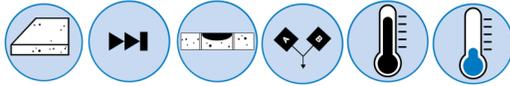


CRACKBOND® CSR



Product Description

CRACKBOND® CSR is a two-component, polyurethane hybrid specially designed with an ultra-low viscosity providing a quick repair of hairline cracks and spalls in concrete. With its fast curing properties, it is perfect for use when minimal downtime is required and rapid return-to-service is needed, and can be used in temperatures from 0 °F to 110 °F (-18 °C to 43 °C).

General Uses & Applications

- Used to quickly repair interior/exterior hairline cracks
- Spall repair when mixed with aggregate
- Industrial floor repair applications with high volume traffic
- Parking structures and concrete bridge repair

Advantages & Features

- Self-leveling, ultra-low viscosity providing deep penetration resulting in a superior bond
- Reaches over 4,500 psi (31 MPa) compressive strength in one hour
- Easy 1:1 mix ratio
- Available in 9 and 22 oz. cartridges as well as 2 gallon kits
- May be used with powder pigments for color matching
- Wide temperature application range between 0 °F to 110 °F (-18 to 43 °C)
- Repaired cracks and spalls can be opened to traffic in less than 60 minutes at 77 °F (25 °C)

Availability: Adhesives Technology Corp. (ATC) products are available online and through select distributors, providing you with all of your construction needs. Please contact ATC for a distributor near you or visit www.atcepoxy.com for online purchasing options or to search for a distributor by zip code.

Color & Ratio: Part A (Resin) Amber; Part B (Hardener) Black, Mix Ratio: 1:1 by volume, Mixed Color when cured - Gray

Storage & Shelf Life: For best results, store between 40 °F (4 °C) and 90 °F (32 °C). Shelf life is 12 months when stored in unopened containers in dry conditions.

Installation: Manufacturer's Printed Installation Instructions (MPII) are available within this Technical Data Sheet (TDS). Due to occasional updates and revisions, always verify that you are using the most current version of the MPII. In order to achieve maximum results, proper installation is imperative.

Clean Up: Always wear appropriate protective equipment such as safety glasses and gloves. Clean uncured materials from tools and equipment using mild solvent. Cured material can only be removed mechanically.

Limitations & Warnings:

- Do not thin with solvents, as this will prevent cure
- NOT intended for repairing cracks subject to movement (eliminate the cause of cracking prior to repair)
- NOT intended for aesthetic finishes as product may develop a greenish tint from UV exposure or may cure with an uneven color with swirls or marbling - when cured it can be coated or painted to meet desired appearance (see MPII)
- New concrete should be a minimum of 21 days old prior to crack repair
- Cartridge balancing and crack or spall repair instructions must be followed closely
- Additional care should be taken when injecting into cracks below grade and/or below 32 °F (0 °C)
- This product is highly sensitive to and reactive with moisture and therefore, the cementitious substrate **must be completely dry** prior to application (see MPII for further details)

Safety: Please refer to the Safety Data Sheet (SDS) for CRACKBOND CSR published on ATC's website or call 1-800-892-1880 for more information.

Specification: The crack or spall repair material shall be a two-component, 1:1 ratio, solvent free polyurethane system. When cured 7 days and at a temperature of 75 °F (24 °C), the polyurethane material must have a minimum tensile strength of 3,016 psi (20.8 MPa), and a 1 hour compressive strength (neat) of 4,629 psi (31.9 MPa) per ASTM D695. Cured adhesive shall have a minimum Shore D hardness of 65 per ASTM D2240. Material shall be CRACKBOND CSR from Adhesives Technology Corp., Pompano Beach, Florida.

ORDERING INFORMATION

TABLE 1: CRACKBOND CSR Adhesive, Dispensing Tools and Mixing Nozzles^{1,2}

Package Size	8.6 oz. (254 ml) Cartridge	21.2 oz. (627 ml) Cartridge	2 Gallon (7.6 L) Kit
CSR Part #	A9-CSRHN	A22-CSRN	B2G-CSR
Manual Dispensing Tool	TM9HD	TM22HD	N/A
Pneumatic Dispensing Tool	N/A	TA22HD-A	
Case Qty.	12	12	1
Pallet Qty.	1,116	576	63 kits
Pallet Weight (lbs.)	1,056	1,152	1,256
Recommended Mixing Nozzle	T12CSREZ	T12CSREZ	N/A



1. Call for bulk packaging availability and lead times.
2. Part #'s ending in "N" are packaged with mixing nozzle, one per cartridge.

MATERIAL SPECIFICATION

TABLE 2: CRACKBOND CSR performance to ASTM C881-15¹

Property	Cure Time	ASTM Standard	Units	Sample Conditioning Temperature
				75 °F (24 °C)
Gel Time - 60 Gram Mass 77 °F (25 °C)	----	C881	min	2
Gel Time - 60 Gram Mass 30 °F (-1 °C)				7
Mixed Viscosity ²			cP	60
Tack-Free Time ³		D2377	min	< 10
Compressive Strength	Neat	D695	psi (MPa)	4,629 (31.9)
				24 hr
	Aggregate ⁴	D695	psi (MPa)	4,052 (27.9)
				24 hr
Tensile Strength	7 day	D638	psi (MPa)	3,485 (24.0)
Tensile Elongation			%	18
Bond Strength	2 day	C882	psi (MPa)	1,894 (13.1)
Shore D Hardness ³	1 day	D2240	----	70
Die C Tear ³	----	D624	PLI	243

1. Results based on testing conducted on a representative lot(s) of product. Average results will vary according to the tolerances of the given property.
2. Mixed viscosity measured at 30 seconds.
3. Property not referenced in ASTM C881 and may vary with temperature and thickness.
4. ASTM C778 (20-30) sand, 2:1 mix ratio (sand:mixed epoxy).

TABLE 3: CRACKBOND CSR CURE SCHEDULE^{1,2,3}

Base Material Temperature	Working Time	Full Cure Time
°F (°C)		
0 (-18)	11 min ⁴	24 hr
30 (-1)		4 hr
75 (24)	2 min	1 hr
110 (43)	1 min	

1. Working and full cure times are approximate, may be linearly interpolated between listed temperatures and are based on cartridge/nozzle system performance.
2. Application Temperature: Substrate and ambient air temperature should be from 0 to 110 °F (-18 to 43 °C).
3. All tests performed in a neat condition, without aggregate added.
4. Cartridge and nozzle should be maintained at temperatures above 30 °F (-1 °C) while in use.

INSTALLATION INSTRUCTIONS (MPII)

General Information

NOTE: Reaction with trace amounts of moisture may cause CSR to expand, create a foam and could raise the product as it cures above the substrate's surface that may require shaving with a stiff metal scraper, floor knife or grinding flush with a flap wheel.

- Product is initially dark gray/black when mixed, but will turn gray upon curing
- Many applications are finished by sanding or grinding the surface smooth
- Always wear proper personal protective equipment, such as safety goggles, dust mask/respirator and gloves while sanding or grinding (see Safety Data Sheet)
- INTERIOR APPLICATIONS: Some color variation may occur during the curing process
- EXTERIOR APPLICATIONS: Product may develop a greenish tint after cure due to UV exposure; Application of a coating, paint or industrial grade primer is an option for improving aesthetic appearance
- Always complete a compatibility test on a small area prior to full application of any coating

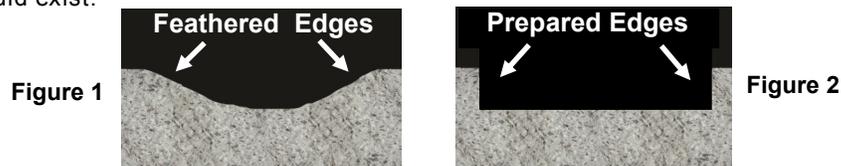
Crack Repair Preparation

1. Prepare crack or spall prior to starting a cartridge or mixing bulk product.
2. New concrete should be a minimum of 21 days old.
3. Clean the crack by wire brushing.
4. Blow out with compressed air; repeating until free of dirt and debris deep into the crack.
5. It is not necessary to open or widen a crack unless you suspect it is very deep and want to insert backer rod or kiln-dried sand to control loss of product deep into the crack.

Spall Repair Preparation

1. A dry diamond blade, tuck point blade or masonry blade may be used to prepare the spall and create a clean bonding surface.
2. A wire brush or twisted wire wheel may be used to remove any loose concrete or dirt.
3. Avoid feathered edges (see Figure 1) which leave the edges of concrete thin and prone to cracking and deterioration.
4. The edges must be ground at a 90° angle to the surface (see Figure 2).
5. Use compressed air or vacuum, blow out or remove all dust, dirt, debris, oil and any other contaminant from the crack.
6. Minimum spall depth across the entire repair area should be 1/2 in. (13 mm) when applying mortar or neat material.

NOTE: No high spots should exist.



Cartridge Preparation



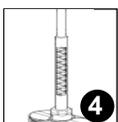
Shake the cartridge vigorously for 20 seconds, then stand cartridge upright for at least 1 minute allowing any bubbles to rise to the top.



Insert cartridge into the dispenser. Make sure it is properly positioned with the shoulder of the cartridge flush with the front/top bracket of the dispenser. Point upward at about a 45° angle.



Remove the plastic cap and plug from the top of the cartridge. Find the flow control inside the threaded end of the mixing nozzle. Insert flow control into the two holes at the top of the cartridge where the product comes out. Make sure it is securely seated in place.



Install mixing nozzle onto cartridge. Continue to point the nozzle upward away from yourself and others while slowly applying pressure to dispenser moving any bubbles and product up through the nozzle until it reaches the tip. **CAUTION: Never point mixing nozzle toward yourself or others while dispensing, as low viscosity materials can travel some distance from the end of the nozzle if dispensed too rapidly.**



Dispense a full stroke of material into disposable container. The cartridge is now balanced and ready for use. **NOTE:** Schedule dispensing to consume an entire cartridge at one time with no interruption of flow to prevent material from hardening in mixing nozzle. If product hardens in nozzle and will not easily flow out, replace nozzle and repeat the cartridge balancing steps listed above after replacing the nozzle. Never transfer a used nozzle to a new cartridge.

Revision 9.1

INSTALLATION INSTRUCTIONS (MPII)

Crack Repair Procedures

1. In horizontal concrete slabs, inject directly into cracks by placing the mixing nozzle tip directly over the crack. Allow adhesive to penetrate into the crack and top-off as needed. Kiln-dried medium grade silica sand can be broadcast on top of the repair to add texture or to more closely match that of the existing concrete.
2. For larger, deeper cracks, insert backer rod or a layer of kiln-dried sand to eliminate excessive loss of adhesive. The layer of product must still be at least 1/2 in. (13 mm) deep on top.
3. The repair will be tack-free in less than 10 minutes at 75 °F (24 °C). Excess material may be removed shortly after application by scraping/leveling with a blade. The crack surface may be ground smooth one hour after application. See SDS for precautions while grinding.
4. Allow material to fully cure before subjecting repaired area to any type of traffic (see Table 3 for working and full cure time schedule).

Spall Repair Procedures

1. Spall repairs can be made with neat material or using a repair mortar.
2. To form a repair mortar, CRACKBOND CSR should be mixed with kiln-dried medium grade (approximately 60 mesh) silica sand to form a repair mortar. Deep patches can use larger aggregate blends.
3. For best results have all equipment and materials prepared prior to mixing. The ratio of sand to mixed adhesive should be between 1 and 3 parts of sand to 1 part of mixed product. For best results, test several ratios to select the ratio of sand to liquid to yield desired results. Premeasure the sand needed based on the volume of mixed CRACKBOND CSR.
4. When using bulk product for spall repair, use the "Bulk With Aggregate" instructions below. Using B2G-CSR (2 gallon kit), QUICKLY, but thoroughly, mix only the amount needed for the repair (50% of Part A with 50% of Part B volume) with Jiffy mixing paddle (or similar) and drill motor at low speed for 20 seconds maximum.
5. When using cartridge product for spall repair, dispense the desired amount of liquid from cartridge into mixing container while Parts A & B are mixing, swiftly add the premeasured sand. Make sure all sand is saturated or wetted out and there are no "clumps" on bottom of bucket. Rapidly scrape bottom and sides of pail to assure good mix. Use clean containers when mixing multiple batches.
6. After mixing CSR at 75 °F (24 °C), it must be placed within 5 minutes. In warmer temperatures, place product in less than 5 minutes.
7. Rapidly pour and trowel (do not over trowel due to fast cure of product).
 - a. Only mix the quantity that can be mixed/placed within 5 minutes (1 gallon at a time maximum).
 - b. Repairs should be from a minimum 1/2 in. (13 mm) up to a maximum 3 in. (76 mm) per lift to avoid cracking from high heat exothermic reaction.

Control Joint Repair Procedures

1. Unprotected control joints may spall when subjected to traffic.
2. Saw cut spall areas as described in spall repair preparation section.
3. Fill entire area with CRACKBOND CSR.
4. After cure, saw cut control joint and fill with CRACKBOND JF-311.

Bulk Preparation Mixing Instructions WITHOUT Aggregate (Neat)

1. Mix only the amount of material that will be used before the working time expires. Shake containers A and B for 10 seconds each. Proportion equal parts by volume of both Part A and Part B into separate containers.
2. Pour both parts into a clean pail while assuring they are mixed at an exact 1:1 ratio by volume. Mix thoroughly by hand with a spatula or with low speed drill (300-400 rpm) and a mix paddle attachment such as a Jiffy mixer. Keep the paddle below the surface of the material to avoid entrapping air. Proper mixing will take 20 seconds maximum. When material is well mixed it will be completely free of streaks. **NOTE:** Do not over mix. Apply to repair area immediately.

Bulk Preparation Mixing Instructions WITH Aggregate

1. Mix only the amount of material that will be used before the working time expires. Shake containers A and B for 10 seconds each. Proportion equal parts by volume of both Part A and Part B into separate containers.
2. Measure desired volume of sand based on total liquid to sand ratio. The ratio of sand to liquid should be between 1 to 3 parts of sand to 1 part by volume of total liquid product. For best results test several ratios to select the ratio of sand to liquid to give you the desired result. In a clean mixing container add Part A and sand. While mixing, carefully scrape the sides and the bottom of the containers. Mix thoroughly with drill and mixing paddle at low rpm for a minimum of 2 minutes or until material is free of streaks and lumps.
3. Quickly add Part B to Part A sand mixture in container. Thoroughly mix material until free of streaks for a maximum of 1 minute and apply to repair area immediately.