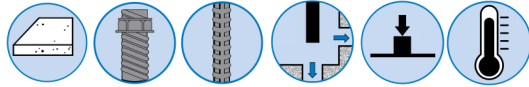


CRACKBOND® 2300 GEL



Product Description

CRACKBOND® 2300 GEL is a two-component, high-strength, non-sag, multi-purpose bonding agent which may be used in anchoring and doweling applications in temperatures between 60 °F and 110 °F (16 °C and 43 °C).

General Uses & Applications

- Bonding hardened concrete to hardened concrete
- Bonding freshly mixed concrete to hardened concrete
- Repairing spalls
- Adhering dowel bars and tie bars
- Short term tensile anchoring and shear loading conditions in accordance with allowable stress design (ASD)

Advantages & Features

- Extended working time
- High modulus
- Non-sag
- Convenient bulk mix ratio of 1:1 by volume
- Bulk components clearly indicated by container color, resin (Beige) and hardener (Dark Gray)

Availability: Adhesives Technology Corp. (ATC) products are available online and through select distributors providing all 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) Beige; Part B (Hardener) Dark Gray, Mixed Ratio: 1:1 by volume, Mixed Color - Concrete Gray

Storage & Shelf Life: 24 months when stored in unopened containers in dry conditions. Store between 40 °F (4 °C) and 95 °F (35 °C).

Installation & Estimation: Manufacturer's Printed Installation Instructions (MPII) are available within this Technical Data Sheet (TDS). Due to occasional updates and revisions, always verify the most current MPII usage. In order to achieve maximum results, proper installation is imperative. An estimating guide for product usage may be found at www.atcepoxy.com.

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

Limitations & Warnings:

- Do not thin with solvents, as this may prevent cure
- Not recommended for any application where there may be a sustained tensile load, including overhead applications
- For anchoring applications, concrete must be a minimum of 21 days old prior to anchor installation

Safety: Please refer to the Safety Data Sheet (SDS) for CRACKBOND 2300 GEL. Call ATC for more information at 1-800-892-1880.

Specification: The bonding agent shall be a two-component, 1:1 mix ratio epoxy system supplied in premeasured containers. The adhesive must meet the requirements of C881-15 specification for Type I, II, IV, and V, Grade 3 Class C. When cured 7 days and at a temperature of 75 °F (24 °C), the bonding agent shall have a compressive strength of 10,220 psi (70.5 MPa) per ASTM D695 and a tensile strength of 3,316 psi (22.9 MPa) per ASTM D638. The bonding agent shall be CRACKBOND 2300 GEL from Adhesives Technology Corp., Pompano Beach, Florida.

STANDARDS & APPROVALS

AASHTO M235 / ASTM C881-15

Type I, II, IV & V Grade 3 Class C

(See ATC website for current Department of Transportation approvals throughout the United States)

2300 GEL

High-Strength Bonding Epoxy

Bonding & Coating

ORDERING INFORMATION

TABLE 1: CRACKBOND 2300 GEL Adhesive Packaging, Dispensing Tools, Mixing

Package Size	21.2 fl. oz. (627 ml) Cartridge	102 fl. oz. (3.0 L) Kit
Part #	A22-2300N	BUG-2300
Recommended Mixing Nozzle	T12	N/A
Manual Dispensing Tool	TM22HD	N/A
Pneumatic Dispensing Tool	TA22HD-A	N/A
Case Qty.	12	1
Pallet Qty.	576	75
Pallet Weight (lb.)	1,578	752
SDS Brush Adaptor	BR-SDS	
Brush Extension	BR-EXT	
Nozzle Extension Tubing	TUBE916-EXT	

1. Each cartridge is packaged with one mixing nozzle.



A22-2300N



BUG-2300



10 in. (254 mm)
Small Nozzle
T12



TM22HD



TA22HD-A

One tool, dual grip configurations



SDS Drill Brush Attachment
BR-SDS



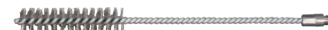
Brush Extension
BR-EXT



Nozzle Extension Tubing
TUBE916-EXT



Small Wire Brush
(See Table 2 part #'s)



Large Wire Brush
(See Table 2 part #'s)



Manual Brush Handle
(Included with Wire Brush)

TABLE 2: CRACKBOND 2300 GEL Brushes

Threaded Rod in.	Drill Bit Diameter in.	Brush Part #	Brush Length in.
3/8	7/16	B716	6
1/2	9/16	B916	
5/8	3/4	B34	
3/4	7/8	B78	
7/8	1	B100	9
1	1 1/8	B118	

MATERIAL SPECIFICATION

TABLE 3: CRACKBOND 2300 GEL performance to ASTM C881-15^{1,2,3}

Property	Cure Time	ASTM Standard	Units	Sample Conditioning Temperature
				75 °F (24) °C
Gel Time - 60 Gram Mass	----	C881	min	28
Tack Free Cure Time (30 mil Thin Film)	----	D2377	hr	3
Pot Life ^{4,5}	----	----	min	23
Compressive Yield Strength	7 day	D695	psi (MPa)	10,220 (70.5)
Compressive Modulus			psi (MPa)	213,000 (1,468.6)
Tensile Strength		D638	psi (MPa)	3,316 (22.9)
Tensile Elongation			%	2.9
Bond Strength	2 day	C882	psi (MPa)	3,600 (24.8)
	14 day		psi (MPa)	4,060 (28.0)
Consistency or Viscosity	----	C881	----	Non-sag
Heat Deflection Temperature	7 day	D648	°F (°C)	121 (49.4)
Water Absorption	14 day	D570	%	0.41
Linear Coefficient of Shrinkage	----	D2566	%	0.0022

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. Full cure is listed above to obtain the given properties for each product characteristic.
3. Results may vary due to environmental factors such as temperature, moisture and type of substrate.
4. Property not referenced in ASTM C881.
5. Pot life is measured as the workable and applicable time of 1.0 gallon (3.8 L) when mixed at 75 °F (24 °C).

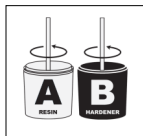
TABLE 4: CRACKBOND 2300 GEL CURE SCHEDULE^{1,2,3}

Base Material Temperature	Working Time	Full Cure Time
°F (°C)		
60 (16)	60 min	72 hr
75 (24)	46 min	48 hr
110 (43)	24 min	24 hr

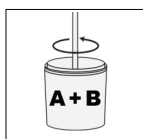
1. Working and full cure times are approximate, may be linearly interpolated between listed temperatures and are based on cartridge/nozzle system performance.
2. Application Temperature: Substrate and ambient air temperature should be from 60 - 110 °F (16 - 43 °C).
3. When ambient or base material temperature falls below 70 °F (21 °C), condition the adhesive to 70 - 75 °F (21 - 24 °C) prior to use.

INSTALLATION INSTRUCTIONS (MPII)

Bulk Preparation



CAUTION: Check the expiration date on the container to ensure it is not expired. **Do not use expired product!** Epoxy materials may separate. This is normal and can be expected when stored over a period of time. Prior to mixing the two components together, thoroughly stir each container separately. Pour contents of Part B (hardener) into Part A (resin) making certain to scrape the sides of the Part B to completely empty the container.



Mix thoroughly with a low speed drill (400 – 600 rpm) using a mixing paddle attachment (i.e. Jiffy Mixer). Keep the paddle speed on low and the mix paddle below the surface of the material to avoid entrapping air. Carefully scrape the sides and the bottom of the container while mixing. Proper mixing will take 2 – 3 minutes and when well mixed the material will be uniform in color and free of streaks or lumps.

Bonding and Coating Use

Surface Preparation: Surfaces may be prepared by acid etching, shot blasting or other equivalent mechanical means to ensure that bonding surfaces are clean and free of foreign materials and loose particles. It is the users responsibility to choose the appropriate method of creating the best profile for their specific application (see NACE NO. 6 - SSPC SP13 for reference).

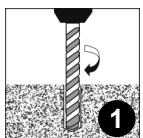
Mixing & Proportioning Instructions: See steps listed above for bulk preparation, or steps 5-7 for cartridge preparation.

Bonding fresh concrete to hardened concrete: After preparing concrete surfaces as described above, use a brush, roller or airless sprayer and apply an even coat of mixed epoxy to the clean and prepared concrete surface. Placement of fresh concrete must be done while epoxy is still tacky. If epoxy hardens prior to concrete placement, epoxy surface will need to be roughened and new epoxy must be mixed and placed.

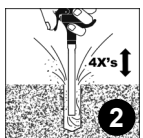
Bonding hardened concrete to hardened concrete: Using a brush, roller or airless sprayer, apply an even coat of mixed epoxy to both concrete surfaces being sure to fill all gaps between the mating concrete surfaces.

Anchoring and Doweling Use (Applicable Only for Cartridge Delivery)

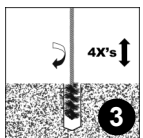
Drilling and Cleaning



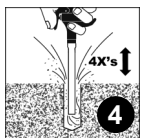
Using a rotary hammer drill, and a bit which conforms to ANSI B212.15 and is the appropriate size for the anchor diameter to be installed, drill the hole to the specified embedment depth. **CAUTION:** Always wear appropriate personal protection equipment (PPE) for eyes, ears & skin and avoid inhalation of dust during the drilling and cleaning process. Refer to the Safety Data Sheet (SDS) for details prior to proceeding.



NOTE: Remove any standing water from hole prior to beginning the cleaning process. If removal of standing water is not possible, please contact ATC for application specific installation instructions. Using oil free compressed air with a minimum pressure of 80 psi (5.5 bar), insert the air wand to the bottom of the drilled hole and blow out the debris with an up/down motion for a minimum of 4 seconds/cycles (4X).



Select the correct wire brush size for the drilled hole diameter (see Table 2), making sure that the brush is long enough to reach the bottom of the drilled hole. Reaching the bottom of the hole, brush in an up/down and twisting motion for 4 cycles (4X). **CAUTION:** The brush should contact the walls of the hole. If it does not, the brush is either too worn or small and should be replaced with a new brush of the correct diameter.



Blow the hole out once more to remove brush debris using oil free compressed air with a minimum pressure of 80 psi (5.5 bar). Insert the air wand to the bottom of the drilled hole and blow out the debris with an up/down motion for a minimum of 4 seconds/cycles (4X). Visually inspect the hole to confirm it is clean. **NOTE:** If installation will be delayed for any reason, cover cleaned holes to prevent contamination.

INSTALLATION INSTRUCTIONS (MPII)

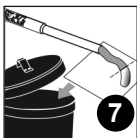
Cartridge Preparation



CAUTION: Check the expiration date on the cartridge to ensure it is not expired. **Do not use expired product!** Remove the protective cap from the adhesive cartridge and insert the cartridge into the recommended dispensing tool. Before attaching mixing nozzle, balance the cartridge by dispensing a small amount of material until both components are flowing evenly. For a cleaner environment, hand mix the two components and let cure prior to disposal in accordance with federal, state and local regulations.

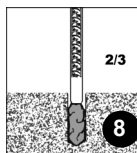


Only after the cartridge has been balanced, screw on the proper Adhesives Technology mixing nozzle to the cartridge (see Table 1). Do not modify mixing nozzle. Confirm that internal mixing element is in place prior to dispensing adhesive. Take note of the air and base material temperatures and review the working/full cure time chart (see Table 4) prior to starting the injection process.

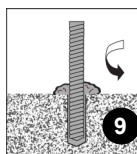


Dispense the initial amount of material from the mixing nozzle onto a disposable surface until the product is a uniform gray color with no streaks, as adhesive must be properly mixed in order to perform as published. Dispose of the initial amount of adhesive according to federal, state and local regulations prior to injection into the drill hole. **CAUTION:** When changing cartridges, never re-use nozzles. A new nozzle should be used with each new cartridge and steps 5 - 7 should be repeated accordingly.

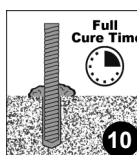
Installation and Curing (Vertical Down and Horizontal)



NOTE: The engineering drawings must be followed. For any applications not covered by this document, or if there are any installation questions, please contact Adhesives Technology Corp. Insert the mixing nozzle to the bottom of the hole and fill from the bottom to the top approximately two-thirds full, being careful not to withdraw the nozzle too quickly as this may trap air in the adhesive. **NOTE:** When using a pneumatic dispensing tool, ensure that pressure is set at 90 psi (6.2 bar) maximum.



Prior to inserting the threaded rod or rebar into the hole, make sure it is clean and free of oil and dirt and that the necessary embedment depth is marked on the anchor element. Insert the anchor element into the hole while turning 1-2 rotations prior to the anchor reaching the bottom of the hole. Excess adhesive should be visible on all sides of the fully installed anchor. **CAUTION:** Use extra care with deep embedment or high temperature installations to ensure that the working time has not elapsed prior to the anchor being fully installed. For horizontal installations, wedges should be used to center and support the anchor while the adhesive is curing.



Do not disturb, torque or apply any load to the installed anchor until the specified full cure time has passed. The amount of time needed to reach full cure is base material temperature dependent - refer to Table 4 for appropriate full cure time.

TECHNICAL DATA



TABLE 5: CRACKBOND 2300 GEL ultimate and allowable TENSION loads for THREADED ROD in normal-weight

Threaded Rod Diameter in.	Nominal Drill Bit Diameter in.	Embedment Depth in. (mm)	Tension Load Based on Bond Strength/Concrete Capacity				Allowable Tension Load Based on Steel Strength ⁴		
			$f'_c \geq 3,000$ psi (20.7 MPa) ⁵		$f'_c \geq 5,000$ psi (34.5 MPa) ⁵		ASTM F1554 Grade 36 lbs. (kN)	ASTM A193 Grade B7 lbs. (kN)	ASTM F593 304/316 SS lbs. (kN)
			Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)			
3/8	7/16	3 1/2 (89)	9,334 (41.5)	2,334 (10.4)	9,726 (43.3)	2,432 (10.8)	2,114 (9.4)	4,556 (20.3)	3,645 (16.2)
1/2	9/16	4 1/2 (114)	14,500 (64.5)	3,625 (16.1)	14,713 (65.4)	3,678 (16.4)	3,758 (16.7)	8,099 (36.0)	6,480 (28.8)
5/8	3/4	5 5/8 (143)	21,804 (97.0)	5,451 (24.2)	22,460 (99.9)	5,615 (25.0)	5,872 (26.1)	12,655 (56.3)	10,124 (45.0)
3/4	7/8	6 3/4 (171)	29,109 (129.5)	7,277 (32.4)	30,208 (134.4)	7,552 (33.6)	8,456 (37.6)	18,224 (81.1)	12,392 (55.1)
7/8	1	7 7/8 (200)	37,769 (168.0)	9,442 (42.0)	40,229 (178.9)	10,057 (44.7)	11,509 (51.2)	24,804 (110.3)	16,867 (75.0)
1	1 1/8	9 (229)	46,430 (206.5)	11,608 (51.6)	50,250 (223.5)	12,563 (55.9)	15,033 (66.9)	32,398 (144.1)	22,030 (98.0)

1. Anchoring data applicable for adhesive delivered from a cartridge through the recommended mixing nozzle.
2. Allowable bond strength/concrete capacity calculated using a safety factor of 4.0.
3. The lower value of either the allowable bond strength/concrete capacity or steel strength should be used as the allowable tension value for design.
4. Allowable steel strengths calculated in accordance with AISC Manual of Steel Construction: Tensile = $0.33 \cdot F_u \cdot A_{nom}$
5. Linear interpolation may be used for intermediate concrete compressive strengths.

TABLE 6: CRACKBOND 2300 GEL ultimate and allowable SHEAR loads for THREADED ROD in normal-weight

Threaded Rod Diameter in.	Nominal Drill Bit Diameter in.	Embedment Depth in. (mm)	Shear Load Based on Bond Strength/Concrete Capacity				Allowable Shear Load Based on Steel Strength ⁴		
			$f'_c \geq 3,000$ psi (20.7 MPa) ⁵		$f'_c \geq 5,000$ psi (34.5 MPa) ⁵		ASTM F1554 Grade 36 lbs. (kN)	ASTM A193 Grade B7 lbs. (kN)	ASTM F593 304/316 SS lbs. (kN)
			Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)			
3/8	7/16	3 1/2 (89)	7,217 (32.1)	1,804 (8.0)	6,850 (30.5)	1,713 (7.6)	1,089 (4.8)	2,347 (10.4)	1,878 (8.4)
1/2	9/16	4 1/2 (114)	9,691 (43.1)	2,423 (10.8)	10,840 (48.2)	2,710 (12.1)	1,936 (8.6)	4,172 (18.6)	3,338 (14.8)
5/8	3/4	5 5/8 (143)	15,025 (66.8)	3,756 (16.7)	15,220 (67.7)	3,805 (16.9)	3,025 (13.5)	6,519 (29.0)	5,216 (23.2)
3/4	7/8	6 3/4 (171)	20,360 (90.6)	5,090 (22.6)	19,600 (87.2)	4,900 (21.8)	4,356 (19.4)	9,388 (41.8)	6,384 (28.4)
7/8	1	7 7/8 (200)	30,914 (137.5)	7,729 (34.4)	26,982 (120.0)	6,746 (30.0)	5,929 (26.4)	12,778 (56.8)	8,689 (38.7)
1	1 1/8	9 (229)	41,468 (184.5)	10,367 (46.1)	34,365 (152.9)	8,591 (38.2)	7,744 (34.4)	16,690 (74.2)	11,349 (50.5)

1. Anchoring data applicable for adhesive delivered from a cartridge through the recommended mixing nozzle.
2. Allowable bond strength/concrete capacity was calculated using a safety factor of 4.0.
3. The lower value of either the allowable bond strength/concrete capacity or steel strength should be used as the allowable shear value for design.
4. Allowable steel strengths calculated in accordance with AISC Manual of Steel Construction: Shear = $0.17 \cdot F_u \cdot A_{nom}$
5. Linear interpolation may be used for intermediate concrete compressive strengths.