

ETI-LV

Low-Viscosity Structural Injection Epoxy

SIMPSON

Strong-Tie

®

CSI Specification: 03.01.00 Maintenance of Concrete

DESCRIPTION

ETI-LV Low-Viscosity Structural Injection Epoxy is a two-component, high-solids, moisture-tolerant epoxy specially designed for pressure injection of concrete cracks. ETI-LV is ideal to increase the bond between freshly placed repair mortars or concrete mixes and existing concrete. It is available in side-by-side cartridges and bulk packaging.

SPECIFICATION COMPLIANCE

Meets the requirements of ASTM C881 Type I and IV, Grade 1. Approved under NSF/ANSI Standard 61 (22 in²/1000 gal).

ASSESSMENT

WHERE TO USE

- As a low-viscosity epoxy (1,790 cps) for repair of fine to medium width cracks 1/64"–1/4" (0.4 – 4 mm) in width
- For structural repairs
- For underwater pressure-injection applications
- As an epoxy resin binder for epoxy repair mortar patching
- To bond new concrete or repair mortars to existing concrete

FEATURES

- Chemically bonds with the concrete to provide a structural repair. ETI-LV seals the crack from moisture, protecting rebar in the concrete from corrosion.
- Moisture-tolerant, can be used on dry and damp surfaces
- Low surface tension allows the material to effectively penetrate narrow cracks
- Formulated for maximum penetration under pressure
- Suitable for pressure injection or gravity-feed applications
- Non-shrink and resistant to oils, salts, and mild chemicals
- Can be used with metered pressure-injection equipment

PRODUCT DATA

All testing performed at 73°F (23°C) and 50% R.H.

Generic Description

Epoxy resin

Packaging

22 fl. oz. (650 mL) dual cartridge (ETI-LV22)

2 US gallon (7.6 L) kit (ETI-LVKT2) contains:

- 1 US gallon (3.7 L) can of Component "A" (ETILV-1A)
- 1 US gallon (3.7 L) can of Component "B" (ETILV-1B)

10 US gallon (37.9 L) kit (ETI-LVKT15) contains:

- 5 US (18.9 L) gallon pail of Component "A" (ETILV-5A)
- 5 US (18.9 L) gallon pail of Component "B" (ETILV-5B)

100 US gallon (379 L) kit (ETI-LVKT150) contains:

- 50 US gallon (189.3 L) drum of Component "A" (ETILV-50A)
- 50 US gallon (189.3 L) drum of Component "B" (ETILV-50B)

Color

Mixed Epoxy: Clear Amber

Mixing Ratio

1A:1B by volume

Product Yield

231 in.³/US gal. (0.001 m³/L) neat 300–600 in.³/US gal. (0.0013–0.0026 m³/L) when mixed 1–3 parts by volume with FX-701 Oven-Dried Graded Silica Filler

For flood-coat applications:

150–200 ft.²/US gal. (3.6–4.9 m²/L) depending on surface profile and porosity

Cure Times:

Initial Cure 24 hours
Full Cure 7 days

Storage

Store dry between 45° and 90°F (7°–32°C).

Shelf Life

2 years in unopened packaging

VOC

6 g/L (mixed)

TECHNICAL INFORMATION

All testing performed at 73°F (23°C) and 50% R.H. and applies to Clear formula only

Viscosity

ASTM D2393

1,790 cps

Bond Strength (moist cure)

ASTM C882

2 days 2,500 psi 17.2 MPa

14 days 2,530 psi 17.4 MPa

Tensile Strength, 7 days

ASTM D638

7,470 psi 51.5 MPa

Tensile Elongation at Break

ASTM D638

7.7%

Compressive Yield Strength, 7 days

ASTM D695

12,480 psi 86.0 MPa

Compressive Modulus

ASTM D695

342,000 psi 2,358 MPa

Deflection Temperature

ASTM D648

130°F (54°C)

Water Absorption, 24 hours

ASTM D570

0.76%

Linear Coefficient of Shrinkage

ASTM D2566

0.004

Gel Time, 60 gram mass

ASTM C881

68 minutes

Chemical Resistance

Very good to excellent against distilled water, inorganic acids, and alkalis. Fair to good against organic acids and alkalis, and many organic solvents. Poor against ketones.

LIMITATIONS

- For optimal product performance, do not apply to surfaces below 40°F (4°C) or above 90°F (32°C)
- Material is a vapor barrier after cure
- Not for use on exterior slab on-grade coating applications
- For use in non-moving cracks only
- Product may discolor if exposed to direct sunlight
- Not for use in actively leaking or seeping cracks
- Remove active hydrostatic pressure before attempting injection
- Not recommended for large exterior repairs or applications subject to large thermal change when used as a repair mortar
- For cracks wider than ¼ in. (6 mm), consult a qualified engineer
- When used as a repair mortar binder, minimum application thickness is ½ in. (13 mm)
- When used as a binder, use FX-701 Oven-Dried, Graded Silica Filler to prevent encapsulating moisture
- When used as a bonding agent, repair mortars and concrete mixes must be applied while ETI-LV is still wet

Please note: This product has not been evaluated for resisting long-term sustained loads in anchor applications. Refer to the current *Anchoring and Fastening Systems for Concrete and Masonry* catalog or strongtie.com for code-listed structural anchoring adhesives.

SURFACE PREPARATION

Concrete surface must be sound, clean, and free of all contaminants that could impair product adhesion, bond, or performance. Concrete should be a minimum of 28 days old or substantially cured to the equivalent design strength prior to ETI-LV installation. Prepare concrete in accordance with ICRI Guideline 310.2 CSP 5-9, taking care to avoid microcracking. Remove all loose or deteriorated concrete by chipping hammer, water jetting, or other mechanical means to achieve an open pore structure and sound concrete surface. Remove all cleaning media and debris by vacuum or blowing with high-pressure, oil-free air.

Forming: Form area to be grouted with a single head box. Forms must be liquid tight to prevent grout leakage during installation. Use appropriate sealants or putties to seal all surfaces to prevent leaks. Use an appropriate release agent prior to erecting forms to improve release. Do not allow release agent to be applied to any non-formed surfaces as it can inhibit the bond of the grout. Do not extend form edges more than 4 in. (101.6 mm) beyond the plate.

Repair Mortar: Prepare the surface by abrasive blasting or other mechanical means to achieve an open pore structure and profile per ICRI Guideline 310.2 CSP3-6. Prepare the repair area in accordance with ICRI Guideline No. 310.1R, taking care to avoid microcracking. Prime exposed reinforcing steel with either FX-406 or FX-408 zinc-rich primers.

Pressure Injection: Prepare surface area around crack by abrasive blasting or other mechanical means, taking care not to impact any debris into the crack. Blow out the crack with 80 psi (min.) oil-free, compressed air to remove any visible debris. For surface mounted ports, use a suitable paste-over material such as SET, CIP or FX-763 to adhere the ports to concrete surface. For drill-in ports, drill the appropriate sized hole and set. Paste over and seal the entire crack, and port bases using a putty knife. Apply the paste-over material at a minimum thickness of ⅜ in. (47 mm) and 1 in. (25 mm) wide. Cover port bases with a minimum thickness of ¼ in. (6 mm) and extend the paste-over at least 1 in. (25 mm) beyond the base of the port. If possible, seal the backside of the crack. Allow paste-over material to fully cure before injecting.

MIXING

For optimal product performance, condition individual components to 70°F (21°C) and stir thoroughly prior to use. Do not prepare more material than can be used within the pot life of the product.

For Neat Resin: Proportion components at a 1A:1B ratio by volume in a clean pail or use calibrated mixing equipment. Mix thoroughly with a low-speed (300–600 rpm) drill and mixing paddle for 2–3 minutes, scraping unmixed material from sides and bottom of mixing container as needed to achieve a uniform consistency. Avoid entrapping air into mixture.

For Repair Mortar: Mix neat resin as stated above, then add 1–3 parts of FX-701 by volume slowly, to avoid clumping, while continuing to mix for approximately 2–3 minutes or until a uniform consistency is achieved, scraping the pail as needed. For large batches, mix neat resin as stated above, then transfer the mixed liquid to a mortar mixer and add 1–3 parts of FX-701 by volume, and continue mixing for 2–3 minutes or until a uniform consistency is achieved. Do not thin ETI-LV.

Dual Cartridges: Hold cartridge upright, unscrew retaining nut and remove plugs. Attach Simpson Strong-Tie EMNO22 mixing nozzle (included) to the top of cartridge and secure with retaining nut. Insert cartridge into dispensing tool. When using a pneumatic dispensing tool, regulate air pressure to 80–100 psi. **IMPORTANT:** Cartridge must be equalized prior to use. Failure to follow these instructions can result in product not properly curing. To ensure proper mixing ratio, orient the cartridge and tool in an upward direction so any entrapped air can escape into the mixing nozzle. Begin by squeezing the trigger on the tool until the mixing nozzle is completely full. Once full, re-orient the cartridge and tool to the side and dispense 3 full trigger pulls (approximately ½ fl. oz./30 mL) and ensure all air bubbles are out of the cartridge before beginning the injection process. Repeat if necessary. Dispose of unmixed adhesive in accordance with local regulations. When properly mixed, ETI-LV will be a uniform amber color. Modification or improper use of mixing nozzle may impair adhesive performance. To store partially used cartridges, leave hardened nozzle in place. To re-use, attach new nozzle. Adhesive will start to gel in the nozzle if allowed to stand beyond the listed pot life. Adhesive will gel faster at higher temperatures. Material under pressure can blow out the back of the cartridge if the adhesive in the nozzle hardens.

APPLICATION

Remove all standing water by vacuum or blowing with oil-free, compressed air prior to installation. ETI-LV can be installed on damp or dry surfaces. Do not install through standing water. Avoid installing at high temperatures or windy conditions to maximize open time. Avoid applying in direct sunlight.

For Dowel Grouting: Fill hole by pumping or pouring properly mixed grout approximately $\frac{1}{2}$ to $\frac{3}{8}$ full. If pumping, withdraw nozzle as the hole fills up, taking care to avoid entrapping air. Insert clean, oil-free dowel, turning slowly until it contacts the bottom of the hole. Strike off any excess material with a steel trowel. Do not disturb until fully cured.

For Pressure Injection: With all ports open, begin injecting ETI-LV at the lowest port and work your way up. For horizontal applications, choose one end of the affected site and work your way to the other end. Begin pumping ETI-LV into the first port to establish flow. If the next port shows material, close that port and continue pumping until the first port refuses material. If the first port refuses material prior to showing at the next port, close the first port and re-establish flow at the second port. Repeat until all ports refuse material. When injection is complete, and following initial set time, remove installation ports and seal holes with FX-922 Plug and Fast Set or FX-763 Low-Modulus Trowel-Grade Epoxy. Remove cured paste-over epoxy by mechanical means.

For Repair Mortar: Pour mixed material into repair area. Screed and vibrate if necessary. Finish with wood float or steel trowel. Allow ETI-LV to fully cure to its design strength prior to placing into service. ETI-LV repair mortar can be applied to dry or damp (SSD) surfaces. Do not apply to wet surfaces or through standing water.

Do not apply in direct sunlight and protect from large temperature variations for 48 hours following installation.

As a Bonding Agent: Apply ETI-LV by brush, roller, spray, or squeegee at a rate of 60–100 ft.²/US gal. (1.5–2.5 m²/L), depending on surface profile and porosity. Immediately install repair materials or concrete mix into wet ETI-LV. Do not allow ETI-LV to dry or become tack-free before concrete or mortar installation. If ETI-LV does dry or becomes tack-free, abrade surface and recoat. Do not apply more bonding agent than can be effectively covered with repair mortars or concrete mixes while remaining wet.

WARNING

Resin: WARNING! Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. Toxic to aquatic life with long-lasting effects.

Hardener: DANGER! Combustible liquid. Harmful if swallowed. Harmful in contact with skin. Harmful if inhaled. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Toxic to aquatic life with long-lasting effects.

Protective Measures: The use of safety glasses and chemical-resistant gloves is recommended. Use appropriate clothing to minimize skin contact. The use of a NIOSH-approved respirator is required to protect respiratory tract when ventilation is not adequate to limit exposure below the PEL. Refer to Safety Data Sheets (SDS) available at strongtie.com/sds for detailed information.

FIRST AID

Eye Contact: Hold open eyes under running water for 15 minutes. Seek medical advice.

Skin Contact: Wash skin with soap and water. Seek medical advice if irritation develops.

Inhalation: Remove victim to fresh air. If necessary, use artificial respiration. Seek medical advice.

Ingestion: If product is swallowed, call physician or poison control center. Do not induce vomiting, or give diluents to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice.

CLEAN-UP

Spills: Construct a dike to prevent spreading. Soak up with absorbent material such as clay, sand, or other non-reactive material. Place in leak-proof containers. Keep out of sewers, storm drains, surface waters, and soils.

Surface Area: Wipe up uncured material with cotton cloths. If desired, scrub area with abrasive, water-based cleaner and flush with water. If approved, solvents such as FX-Epoxy Cleaner, ketones (MEK, acetone, etc.), or adhesive remover can be used. Cured material can only be removed by mechanical means.

Tools and Equipment: Remove uncured material with FX-Epoxy Cleaner, ketones (MEK, acetone, etc.), or adhesive remover. Cured material can only be removed by mechanical means.

Skin: Use a non-toxic pumice-based soap, citrus-based hand cleaner or waterless hand-cleaner towel. Never use solvents to remove product from skin.

Disposal: Dispose of container and unused contents in accordance with federal, state, and local requirements. Containers may be recycled; consult local regulations for exceptions.

LIMITED WARRANTY

This product is covered by the Simpson Strong-Tie RPS Product One-Year Limited Warranty, which is available at strongtie.com/limited-warranties or by calling Simpson Strong-Tie at (800) 999-5099.

Distributor

IMPORTANT INFORMATION

It is the responsibility of each purchaser and user of each product to determine the suitability of the product for its intended use. Prior to using any product, consult a qualified design professional for advice regarding the suitability and use of the product, including whether the capacity of any structural building element may be impacted by a repair. As jobsite conditions vary greatly, a small-scale test patch is required to verify product suitability prior to full-scale application. The installer must read, understand and follow all written instructions and warnings contained on the Limited Warranty, product label(s), Product Data Sheet(s), Safety Data Sheet(s) and the strongtie.com website prior to use. For industrial use only by qualified applicators. KEEP OUT OF REACH OF CHILDREN!

WARNING! Cancer and reproductive harm — www.P65Warnings.ca.gov.