

# ULTRABOND® HS-1CC Adhesive Anchor Installation Instructions

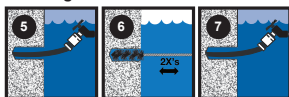
## Installation Instructions

### Drilling and Cleaning - Hammer Drilled Holes



- 1a. Using a rotary hammer drill & properly connected hollow vacuum bit system, ensure vacuum is on and drill hole to specified diameter and depth. No other cleaning is necessary - go to step 8.
- 1b. If a rotary hammer drill and standard carbide bit is used, drill hole to specified diameter and depth, go to step 2. For submerged conditions, skip to step 5.
2. Remove standing water and blow out hole 2 cycles (2X) using oil free compressed air.
3. Brush for 2 cycles (2X) in up/down twisting motion.
4. Repeat step 2, then go to step 8.

### Submerged Holes



5. Flush hole with pressurized water until water flowing from hole is clean and free of debris.
6. Brush for 2 cycles (2X) in up/down twisting motion.
7. Repeat step 5, then go to step 8.

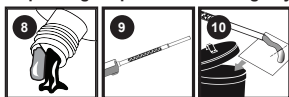
### Drilling and Cleaning - Core Drilled Holes



1. Using a core drill bit, drill hole to specified diameter and depth and remove the core.
2. Flush hole with pressurized water until water flowing from hole is clean and free of debris.
3. Remove standing water & blow out hole two cycles (2X) using oil free compressed air.
4. Brush for 2 cycles (2X) in up/down twisting motion.
5. Repeat step 3, then go to step 8.

### Dispensing Preparation - Cartridge Systems

#### FOR CARTRIDGE SYSTEMS ONLY



(When using two-component bulk product skip to step 8 for BULK SYSTEMS)

8. Remove protective cap, insert cartridge into recommended dispensing tool and balance until both components come out evenly.
9. Screw on proper, non-modified ATC mixing nozzle to cartridge.
10. Dispense and waste enough material to ensure uniform gray color before injecting into hole. For a new cartridge (or if working time has been exceeded), ensure cartridge opening is clean, install new nozzle and repeat steps 8 & 9. Go to step 13a.

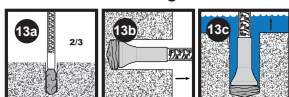
### Dispensing Preparation - Bulk Systems

#### FOR BULK SYSTEMS ONLY

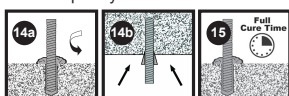


8. Epoxy materials may separate. This is normal and may be expected when stored over a period of time. Part A (Resin) should not be remixed. Part B (Hardener) should be remixed with a clean 5 gallon paint stick in a "butter churning" motion to homogenize the product.
9. Pour Resin into Side A pump reservoir then close lid on Side A. Only after separately mixing Part B, pour hardener into Side B reservoir then close lid on Side B. Follow bulk pump instructions for filling the metering pump and outlet assembly, then bleed the air from the system and fill the hose and applicator.
10. Balance the bulk pump machine following instructions in the Bulk Pump Operations Manual and test to ensure that it is dispensing the material on ratio (1:1).
11. Screw on the proper, non-modified ATC mixing nozzle onto the bulk pump wand.
12. Dispense and waste enough material to ensure uniform gray color before injecting into hole.

### Installation and Curing



- 13a. Fill hole 2/3 full with adhesive starting at the bottom and withdraw as hole fills, using an extension tube as needed. Only fill hole 1/2 full when installing inserts.
- 13b. Use piston plugs for overhead and vertically inclined installations.
- 13c. If injecting in a water-filled hole, or underwater in a submerged condition, fill hole completely with adhesive as described in 13b.



- 14a. Fully insert clean threaded rod or rebar with slow turning motion to the bottom of the hole. For internally threaded inserts, thread a bolt into the insert and press it into the hole, finishing with hammer strikes until it is flush with the surface of the concrete.
- 14b. For horizontal, inclined or overhead installations, use wedges to support the anchor while curing.
15. Do not disturb, torque or apply load until full cure time has passed.

## Reference Commentary

### Drilling and Cleaning - Hammer Drilled Holes

Read and follow manufacturer's operations manual for the selected rotary drill.

R1a. Recommended hollow vacuum bit systems<sup>1</sup> for drilling dry & damp cracked and uncracked concrete. Drill bit should conform to ANSI B212.15. Once visual inspection confirms that hole is clean, proceed to step 8 for either Cartridge or Bulk Systems.

R1b. Traditional drilling method for drilling dry, water saturated and water-filled holes in cracked and uncracked concrete. Drill bit should conform to ANSI B212.15. **CAUTION:** Always wear appropriate personal protection equipment (PPE) for eyes, ears and skin to help avoid inhalation of dust during the drilling and cleaning process. Refer to the Safety Data Sheet (SDS) for details prior to proceeding.

R2. **BLOW (2X) – BRUSH (2X) – BLOW (2X).** The compressed air wand should be inserted to the bottom of the hole, have a minimum pressure of 87 psi (6 bar) and be moved in an up/down motion to remove debris.

R3. Select the correct wire brush for the hole diameter, making sure it is long enough to reach the bottom of the drilled hole, using a brush extension if necessary. **CAUTION:** The brush should be clean and 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.

R4. After final blow step is completed, visually inspect the hole to confirm it is clean. **NOTE:** If installation will be delayed for any reason, cover cleaned holes to prevent contamination. Proceed to step 8 for either Cartridge or Bulk Systems.

R5. For submerged (underwater) installations, **FLUSH – BRUSH (2X) – FLUSH.** Start at the bottom or back of the hole when flushing.

R6. Select the correct wire brush for the hole diameter, making sure it is long enough to reach the bottom of the drilled hole, using a brush extension if necessary. **CAUTION:** The brush should be clean and 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.

R7. After final flush is completed, go to step 8 for either Cartridge or Bulk Systems.

<sup>1</sup>The Milwaukee 8-Gallon Dust Extractor vacuum-bit system is recommended by Adhesives Technology Corp.

### Drilling and Cleaning - Core Drilled Holes

Read and follow manufacturer's operations manual for the selected core drill.

R1. Once hole is cored to the proper diameter and depth, remove center core and measure to ensure that specified embedment depth can be achieved. **CAUTION:** Always wear appropriate personal protection equipment (PPE) for eyes, ears and skin to help avoid inhalation of dust during the drilling and cleaning process. Refer to the Safety Data Sheet (SDS) for details prior to proceeding.

R2. **FLUSH – BLOW (2X) – BRUSH (2X) – BLOW (2X).** Start at the bottom or back of the hole when flushing.

R3. The compressed air wand should be inserted to the bottom of the hole, have a minimum pressure of 87 psi (6 bar) and be moved in an up/down motion to remove debris.

R4. Select the correct wire brush for the hole diameter, making sure it is long enough to reach the bottom of the drilled hole, using a brush extension if necessary. **CAUTION:** The brush should be clean and 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.

R5. After final blow step is completed, visually inspect the hole to confirm it is clean. **NOTE:** If installation will be delayed for any reason, cover cleaned holes to prevent contamination. Proceed to step 8 for either Cartridge or Bulk Systems.

### Dispensing Preparation - Cartridge Systems

#### FOR CARTRIDGE SYSTEMS ONLY

R8. **CAUTION:** Check the expiration date on the cartridge to ensure it is not expired. **Do not use expired product!**

Shelf life of ULTRABOND HS-1CC is 24 months when stored at temperatures between 40 °F (4 °C) and 95 °F (35 °C).

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 local regulations.

R9. Do not modify mixing nozzle and 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 prior to starting the injection process.

R10. Test bead of mixed adhesive must be uniform in color and free of streaks, as adhesive must be properly mixed in order to perform as published. Dispose of the test bead according to federal, state and local regulations. **CAUTION:** When changing cartridges, never re-use nozzles and do not attempt to force adhesive out of a hardened mixing nozzle. Leave the mixing nozzle attached to the cartridge upon completion of work.

### Dispensing Preparation - Bulk Systems

#### FOR BULK SYSTEMS ONLY

The bulk pump uses a two-component delivery system whereby metering individual components and mixing of the two components are automatically controlled during dispensing through a metering manifold and disposable mixing nozzle. The bulk pump has a minimum input air pressure requirement of 80 - 90 psi @ 15 CFM, supplied through a regulator which reduces the pressure in order to control the rate of dispensing. The two individual adhesive components stay separate throughout the system, until they reach the specified disposable mixing nozzle via a manifold at the end of the bulk pump wand. Under normal operation, the bulk pump must be capable of dispensing the individual components at a 1:1 mix ratio by volume with a tolerance of ± 2%.

R8. **CAUTION:** Check the expiration dates on the bulk containers to ensure they are not expired. **Do not use expired product!** Shelf life of ULTRABOND HS-1CC is 24 months when stored at temperatures between 40 °F (4 °C) and 95 °F (35 °C). Mix Part B carefully to avoid whipping air into product.

R9. **NOTE: Review Bulk Pump Operations Manual thoroughly before proceeding and follow all steps necessary for set-up and operation of the pump.** Fill each reservoir (hopper) to at least one-half full. Incoming air supply pressure should be maintained at approximately 100 psi (6.9 bar).

R10. Be sure to establish proper flow of both materials at the applicator tip prior to attaching mixing nozzle. A ratio check should always be performed before installation begins to confirm that equal volumes of Part A and Part B are being dispensed. This check must be completed prior to attaching the mixing nozzle.

R11. Do not modify mixing nozzle and 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 prior to starting the injection process.

R12. Test bead of mixed adhesive must be uniform in color and free of streaks, as adhesive must be properly mixed in order to perform as published. Dispose of the test bead according to federal, state and local regulations. **CAUTION:** Never re-use nozzles and do not attempt to force adhesive out of a hardened mixing nozzle.

### Installation and Curing

**NOTE: Building Code Requirements for Structural Concrete (ACI 318-14 and later) requires the installer to be certified where adhesive anchors are to be installed in horizontal to vertically inclined (overhead) installations.**

**The engineering drawings must be followed. For all applications not covered by this document, or for all installation questions, please contact Adhesives Technology Corp.**

R13a. Be careful not to withdraw the mixing nozzle too quickly as this may trap air in the adhesive. Extension tubing can be connected as needed onto the outside of the tip of both the small mixing nozzle (T12) and the large mixing nozzle (T34HF).

**NOTE:** When using a pneumatic dispensing tool, ensure that pressure is set at 90 psi (6.2 bar) maximum.

R13b. Select the proper piston plug for the drill hole diameter. The piston plug fits directly onto the tip of both the small and large mixing nozzle. Extension tubing may also be used if needed in order to reach the bottom of the drill hole.

R13c. Be careful not to withdraw the mixing nozzle assembly too quickly as this may trap water in the adhesive. The piston plug should push itself out of the hole from the pressure of the injected adhesive.

R14a. Prior to inserting the threaded rod or rebar into the hole, make sure it is straight, clean and free of oil/dirt and that the necessary embedment depth is marked on the anchor element. Insert the anchor elements 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 rod or rebar, but may not be visible on all sides of the insert. **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. Adjustments to the anchor alignment may only be performed during the published working time for a given temperature.

R14b. For overhead, horizontal and inclined (between horizontal and overhead), wedges should be used to support the anchor while the adhesive is curing. Take appropriate steps to protect the exposed threads of the anchor element from uncured adhesive until after the full cure time has elapsed.

R15. The amount of time needed to reach full cure is base material dependent. Refer to the chart for appropriate full cure time for a given temperature.

# ULTRABOND® HS-1CC Adhesive Anchor Installation Instructions

## INSTALLATION PARAMETERS FOR THREADED ROD AND REBAR

Characteristic	Symbol	Units	Threaded Rod Diameter (inch)										
			3/8	1/2	5/8	3/4	7/8	1	N/A	1 1/4	Rebar Size		
			#3	#4	#5	#6	#7	#8	#9	#10			
Threaded Rod	Nominal Anchor Diameter	$d_a$	in.	0.375	0.500	0.625	0.750	0.875	1.000	N/A	1.250		
	Drill Size	$d_o$	in.	7/16	9/16	3/4	7/8	1	1 1/8	N/A	1 3/8		
	Brush Part #	----	----	B716	B916	B34	B78	B100	B118	N/A	B138		
	Piston Plug Part #	----	----	PP716	PP916	PP34	PP78	PP100	PP118	N/A	PP138		
	Piston Plug Color	----	----	Black <sup>1</sup>	Blue	Yellow	Green	Black	Orange	N/A	Brown		
	Maximum Tightening Torque	A36/A307 Carbon Steel A193 B7 Carbon Steel or F593 SS	$T_{inst,max}$	Ft-lb (N-m)	10 (14)	25 (34)	50 (68)	90 (122)	125 (169)	165 (224)	N/A	280 (380)	
16 (22)					33 (45)	60 (81)	105 (142)	125 (169)	165 (224)	N/A	280 (380)		
Rebar	Nominal Anchor Diameter	$d_a$	in.	0.375	0.500	0.625	0.750	0.875	1.000	1.127	1.270		
	Drill Size	$d_o$	in.	1/2	5/8	3/4	7/8	1	1 1/8	1 3/8	1 1/2		
	Brush Part #	----	----	B12	B58	B34	B78	B100	B118	B138	B112		
	Piston Plug Part #	----	----	PP716	PP58	PP34	PP78	PP100	PP118	PP138	PP112		
	Piston Plug Color	----	----	Black <sup>1</sup>	Red	Yellow	Green	Black	Orange	Brown	Gray		
	Brush Length	----	in.	6						9			

<sup>1</sup>Black nozzle adaptor with extension tubing for deep embedment depths in 7/16 and 1/2 inch hole diameters.

## CONCRETE BREAKOUT DESIGN INFORMATION FOR THREADED ROD AND REBAR

Design Information	Symbol	Units	Threaded Rod Diameter (inch)									
			3/8	1/2	5/8	3/4	7/8	1	N/A	1 1/4	Rebar Size	
			#3	#4	#5	#6	#7	#8	#9	#10		
Minimum Embedment Depth	$h_{ef,min}$	in. (mm)	2 3/8 (60)	2 3/4 (70)	3 1/8 (79)	3 1/2 (89)	3 3/4 (95)	4 (102)	4 1/2 (114)	5 (127)		
Maximum Embedment Depth	$h_{ef,max}$	in. (mm)	7 1/2 (191)	10 (254)	12 1/2 (318)	15 (381)	17 1/2 (445)	20 (508)	22 1/2 (572)	25 (635)		
Minimum Spacing Distance	$s_{min}$	in. (mm)	2 3/16 (56)	2 13/16 (71)	3 3/4 (95)	4 3/8 (111)	5 (127)	5 5/8 (143)	6 1/4 (159)	6 7/8 (175)		
Minimum Edge Distance	$c_{min}$	in. (mm)	2 3/16 (56)	2 13/16 (71)	3 3/4 (95)	4 3/8 (111)	5 (127)	5 5/8 (143)	6 1/4 (159)	6 7/8 (175)		
Minimum Concrete Thickness	$h_{min}$	in. (mm)	$h_{ef} + 1.25$ , [ $\geq 3.937$ ] ( $h_{ef} + 30$ , [ $\geq 100$ ])				$h_{ef} + 2d_o$ where $d_o$ is the hole diameter					

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.06894 MPa. For pound-inch units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

## CONCRETE BREAKOUT DESIGN INFORMATION AND INSTALLATION PARAMETERS FOR INTERNALLY THREADED INSERTS

Design Information or Characteristic	Symbol	Units	Internally Threaded Insert					
			PS2-38 or PS6-38	PS2-12 or PS6-12	PS2-58 or PS6-58	PS2-34 or PS6-34	PS2-1 or PS6-1	
Insert Part #	----	----	PS2-38 or PS6-38	PS2-12 or PS6-12	PS2-58 or PS6-58	PS2-34 or PS6-34	PS2-1 or PS6-1	
Internal Thread Size (UNC)	$d_t$	in.-TPI	3/8" - 16	1/2" - 13	5/8" - 11	3/4" - 10	1" - 8	
Drill Size	$d_o$	in.	1/2	5/8	7/8	1	1 1/2	
Nominal Anchor Diameter	$d_a$	in. (mm)	0.488 (12.4)	0.595 (15.1)	0.819 (20.8)	0.898 (22.8)	1.450 (36.8)	
Minimum Nominal Embedment Depth	$h_{ef,min}$	in. (mm)	2 3/4 (70)	3 11/16 (94)	5 3/4 (146)	6 1/2 (165)	8 1/2 (216)	
Minimum Spacing Distance	$c_{min}$	in. (mm)	2 1/2 (64)	3 1/8 (79)	4 3/8 (111)	5 (127)	7 1/2 (191)	
Minimum Edge Distance	$c_{min}$	in. (mm)	2 1/2 (64)	3 1/8 (79)	4 3/8 (111)	5 (127)	7 1/2 (191)	
Minimum Concrete Thickness	$h_{min}$	in. (mm)	4 1/2 (114)	5 3/8 (137)	8 (203)	9 1/2 (241)	12 1/2 (318)	
Maximum Tightening Torque	A36/A307 Carbon Steel A193 B7 Carbon Steel or F593 SS	$T_{inst,max}$	Ft-lb (N-m)	10 (14)	25 (34)	50 (68)	90 (122)	165 (224)
				16 (22)	33 (45)	60 (81)	105 (142)	165 (224)
Brush Part #	----	----	B12	B58	B78	B100	B112	
Piston Plug Part #	----	----	PP12	PP58	PP78	PP100	PP112	
Piston Plug Color	----	----	Black <sup>1</sup>	Red	Green	Black	Gray	
Brush Length	----	in.	6				9	

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.06894 MPa. For pound-inch units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi.

<sup>1</sup>Black nozzle adaptor with extension tubing for deep embedment depths in 7/16 and 1/2 inch hole diameters.

## CURE SCHEDULE<sup>1,2,3</sup>

Base Material Temperature °F (°C)	Working Time min	Full Cure Time hr
43 (6)	45	144
50 (10)	35	72
75 (24)	16	7
90 (32)	12	4
110 (43)	3	2

<sup>1</sup>Working and full cure times are approximate, may be linearly interpolated between listed temperatures and are based on cartridge/nozzle system performance.

<sup>2</sup>Application Temperature: Substrate and ambient air temperature should be between 43 - 110 °F (6 - 43 °C).

<sup>3</sup>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. A high flow mixing nozzle (T34HF) may also be used to ease dispensing at colder temperatures or to increase flow rate.

## ADHESIVE DISPENSING TOOLS AND MIXING NOZZLES<sup>1</sup>

Package Size	8.6 fl.oz. (254 ml) Cartridge	21.2 fl. oz. (627 ml) Cartridge	53 fl. oz. (1.6 L) Cartridge	10 Gallon (38 L) Kit	
				Resin	Hardener
Part #	A9-HS1CC	A22-HS1CC	A53-HS1CC	B5G-HS1CC-A	B5G-HS1CC-B
Manual Dispensing Tool	TM9HD	TM22HD		----	
Pneumatic Dispensing Tool		TA22HD-A	TA53HD-A	AST Pump Model Number RMP 6624-1717	
Battery Tool	----	TB22HD-A		----	
Recommended Mixing Nozzle	T12 or T34HF			T34HF	
SDS Brush Adaptor				BR-SDS	
Brush Extension				BR-EXT	
Nozzle Extension Tubing				TUBE916-EXT	
Retention Wedge				WEDGE	

<sup>1</sup>Call for bulk packaging availability and lead times.

