorten the self-life.

#### 2.06 LIMITATIONS

- Do not place on magnesium phosphate cement concrete.
- Do not thin with solvent. Solvent will prevent proper cure.
- Do not use wet aggregate. Aggregate must be clean, dry and bagged.
- Maximum substrate temperature is 150°F (65.6°C).



- Minimum substrate temperature is 50°F (10°C).

## 2.07 SAFETY

- Eyes: Hold eyelids apart and flush thoroughly with water for 15 minutes.
- Skin: Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water.
- Inhalation: Remove person to fresh air.
- Ingestion: Do not induce vomiting. In all cases, contact a physician immediately if symptoms persist.
- SDS: Obtain, read and understand the Safety Data Sheet before use of this or any other Poly-Tuff System International products.
- Do not take internally.

## 2.08 CAUTION

- Side A – Irritant
- Side B – Corrosive
- Product is a strong sensitizer
- Use with adequate ventilation
- Wear protective clothing, gloves and appropriate eye protection (safety glasses, goggles or face shield)
- Do not take internally

**READ SDS PRIOR TO USING PRODUCT. FOR PROFESSIONAL USE ONLY. KEEP OUT OF REACH OF CHILDREN. MADE IN THE USA.**

### PHYSICAL PROPERTIES AT 79°F (26°C)

|   |                          |                          |
|---|--------------------------|--------------------------|
| VOC (Volatile Organic Compounds)<br>(VOC Calculated Per ASTM D3960) | 0 gr./lt.                |                          |
| Standard Viscosity, Mixed Epoxy and Hardener s                      | 350 cps                  |                          |
| Mix Density Clear, Mixed Epoxy and Hardener                         | 9.0 lbs./gal             |                          |
| Gel Time, ASTM D2471 (60 grams)                                     | 50°F(10°C)<br>35 minutes | 79°F(26°C)<br>14 minutes |
| Mix Ratio, by Volume  | 2:1                      |                          |
| Shelf Life (shipped and stored) at 40°F to 100°F<br>(4.4°C to 38°C) | 1.5 Years                |                          |
| Packaging 3 and 15 gal. (11.4 and 56.8 liters)                      |                          |                          |

### MECHANICAL PROPERTIES AT 79°F (26°C)

|   |                         |
|---|-------------------------|
| Surface Preparation ICRI 310.2R<br>Concrete Surface Profile (CSP 2 and above) Depending on System to be Installed<br>and Condition of Concrete. |                         |
| Resin and Hardener  | Standard                |
| Bonding New to Existing Concrete ACI 548  | Meets                   |
| Compressive Strength, ASTM D695   | 16,000 psi (110 MPa)    |
| Compressive Modulus, ASTM D695  | 550,000 psi (3,790 MPa) |
| Tensile Strength, ASTM D638   | 10,000 psi (69 MPa)     |
| Tensile Elongation, ASTM D638   | 1.5%                    |
| Flexural Strength, ASTM D790  | 12,500 psi (86 MPa)     |
| Flexural Modulus, ASTM D790   | 500,000 psi (3450 MPa)  |
| Adhesion ASTM D7234, Concrete Failure   | >400 psi (>2.76 MPa)    |
| Bond Strength Slant Shear ASTM C882,<br>100% Concrete Failure, 14 Days at 60°F (15.6°C)   | 2,500 psi (17 MPa)      |
| Heat Deflection Temperature, ASTM D648  | >120°F (>48.9°C)        |
| Hardness (Shore D), ASTM D2240  | 80 – 85                 |
| Water Absorption, ASTM D570   | <0.1%                   |
| Flame Test, ASTM E648   | Class 1                 |
| Microbial (fungi) Resistance ASTM G21<br>(Without the Anti-Microbial Agent)   | Pass #1                 |

Please read all information in the General & Safety Guidelines, Technical Data Sheets, Guide Specifications and Safety Data Sheets (SDS) before applying material. PSI Products are for "Professional Use Only" and preferably applied by professionals who have prior experience with PSI Products or have undergone training in application of PSI Products. Published technical data and instructions are subject to change without notice. Contact your local PSI representative or visit our website for current technical data, instructions, and project specific recommendations.

**LIMITED WARRANTY**

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**DISCLAIMER**

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