

# CI-LPL

Long Pot Life Structural Injection Epoxy



CSI Specification: 03 01 00 Maintenance of Concrete

## DESCRIPTION

CI-LPL Long Pot Life Structural Injection Epoxy is a two-component, high-solids, moisture-tolerant epoxy specially designed for pressure injection and gravity feeding of concrete cracks.

## SPECIFICATION COMPLIANCE

- Meets the requirements of: ASTM C881 & AASHTO M235, Type I/IV, Grade 1, Class C<sup>1</sup>

ASSESSMENT

## WHERE TO USE

- Pressure-injection of cracks in structural concrete
- Gravity-feed of cracks in horizontal concrete
- As a low-viscosity epoxy (2,000 cP) for repair of fine to medium width cracks 1/64"–1/4" (0.4–6 mm) in width
- For structural repairs
- For underwater pressure-injection applications

## FEATURES

- Chemically bonds with the concrete to provide a structural repair. CI-LPL 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 at elevated temperatures 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
- Formulated for use in hot environments to 110°F (43°C)
- Freeze-thaw resistant

## PRODUCT DATA

### Generic Description

Epoxy resin

### Packaging

32 fl. oz. (946 mL) dual cartridge (CILPL32), 5/carton;

3 US gallon (11.4 L) bulk kit (CILPL3KT) contains:

- (2) 1 US gallon (3.8 L) cans of Component "A" (CILPL1A)
- 1 US gallon (3.8 L) can of Component "B" (CILPL1B)

### Cured Color

Amber

### Shelf Life

2 years in unopened packaging

### Storage

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

### VOC

<1 g/L (mixed)

## APPLICATION DATA

Mixing Ratio	2:1
Yield	231 in. <sup>3</sup> /US gal. (0.001 m <sup>3</sup> /L)
Pot Life, 1 Quart	20 minutes at 95°F (35°C) 60 minutes at 72°F (22°C)
Thin Film (5 mil) Cure Time at 95°F (35°C), ASTM D5895	Set to Touch: 3:00 hours Dry Through: 4:00 hours
Thin Film (5 mil) Cure Time at 72°F (22°C), ASTM D5895	Set to Touch: 6:30 hours Dry Through: 16:30 hours

1. Installation temperature under damp conditions for crack injection 72°F–110°F (22°C–43°C).



## TECHNICAL INFORMATION

### Compressive Strength

	60°F (16°C) psi (MPa)	72°F (22°C) psi (MPa)	90°F (32°C) psi (MPa)	110°F (43°C) psi (MPa)	Test Standard
8-hour cure	—	—	6,900 (47.6)	10,000 (70.0)	ASTM D695
16-hour cure	—	—	9,900 (68.3)	10,100 (69.6)	
24-hour cure	—	6,800 (46.9)	10,900 (75.2)	10,200 (70.3)	
3-day cure	8,450 (58.3)	9,900 (68.3)	11,200 (77.2)	10,200 (70.3)	
7-day cure	10,400 (71.7)	10,800 (74.5)	11,200 (77.2)	10,200 (70.3)	
14-day cure	11,600 (80.0)	11,500 (79.3)	11,200 (77.2)	10,200 (70.3)	
28-day cure	12,000 (82.7)	11,700 (80.7)	11,400 (78.6)	10,400 (71.7)	

Temperature Range	60°F (16°C)	72°F (22°C)	95°F (35°C)	Test Standard
<b>Epoxy Classification</b>	Types I, IV; Grade II (MV) <sup>1</sup>	Types I, IV; Grade I (LV) <sup>1</sup>		ASTM C881
<b>Viscosity, Mixed</b>	3,600 cP	2,000 cP	750 cP	ASTM D2556
<b>Gel Time, 60 gram mass</b>	420 minutes	135 minutes	40 minutes	ASTM C881
<b>Bond Strength, Slant Shear:</b>				
Hardened to Hardened Concrete, 2-day cure	3,000 psi <sup>2</sup> (20.7 MPa)	—	1,300 psi (9.0 MPa)	ASTM C882
Hardened to Hardened Concrete, 3-day cure	—	1,375 psi (9.5 MPa)	—	
Hardened to Hardened Concrete, 14-day cure	—	1,500 psi (10.3 MPa)	—	
<b>Tensile Strength, 7-day cure</b>	7,100 psi (49 MPa)	8,000 psi (55.2 MPa)	8,300 psi (57.2 MPa)	ASTM D638
<b>Elongation at Break, 7-day cure</b>	2.52%	3.41%	3.21%	ASTM D638
<b>Flexural Strength, 7-day cure</b>	—	11,400 psi (78.6 MPa)	—	ASTM D790
<b>Modulus of Elasticity in Compression, 7-day cure</b>	345,000 psi (2,378.7 MPa)	349,000 psi (2,406.3 MPa)	365,000 psi (2,516.6 MPa)	ASTM D695
<b>Heat Deflection Temperature, 7-day cure</b>		122°F (50°C)		ASTM D648
<b>Glass Transition Temperature, 7-day cure</b>		135°F (57°C)		ASTM E1356
<b>Water Absorption, 7-day cure</b> <sup>3</sup>		0.07%		ASTM D570
<b>Linear Coefficient of Shrinkage</b>		0.001 in./in. (0.001 cm/cm)		ASTM D2566
<b>Coefficient of Thermal Expansion</b>		2.92 x 10 <sup>-5</sup> in./(in.°F) (5.26 x 10 <sup>-5</sup> cm/(cm°C))		ASTM C531
<b>Shore D Hardness, 24-hour cure</b>		78		ASTM D2240
<b>Shore D Hardness, 7-day cure</b>		80		ASTM D2240
<b>Adhesion to Concrete, 24-hour cure</b>		1,250 psi (8.8 MPa)		ASTM D7234

1. Installation under damp conditions 72–110°F (22–43°C)  
2. Tested using dry test specimens

3. Cured at 72°F (22°C), immersed in water 24 hours

TECHNICAL INFORMATION

PLANNING

## LIMITATIONS

- For optimal product performance, do not apply to dry surfaces below 60°F (16°C), damp surfaces below 72°F (22°C), or to surfaces above 110°F (43°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
- For cracks wider than ¼ in. (6 mm), consult a qualified engineer

## SURFACE PREPARATION

**Gravity Feed Crack Repair:** Crack and surrounding surface must be sound, clean and free of all contaminants that could impair product adhesion, bond or performance. If possible seal backside of crack. Open the crack with an abrasive or diamond blade to create a reservoir for the epoxy. Blow out the crack with 80 psi (550 kPa) (min.) oil-free, compressed air to remove any visible debris.

**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 (550 kPa) (min.) oil-free, compressed air to remove any visible debris. For surface mounted ports, use a suitable paste-over material such as CIP-LO, CIP-F, ETR16, 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 3/16 in. (4.8 mm) and 1 in. (25 mm) wide. Cover port bases with a minimum thickness of 1/4 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 Neat Resin:** 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. Proportion components at a 2A: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.

**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 (550–690 kPa). **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 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, CI-LPL 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

**Gravity Feed Crack Repair:** Slowly pour or dispense epoxy into the crack/reservoir. Continue pouring until completely filled. Monitor and maintain fill level as epoxy penetrates the substrate.

**For Pressure Injection:** With all ports open, begin injecting CI-LPL 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 CI-LPL 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. If desired, remove cured paste-over epoxy by mechanical means.

## WARNING

**Resin:** WARNING! Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction.

**Hardener:** DANGER! Causes severe skin burns and eye damage. May cause an allergic skin reaction.

**Protective Measures:** The use of chemical splash goggles or safety glasses with side shields 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](http://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 ketones (MEK, acetone, etc.), or adhesive remover can be used. Cured material can only be removed by mechanical means.

**Tools and Equipment:** 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 ketones (MEK, acetone, etc.), or adhesive remover can be used. 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](http://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](http://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](http://www.P65Warnings.ca.gov).