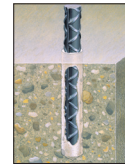


Adhesive Anchoring Selection Guide

Solid Concrete Applications



Doweling into Concrete with Rebar



Fastening to Concrete with Threaded Rod

PRODUCT SYSTEMS	KEY FEATURES	PROPERTIES	STRENGTH DESIGN PERFORMANCE ^{1,2}																											
<p>A7+ Fast Dispensing, Fast Curing Acrylic Install more anchors in less time</p> <p>5 fluid oz. (150 ml) kit, 9.5 fluid oz. (280 ml) and 28 fluid oz. (825 ml) cartridges</p> 	<ul style="list-style-type: none"> Solid or hollow base materials Dispenses easier and faster Use in dry, saturated, and water-filled holes Fastest cure (35 min. at 60°F) Dispenses and cures faster in cold weather Can be used in smaller diameter holes No-drip formula Hand dispensable 28-oz. cartridge 18 month shelf life NSF/ANSI 61 	<table border="1"> <thead> <tr> <th>BASE MATERIAL (F°/C°)</th> <th>GEL/WORKING TIME</th> <th>FULL CURE TIME</th> </tr> </thead> <tbody> <tr><td>110°/ 43°</td><td>1.5 minutes</td><td>45 minutes</td></tr> <tr><td>90°/ 32°</td><td>3 minutes</td><td>45 minutes</td></tr> <tr><td>70°/ 21°</td><td>5 minutes</td><td>45 minutes</td></tr> <tr><td>50°/ 10°</td><td>15 minutes</td><td>90 minutes</td></tr> <tr><td>30°/ -1°</td><td>35 minutes</td><td>4 hours</td></tr> <tr><td>14°/ -10°</td><td>35 minutes</td><td>24 hours</td></tr> </tbody> </table>	BASE MATERIAL (F°/C°)	GEL/WORKING TIME	FULL CURE TIME	110°/ 43°	1.5 minutes	45 minutes	90°/ 32°	3 minutes	45 minutes	70°/ 21°	5 minutes	45 minutes	50°/ 10°	15 minutes	90 minutes	30°/ -1°	35 minutes	4 hours	14°/ -10°	35 minutes	24 hours	<p>NSF Certified to ANSINFSF 61</p>  <p>3,871 10,752 23,171</p> <p>3/8" x 3-3/8" 5/8" x 5-5/8" 1" x 9"</p>						
BASE MATERIAL (F°/C°)	GEL/WORKING TIME	FULL CURE TIME																												
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14°/ -10°	35 minutes	24 hours																												
<p>C6+ High Strength Epoxy for All Conditions Delivers better load performance</p> <p>10 fluid oz. (250 ml) cartridges 20 fluid oz. (600 ml) cartridges</p> 	<ul style="list-style-type: none"> 35% greater bond strength than the closest competition in 70°F concrete Better performance in dry, saturated, and water-filled conditions Oversized and Diamond cored holes Safe and durable Approved for cracked concrete and seismic zones 24 month shelf life NSF/ANSI 61 	<table border="1"> <thead> <tr> <th>BASE MATERIAL¹ (F°/C°)</th> <th>WORKING TIME²</th> <th>FULL CURE TIME</th> </tr> </thead> <tbody> <tr><td>104°/ 40°</td><td>3 minutes</td><td>3 hours</td></tr> <tr><td>95°/ 35°</td><td>4 minutes</td><td>4 hours</td></tr> <tr><td>86°/ 30°</td><td>6 minutes</td><td>5 hours</td></tr> <tr><td>77°/ 25°</td><td>8 minutes</td><td>6 hours</td></tr> <tr><td>72°/ 22°</td><td>11 minutes</td><td>7 hours</td></tr> <tr><td>59°/ 15°</td><td>15 minutes</td><td>8 hours</td></tr> <tr><td>50°/ 10°</td><td>20 minutes</td><td>12 hours</td></tr> <tr><td>40°/ 4.4°</td><td>20 minutes</td><td>24 hours</td></tr> </tbody> </table>	BASE MATERIAL ¹ (F°/C°)	WORKING TIME ²	FULL CURE TIME	104°/ 40°	3 minutes	3 hours	95°/ 35°	4 minutes	4 hours	86°/ 30°	6 minutes	5 hours	77°/ 25°	8 minutes	6 hours	72°/ 22°	11 minutes	7 hours	59°/ 15°	15 minutes	8 hours	50°/ 10°	20 minutes	12 hours	40°/ 4.4°	20 minutes	24 hours	<p>NSF Certified to ANSINFSF 61</p>  <p>3,489 9,692 24,811</p> <p>3/8" x 3-3/8" 5/8" x 5-5/8" 1" x 9"</p>
BASE MATERIAL ¹ (F°/C°)	WORKING TIME ²	FULL CURE TIME																												
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50°/ 10°	20 minutes	12 hours																												
40°/ 4.4°	20 minutes	24 hours																												
<p>G5 High Strength Epoxy Tested to ICC-ES AC308 15 min. working time; 24 hour cure time (Per AC308) (70°F)</p> <p>22 fluid oz. (650 ml) cartridge</p>  <p>MADE IN USA</p>	<ul style="list-style-type: none"> Solid base materials Fire rated: tested up to 4hrs FRP Works in dry, damp, saturated, and underwater applications Gives more time to install anchors Easier to install anchors in hot weather Odorless Oversized and cored holes Improved wet/water filled Resist wind loads 18 month shelf life 100% solid (No V.O.C.) NSF/ANSI 61 	<table border="1"> <thead> <tr> <th>BASE MATERIAL (F°/C°)</th> <th>WORKING TIME</th> <th>FULL CURE TIME</th> </tr> </thead> <tbody> <tr><td>110°/ 43°</td><td>9 minutes</td><td>24 hours</td></tr> <tr><td>90°/ 32°</td><td>9 minutes</td><td>24 hours</td></tr> <tr><td>70°/ 20°</td><td>15 minutes</td><td>24 hours</td></tr> </tbody> </table>	BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME	110°/ 43°	9 minutes	24 hours	90°/ 32°	9 minutes	24 hours	70°/ 20°	15 minutes	24 hours	<p>NSF Certified to ANSINFSF 61</p> <p>RECOGNIZED WORLDWIDE Fire Tested BS476 4 Hrs FRP</p> <p>International Standard Fire Resistance Performance</p>  <p>2,526 7,016 14,696</p> <p>3/8" x 3-3/8" 5/8" x 5-5/8" 1" x 9"</p>															
BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME																												
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¹Diameter x Embedment in 4000 psi concrete.

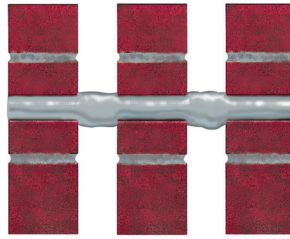
²All loads given in pounds.

³Calculated using the ICCES threaded rod data in uncracked, dry concrete with periodic inspection. Temperature range A.

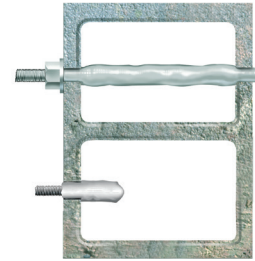
*Red Head A7+ replaced Epon A7 and S7. For information on the retired A7 and S7 adhesives, please visit www.itwredhead.com

Hollow Base Material Applications


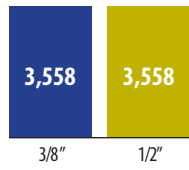

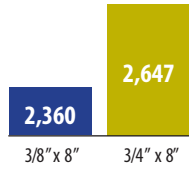

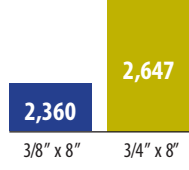

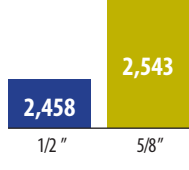
Use the following accessories with the A7+ adhesive anchoring system for all of your hollow base material applications.



Brick Pinning



Fastening to hollow concrete block

SYSTEM ACCESSORIES	KEY FEATURES	ULTIMATE TENSILE ^{1,2} PERFORMANCE (LBS)						
<h3>Umbrella Anchor</h3>  <p>Umbrella Anchor</p> <p>Makes it possible to use adhesive for fastening to the face of hollow block or tile (see page 53)</p>	<ul style="list-style-type: none"> Highest hold in hollow block 1/4", 3/8", or 1/2" rods Fasten to front face of blocks Creates large bearing surface inside block to achieve high loads 	<p>A7+</p>  <table border="1"> <tr> <th>Diameter</th> <th>Ultimate Tensile (LBS)</th> </tr> <tr> <td>3/8"</td> <td>3,558</td> </tr> <tr> <td>1/2"</td> <td>3,558</td> </tr> </table>	Diameter	Ultimate Tensile (LBS)	3/8"	3,558	1/2"	3,558
Diameter	Ultimate Tensile (LBS)							
3/8"	3,558							
1/2"	3,558							
<h3>Nylon Screens</h3>  <p>Makes it possible to use adhesive for fastening to hollow block or brick walls (see page 56)</p>	<ul style="list-style-type: none"> 3/8" to 3/4" diameter sizes 30%-50% lower cost than stainless screens Special design makes screens easier to insert through block or brick Does not get bent or crushed Corrosion resistant 	<p>A7+</p>  <table border="1"> <tr> <th>Size</th> <th>Ultimate Tensile (LBS)</th> </tr> <tr> <td>3/8" x 8"</td> <td>2,360</td> </tr> <tr> <td>3/4" x 8"</td> <td>2,647</td> </tr> </table>	Size	Ultimate Tensile (LBS)	3/8" x 8"	2,360	3/4" x 8"	2,647
Size	Ultimate Tensile (LBS)							
3/8" x 8"	2,360							
3/4" x 8"	2,647							
<h3>Stainless Steel Screens</h3>  <p>Makes it possible to use adhesive for fastening to hollow block or brick walls (see page 56)</p>	<ul style="list-style-type: none"> 1/4" & 3/4" diameter sizes Corrosion resistant Available in 1/4" thicknesses 	<p>A7+</p>  <table border="1"> <tr> <th>Size</th> <th>Ultimate Tensile (LBS)</th> </tr> <tr> <td>3/8" x 8"</td> <td>2,360</td> </tr> <tr> <td>3/4" x 8"</td> <td>2,647</td> </tr> </table>	Size	Ultimate Tensile (LBS)	3/8" x 8"	2,360	3/4" x 8"	2,647
Size	Ultimate Tensile (LBS)							
3/8" x 8"	2,360							
3/4" x 8"	2,647							
<h3>Stubby Screens</h3>  <p>Makes it possible to use adhesive for fastening to the face of hollow block or tile (see page 53)</p>	<ul style="list-style-type: none"> 1/4", 3/8", 1/2", 5/8" diameter sizes Fasten to front face of block Anchor remains perpendicular in wall 	<p>A7+</p>  <table border="1"> <tr> <th>Diameter</th> <th>Ultimate Tensile (LBS)</th> </tr> <tr> <td>1/2"</td> <td>2,458</td> </tr> <tr> <td>5/8"</td> <td>2,543</td> </tr> </table>	Diameter	Ultimate Tensile (LBS)	1/2"	2,458	5/8"	2,543
Diameter	Ultimate Tensile (LBS)							
1/2"	2,458							
5/8"	2,543							

¹ Testing performed in hollow concrete block.

² Diameter x Embedment.

A7+

The Most Versatile Quick Cure Adhesive



A7P-10

A7P-28

APPLICATIONS / USES

- Concrete dowelling (slabs, walls, columns)
- Steel framing (columns, beams, ledgers)
- Brick pinning and CMU reinforcement
- Architectural metal fastening (railings, signage)
- Mechanical, electrical, and plumbing attachment
- Vibratory equipment anchoring
- Overhead and horizontal anchors

DESCRIPTION

Quick Curing Hybrid Epoxy Adhesive

RED HEAD A7+ is a high-strength, fast-cure adhesive that is designed to securely anchor threaded rod and rebar to cured concrete and masonry. A7+ is one of the most versatile anchoring solutions on the market, suitable for use in an extremely wide range of applications and environmental conditions.

- Qualified for use in concrete, brick, block, and clay tile
- ICC-ES approved for cracked concrete and seismic applications (ICC-ES ESR 3903).
- Cures in only 45 minutes (at base temperature of 70°F/21°C)
- No extra time required for drying saturated concrete or water-filled holes
- Easy pumping even in cold temperatures
- Low odor - suitable for use indoors and in occupied buildings
- Optimum viscosity simplifies use in overhead and horizontal holes
- 18-month storage life minimizes waste and risk of using expired product
- Rugged cartridge resists breakage due to rough handling or cold temperatures
- Store between 32°F and 95°F in a cool, dry place.

ADVANTAGES

- All weather formula
- Works in damp holes and underwater applications
- Fast curing time, 45 minutes at 70°F
- ICC-ES Evaluation Report ESR-3903 (Concrete) and ESR-3951 (Masonry)
- NSF 61 Listed, certified for use in conjunction with drinking water systems
- Fast & easy dispensing, even 28 ounce cartridge can be hand dispensed
- Formula for use in solid and hollow base materials
- Suitable for oversized and diamond cored holes with increased depths

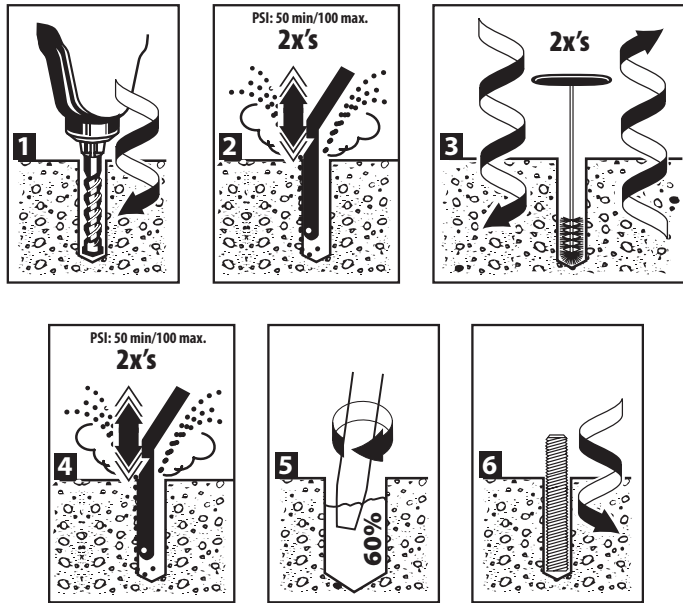
Curing Times

CONCRETE (F°)	ADHESIVE (F°)	GEL TIME	FULL CURE TIME
110	110	1.5 minutes	45 minutes
90	90	3 minutes	45 minutes
70	70	5 minutes	45 minutes
50	50	15 minutes	90 minutes
30	30	35 minutes	4 hours
14	30	35 minutes	24 hours

Most Competitive Spacing and Edge Distance

NOMINAL ANCHOR DIAMETER (IN.)	MINIMUM SPACING (IN.)	MINIMUM EDGE DISTANCE (IN.)
3/8	15/16	15/16
1/2	1-1/2	1-1/2
5/8	2-1/2	2-1/2
3/4	3	3
7/8	3-1/2	3-1/2
1	4	4
1-1/4	5	5

INSTALLATION STEPS



* Damp, submerged and underwater applications require 4x's air, 4x's brushing and 4x's air

PACKAGING

1. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio
2. Acrylic components dispensed through a static mixing nozzle that thoroughly mixes the material and places the material at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

APPROVALS/LISTINGS

ICC-ES ESR-3903 for Cracked and Uncracked concrete including all Seismic Zones

ICC-ES ESR-3951 for masonry

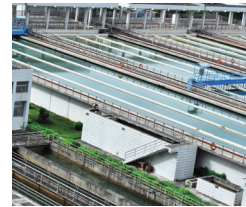
IBC 2006/2009/2012/2015 Compliant

NSF/ANSI Standard 61

For the most current approvals/listings visit: www.itwredhead.com

APPLICATIONS

Water Treatment Facilities

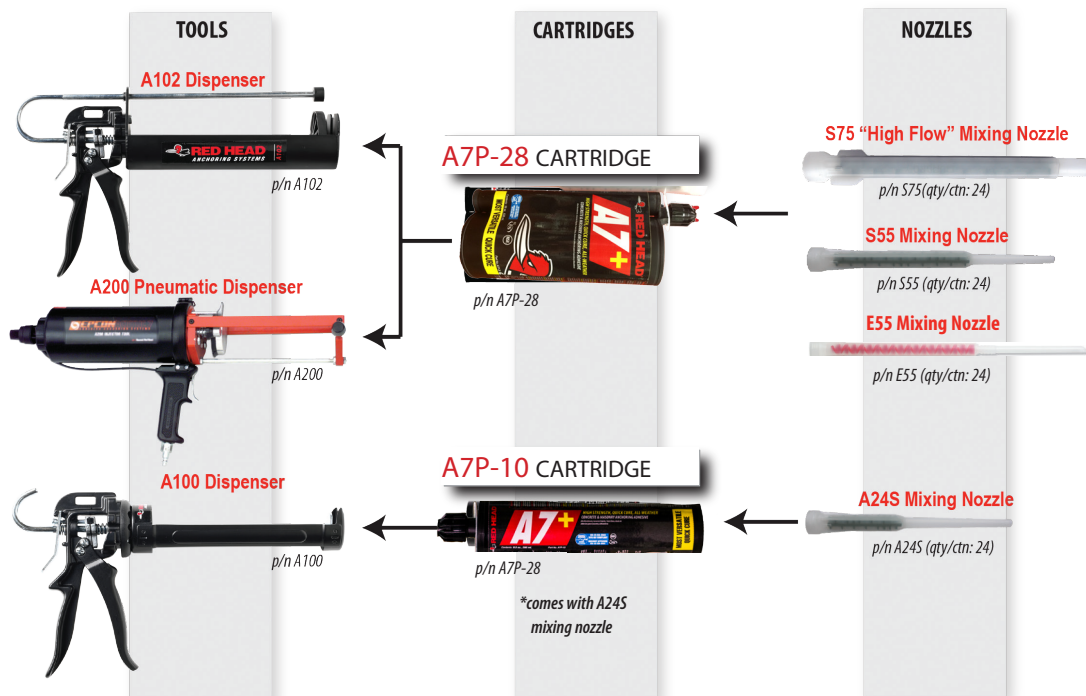


The best-in-class in edge and spacing distance of Red Head A7+ and its ability to work in water have made it a great fit for waste water treatment plants.




Roadway Doweling






A7+ dispenses so quickly and rebar inserts so easily that contractors find installed costs are lower than many other products including grout for doweling.



A7P-28 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7P-28	28 Fluid Ounce Cartridge A7+ Each cartridge comes with a S55 Nozzle	4
 E55	Mixing Nozzle for A7P-28 and G5-22 Cartridge Nozzle diameter fits 3/8" to 5/8" holes. (overall length of nozzle 14")	24
 A102	<i>Largest hand dispensable cartridge— still easy to dispense</i> Hand Dispenser for A7P-28 Cartridge	1

PART NUMBER	DESCRIPTION	BOX QTY
 S55	Mixing Nozzle for A7P-28 Cartridge Nozzle diameter fits holes for 3/8" diameter & larger anchors (overall length of nozzle 10")	6
 A200	Pneumatic Dispenser for A7P-28 Cartridge	1
 E25-6	6-Foot Straight Tubing (Used when holes are deeper) (can cut to proper size) (.39 in I.D. x .43 in. O.D.)	24

ESTIMATING TABLE

A7+ Number of Anchoring Installations per Cartridge* 28 Fluid Ounce Cartridge Using Reinforcing Bar with A7+ Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#3	7/16	558.2	279.1	186.1	139.5	111.6	93.0	79.7	69.8	62.0	55.8	50.7	46.5	42.9	39.9	37.2
#4	5/8	273.5	136.7	91.2	68.4	54.7	45.6	39.1	34.2	30.4	27.3	24.9	22.8	21.0	19.5	18.2
#5	3/4	189.9	95.0	63.3	47.5	38.0	31.7	27.1	23.7	21.1	19.0	17.3	15.8	14.6	13.6	12.7
#6	7/8	139.5	69.8	46.5	34.9	27.9	23.3	19.9	17.4	15.5	14.0	12.7	11.6	10.7	10.0	9.3
#7	1	106.8	53.4	35.6	26.7	21.4	17.8	15.3	13.4	11.9	10.7	9.7	8.9	8.2	7.6	7.1
#8	1-1/8	84.4	42.2	28.1	21.1	16.9	14.1	12.1	10.6	9.4	8.4	7.7	7.0	6.5	6.0	5.6
#9	1-1/4	68.4	34.2	22.8	17.1	13.7	11.4	9.8	8.5	7.6	6.8	6.2	5.7	5.3	4.9	4.6
#10	1-1/2	47.5	23.7	15.8	11.9	9.5	7.9	6.8	5.9	5.3	4.7	4.3	4.0	3.7	3.4	3.2
#11	1-3/4	34.9	17.4	11.6	8.7	7.0	5.8	5.0	4.4	3.9	3.5	3.2	2.9	2.7	2.5	2.3

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.




ESTIMATING TABLE

A7+ Number of Anchoring Installations per Cartridge* 28 Fluid Ounce Cartridge Using Threaded Rod with A7+ Adhesive in Solid Concrete

ROD (in.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1/4	5/16	1094.0	547.0	364.7	273.5	218.8	182.3	156.3	136.7	121.6	109.4	99.5	91.2	84.2	78.1	72.9
3/8	7/16	558.2	279.1	186.1	139.5	111.6	93.0	79.7	69.8	62.0	55.8	50.7	46.5	42.9	39.9	37.2
1/2	9/16	337.7	168.8	112.6	84.4	67.5	56.3	48.2	42.2	37.5	33.8	30.7	28.1	26.0	24.1	22.5
5/8	3/4	189.9	95.0	63.3	47.5	38.0	31.7	27.1	23.7	21.1	19.0	17.3	15.8	14.6	13.6	12.7
3/4	7/8	139.5	69.8	46.5	34.9	27.9	23.3	19.9	17.4	15.5	14.0	12.7	11.6	10.7	10.0	9.3
7/8	1	106.8	53.4	35.6	26.7	21.4	17.8	15.3	13.4	11.9	10.7	9.7	8.9	8.2	7.6	7.1
1	1-1/8	84.4	42.2	28.1	21.1	16.9	14.1	12.1	10.6	9.4	8.4	7.7	7.0	6.5	6.0	5.6
1-1/4	1-3/8	56.5	28.3	18.8	14.1	11.3	9.4	8.1	7.1	6.3	5.7	5.1	4.7	4.3	4.0	3.8
1-1/2	1-5/8	40.5	20.2	13.5	10.1	8.1	6.7	5.8	5.1	4.5	4.0	3.7	3.4	3.1	2.9	2.7

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

A7P-10 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7P-10	9.5 Fluid Ounce Cartridge with Nozzle	6
 A245	Mixing Nozzle for A7P-10 Cartridge Nozzle diameter fits 3/8" to 5/8" holes (overall length of nozzle 6-3/8")	24
 A100	Hand Dispenser Designed for A7P-10 Cartridge Contractor Quality 26:1 Thrust Ratio	1

ESTIMATING TABLES

A7+ 9.5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Reinforcing Bar with A7+ Adhesive in Solid Concrete

ROD (In.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES									
		1	2	3	4	5	6	7	8	9	10
#3	7/16	189.4	94.7	63.1	47.4	37.9	31.6	27.1	23.7	21.0	18.9
#4	5/8	92.8	46.4	30.9	23.2	18.6	15.5	13.3	11.6	10.3	9.3
#5	3/4	64.5	32.2	21.5	16.1	12.9	10.7	9.2	8.1	7.2	6.4
#6	7/8	47.4	23.7	15.8	11.8	9.5	7.9	6.8	5.9	5.3	4.7
#7	1	36.3	18.1	12.1	9.1	7.3	6.0	5.2	4.5	4.0	3.6
#8	1-1/8	28.6	14.3	9.5	7.2	5.7	4.8	4.1	3.6	3.2	2.9
#9	1-1/4	23.2	11.6	7.7	5.8	4.6	3.9	3.3	2.9	2.6	2.3
#10	1-1/2	16.1	8.1	5.4	4.0	3.2	2.7	2.3	2.0	1.8	1.6
#11	1-3/4	11.8	5.9	3.9	3.0	2.4	2.0	1.7	1.5	1.3	1.2



ESTIMATING TABLES

A7+ 9.5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Threaded Rod with A7+ Adhesive in Solid Concrete

ROD (In.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES									
		1	2	3	4	5	6	7	8	9	10
1/4	5/16	371.3	185.6	123.8	92.8	74.3	61.9	53.0	46.4	41.3	37.1
3/8	7/16	189.4	94.7	63.1	47.4	37.9	31.6	27.1	23.7	21.0	18.9
1/2	9/16	114.6	57.3	38.2	28.6	22.9	19.1	16.4	14.3	12.7	11.5
5/8	3/4	64.5	32.2	21.5	16.1	12.9	10.7	9.2	8.1	7.2	6.4
3/4	7/8	47.4	23.7	15.8	11.8	9.5	7.9	6.8	5.9	5.3	4.7
7/8	1	36.3	18.1	12.1	9.1	7.3	6.0	5.2	4.5	4.0	3.6
1	1-1/8	28.6	14.3	9.5	7.2	5.7	4.8	4.1	3.6	3.2	2.9
1-1/4	1-3/8	19.2	9.6	6.4	4.8	3.8	3.2	2.7	2.4	2.1	1.9
1-1/2	1-5/8	13.7	6.9	4.6	3.4	2.7	2.3	2.0	1.7	1.5	1.4

A7P-5 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY	PART NUMBER	DESCRIPTION	BOX QTY
 A7P-500KIT	Convenient Dispensing Kit Packaged in a Solid Plastic Shell with (1) A500 Plastic Dispenser (1) A7P-5 Cartridge and (1) A24 Nozzle Nozzle diameter fits 3/8" to 5/8" holes	8	 A7P-501KIT	Convenient Dispensing Kit Packaged in a Solid Plastic Shell with (1) A501 Plastic Dispenser (1) A7P-5 Cartridge and (1) A24 Nozzle Nozzle diameter fits 3/8" to 5/8" holes	8

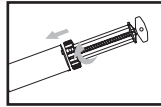
AVAILABLE WITH YOUR CHOICE OF TWO, EASY DISPENSING SYSTEMS

A500 PLASTIC DISPENSER

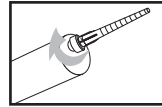
Attaches directly to cartridge allowing for easy hand dispensing. **No extra tools are required.**



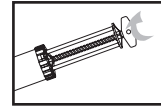
Simple Assembly and Dispensing



1. Twist-lock dispenser onto cartridge.



2. Thread nozzle onto cartridge.



3. Turn lever in order to dispense adhesive.

EASY PACKAGING!

A500 and A501 kits are perfect for both counter or pegboard hanging display.



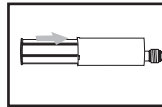
A7P-500KIT

A501 CAULKING GUN ADAPTOR

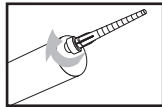
Allows cartridge to work with most standard caulking guns (caulking gun supplied by contractor).



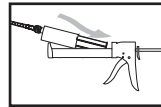
Simple Assembly and Dispensing



1. Push adaptor tightly against back of cartridge.



2. Thread nozzle onto cartridge.



3. Place assembly in caulking gun and dispense adhesive.



A7P-501KIT

ESTIMATING TABLES

A7+ 5 Fluid Ounce Cartridge *Number of Anchoring Installations per Cartridge* Using Reinforcing Bar with A7+ Adhesive in Solid Concrete*

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES							
		1	2	3	4	5	6	7	8
#3	7/16	101.5	50.7	33.8	25.4	20.3	16.9	14.5	12.7
#4	5/8	49.7	24.9	16.6	12.4	9.9	8.3	7.1	6.2
#5	3/4	34.5	17.3	11.5	8.6	6.9	5.8	4.9	4.3
#6	7/8	25.4	12.7	8.5	6.3	5.1	4.2	3.6	3.2
#7	1	19.4	9.7	6.5	4.9	3.9	3.2	2.8	2.4
#8	1-1/8	15.3	7.7	5.1	3.8	3.1	2.6	2.2	1.9
#9	1-1/4	12.4	6.2	4.1	3.1	2.5	2.1	1.8	1.6

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

ESTIMATING TABLES

A7+ 5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Threaded Rod with A7+ Adhesive in Solid Concrete

ROD (in.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES							
		1	2	3	4	5	6	7	8
1/4	5/16	198.9	99.5	66.3	49.7	39.8	33.2	28.4	24.9
3/8	7/16	101.5	50.7	33.8	25.4	20.3	16.9	14.5	12.7
1/2	9/16	61.4	30.7	20.5	15.3	12.3	10.2	8.8	7.7
5/8	3/4	34.5	17.3	11.5	8.6	6.9	5.8	4.9	4.3
3/4	7/8	25.4	12.7	8.5	6.3	5.1	4.2	3.6	3.2
7/8	1	19.4	9.7	6.5	4.9	3.9	3.2	2.8	2.4
1	1-1/8	15.3	7.7	5.1	3.8	3.1	2.6	2.2	1.9

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive

Average Ultimate Tension and Shear Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
				ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	13 - 18 (17-24)	1-1/2 (38.1)	N/A	N/A	3,734 (16.6)	4,126 (18.3)
			3-3/8 (85.7)	5,852 (26.0)	5,220 (23.2)	10,977 (48.8)	5,220 (23.2)
			4-1/2 (114.3)	7,729 (34.4)	5,220 (23.2)	11,661 (51.9)	5,220 (23.2)
1/2 (12.7)	9/16 (14.3)	22 - 25 (29-33)	2 (50.8)	N/A	N/A	6,022 (26.8)	8,029 (35.7)
			4-1/2 (114.3)	10,798 (48.0)	8,029 (35.7)	17,162 (76.3)	8,029 (35.7)
			6 (152.4)	14,210 (63.2)	8,029 (35.7)	17,372 (77.3)	8,029 (35.7)
5/8 (15.9)	3/4 (19.1)	55 - 80 (74-108)	2-1/2 (63.5)	N/A	N/A	7,330 (32.6)	11,256 (50.1)
			5-5/8 (142.9)	16,417 (73.0)	15,967 (71.0)	26,504 (117.9)	15,967 (71.0)
			7-1/2 (190.5)	18,747 (83.4)	15,967 (71.0)	29,381 (130.7)	15,967 (71.0)
3/4 (19.1)	7/8 (22.2)	106 - 160 (143-216)	3 (76.2)	N/A	N/A	8,634 (38.4)	20,126 (89.5)
			6-3/4 (171.5)	18,618 (82.8)	20,126 (89.5)	29,727 (132.2)	20,126 (89.5)
			9 (228.6)	23,934 (106.5)	20,126 (89.5)	37,728 (167.8)	20,126 (89.5)
7/8 (22.2)	1 (25.4)	185 - 250 (250-338)	3-1/2 (88.9)	N/A	N/A	13,650 (60.7)	20,920 (92.9)
			7-7/8 (200.0)	N/A	29,866 (132.9)	44,915 (199.8)	29,866 (132.9)
			10-1/2 (266.7)	36,881 (164.1)	29,866 (132.9)	48,321 (215.0)	29,866 (132.9)
1 (25.4)	1-1/8 (28.6)	276 - 330 (374-447)	4 (101.6)	N/A	N/A	16,266 (72.2)	33,152 (147.5)
			9 (228.6)	32,215 (143.3)	37,538 (167.0)	48,209 (214.5)	37,538 (167.0)
			12 (304.8)	46,064 (204.9)	37,538 (167.0)	63,950 (284.5)	37,538 (167.0)
1-1/4 (31.8)	1-3/8 (34.9)	370 - 660 (501-894)	5 (127.0)	N/A	N/A	21,838 (97.1)	33,152 (147.5)
			11-1/4 (285.8)	45,962 (204.5)	58,412 (259.8)	56,715 (252.3)	58,412 (259.8)
			15 (381.0)	62,208 (276.7)	58,412 (259.8)	84,385 (375.4)	58,412 (259.8)

¹ Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod. **Divide by 4.**

² Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

³ Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive **Allowable Tension Loads¹ for Threaded Rod Installed in Solid Concrete**

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	934 (4.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		3-3/8 (85.7)	1,460 (6.5)	2,740 (12.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		4-1/2 (114.3)	1,930 (8.6)	2,915 (13.0)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	1,505 (6.7)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		4-1/2 (114.3)	2,700 (12.0)	4,290 (19.1)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		6 (152.4)	3,550 (15.8)	4,340 (19.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	3/4 (19.1)	2-1/2 (63.5)	N/A	1,832 (8.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		5-5/8 (142.9)	4,100 (18.3)	6,625 (29.5)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		7-1/2 (190.5)	4,685 (20.8)	7,345 (32.7)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	7/8 (22.2)	3 (76.2)	N/A	2,158 (9.6)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		6-3/4 (171.5)	4,655 (20.7)	7,430 (33.1)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		9 (228.6)	5,980 (26.6)	9,430 (42.0)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
7/8 (22.2)	1 (25.4)	3-1/2 (88.9)	N/A	3,413 (15.2)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		7-7/8 (200.0)	N/A	11,230 (49.9)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		10-1/2 (266.7)	9,220 (41.0)	12,080 (53.7)	11,600 (51.6)	25,510 (113.5)	20,834 (92.7)
1 (25.4)	1-1/8 (28.6)	4 (101.6)	N/A	4,067 (18.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		9 (228.6)	8,050 (35.8)	12,050 (53.6)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		12 (304.8)	11,515 (51.2)	15,985 (71.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
1-1/4 (31.8)	1-3/8 (34.9)	5 (127.0)	N/A	5,460 (24.3)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		11-1/4 (285.8)	11,490 (51.1)	14,175 (63.1)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		15 (381.0)	15,550 (69.2)	21,095 (93.8)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)

¹ Use lower value of either bond or steel strength for allowable tensile load.

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive **Allowable Shear Loads¹ for Threaded Rod Installed in Solid Concrete**

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	1,031 (4.6)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
		3-3/8 (85.7)	1,305 (5.8)	1,305 (5.8)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
		4-1/2 (114.3)	2,005 (8.9)	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	3/4 (19.1)	2-1/2 (63.5)	N/A	2,814 (12.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
		5-5/8 (142.9)	3,990 (17.8)	3,990 (17.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	7/8 (22.2)	3 (76.2)	N/A	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
		6-3/4 (171.5)	5,030 (22.4)	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	1 (25.4)	3-1/2 (88.9)	N/A	5,230 (23.3)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
		7-7/8 (200.0)	7,465 (33.2)	7,465 (33.2)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
1 (25.4)	1-1/8 (28.6)	4 (101.6)	N/A	8,288 (36.9)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
		9 (228.6)	9,385 (41.7)	9,385 (41.7)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
1-1/4 (31.8)	1-3/8 (34.9)	5 (127.0)	N/A	8,288 (36.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)
		11-1/4 (285.8)	14,600 (64.9)	14,600 (64.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)

¹ Use lower value of either concrete or steel strength for allowable shear load.

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive

Average Ultimate Tension Loads^{1,2,3} for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR DIA. In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	6,180 (27.5)	8,324 (37.0)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	7,560 (33.6)	11,418 (50.8)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	9,949 (44.3)	16,657 (74.1)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	15,038 (66.9)	17,828 (79.3)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	14,012 (62.3)	20,896 (93.0)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	16,718 (74.4)	26,072 (116.0)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	21,247 (94.5)	26,691 (118.7)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	33,325 (148.2)	37,425 (166.5)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	40,374 (179.6)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	38,975 (173.4)	46,050 (204.8)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	35,600 (158.4)	47,311 (210.5)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	41,010 (182.4)	66,140 (294.2)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	57,221 (254.5)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	79,966 (355.7)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	49,045 (218.2)	73,091 (325.1)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	69,079 (307.3)	83,295 (370.5)	76,200 (339.0)	114,300 (508.5)
# 11 (34.9)	12-3/8 (314.3)	63,397 (282.0)	75,047 (333.8)	93,600 (416.4)	140,400 (624.6)
	16-1/2 (419.1)	81,707 (363.5)	91,989 (409.2)	93,600 (416.4)	140,400 (624.6)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension loads.

3 SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive

Recommended Edge Distance Requirements for Shear Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) 100% LOAD CAPACITY	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (50% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (10% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7)	4-3/16 (106.4)	3-7/16 (87.3)	2-5/16 (58.7)	13/16 (20.6)
1/2 (12.7)	4-1/2 (114.3)	5-5/8 (142.9)	4-5/8 (117.5)	3-1/8 (79.4)	1-1/8 (28.6)
5/8 (15.9)	5-5/8 (142.9)	7 (177.8)	5-3/4 (146.1)	3-1/8 (79.4)	1-3/8 (34.9)
3/4 (19.1)	6-3/4 (171.5)	8-7/16 (214.2)	6-15/16 (176.2)	4-5/8 (117.5)	1-5/8 (41.3)
1 (25.4)	9 (228.6)	11-1/4 (285.8)	9-1/4 (235.0)	6-1/4 (158.8)	2-1/4 (57.2)
1-1/4 (31.8)	11-1/4 (285.8)	14-1/16 (357.2)	11-5/8 (295.3)	7-7/8 (200.0)	2-7/8 (73.0)

PERFORMANCE TABLE

A7+ Quick-Cure Adhesive Recommended Edge Distance Requirements for Tension Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) (100% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (90% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (70% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7) 4-1/2 (114.3)	2-1/2 (63.5) 3-3/8 (85.7)	1-15/16 (49.2) 2-5/8 (66.7)	1-3/8 (34.9) 1-7/8 (47.6)	13/16 (26.2) 1-1/8 (28.6)
1/2 (12.7)	4-1/2 (114.3) 6 (152.4)	3-3/8 (85.7) 4-1/2 (114.3)	2-5/8 (66.7) 3-1/2 (88.9)	1-7/8 (47.6) 2-1/2 (63.5)	1-1/8 (28.6) 1-1/2 (38.1)
5/8 (15.9)	5-5/8 (142.9) 7-1/2 (190.5)	4-3/16 (106.4) 5-5/8 (142.9)	3-1/4 (82.6) 4-3/8 (111.1)	2-5/16 (58.7) 3-1/8 (79.4)	1-3/8 (34.9) 1-7/8 (47.6)
3/4 (19.1)	6-3/4 (171.5) 9 (228.6)	5-1/16 (128.6) 6-3/4 (171.5)	3-15/16 (100.0) 5-1/4 (133.4)	2-13/16 (71.4) 3-3/4 (95.3)	1-5/8 (15.9) 2-1/4 (57.2)
1 (25.4)	9 (228.6) 12 (304.8)	6-3/4 (171.5) 9 (228.6)	5-1/4 (133.4) 7 (177.8)	3-3/4 (95.3) 5 (127.0)	2-1/4 (57.2) 3 (76.2)
1-1/4 (31.8)	11-1/4 (285.8) 15 (381.0)	8-7/16 (214.3) 11-1/4 (285.8)	6-9/16 (166.7) 8-3/4 (222.2)	4-3/4 (120.7) 6-1/4 (158.8)	2-7/8 (73.0) 3-3/4 (95.3)

REFERENCE TABLE

A7+ Quick-Cure Adhesive Allowable Stress Design Reference Tables

A7+ Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar^{1,2}

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load	0.75 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load	0.25 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load	1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
10% Shear Load	0.25 x Anchor Embedment
LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load	1.25 x Anchor Embedment
Minimum Spacing—Tension	
80% Tension Load	0.25 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load	1.25 x Anchor Embedment
Minimum Spacing—Shear	
25% Shear Load	0.25 x Anchor Embedment

1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.

2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

Combined Tension and Shear Loading—for A7+ Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{N_a}{N_s}\right)^{5/3} + \left(\frac{V_a}{V_s}\right)^{5/3} \leq 1$$

N_a = Applied Service Tension Load
 N_s = Allowable Tension Load

V_a = Applied Service Shear Load
 V_s = Allowable Shear Load

STRENGTH DESIGN TABLE

A7+
Quick-Cure Adhesive

**Rebar- ASTM A615 Grade 60 Steel in Uncracked Concrete
- Tension (lbf) and Shear (lbf)**

Rebar	Anchor Diameter (in.)	Embedment Depth (in.)	Tension (lbf)					Shear (lbf)
			2500 psi	3000 psi	4000 psi	5000 psi	6000 - 8000 psi	2500 - 8000 psi
#3	3/8	3 3/8	3,663	3,663	3,663	3,663	3,663	3,564
		4 1/2	4,884	4,884	4,884	4,884	4,884	3,564
		7 1/2	6,435	6,435	6,435	6,435	6,435	3,564
#4	1/2	4 1/2	7,446	7,523	7,523	7,523	7,523	6,480
		6	10,030	10,030	10,030	10,030	10,030	6,480
		10	11,700	11,700	11,700	11,700	11,700	6,480
#5	5/8	5 5/8	10,406	11,399	11,542	11,542	11,542	10,044
		7 1/2	15,389	15,389	15,389	15,389	15,389	10,044
		12 1/2	18,135	18,135	18,135	18,135	18,135	10,044
#6	3/4	6 3/4	13,679	14,871	14,871	14,871	14,871	14,256
		9	19,827	19,827	19,827	19,827	19,827	14,256
		15	25,740	25,740	25,740	25,740	25,740	14,256
#7	7/8	7 7/8	17,237	18,883	19,467	19,467	19,467	19,440
		10 1/2	25,955	25,955	25,955	25,955	25,955	19,440
		17 1/2	35,100	35,100	35,100	35,100	35,100	19,440
#8	1	9	21,060	23,070	25,115	25,115	25,115	25,596
		12	32,424	33,486	33,486	33,486	33,486	25,596
		20	46,215	46,215	46,215	46,215	46,215	25,596
#9	1 1/8	10 3/16	25,363	27,638	31,472	31,472	31,472	32,400
		13 1/2	38,845	41,816	41,816	41,816	41,816	32,400
		22 9/16	58,500	58,500	58,500	58,500	58,500	32,400
#10	1 1/4	11 1/2	30,491	33,018	38,477	43,019	46,227	41,148
		15 1/4	46,406	50,835	58,699	61,261	61,261	41,148
		25 7/16	74,295	74,295	74,295	74,295	74,295	41,148

Tabulated values are for estimation purposes only and should not be used for design (please use our TruSpec anchorage design software at www.itwredhead.com)

Tabulated values represent design strengths per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, not for sustained nor seismic loading

Bond strengths are for dry, cracked concrete with periodic inspection.

Bond strengths are for Temperature Range A (maximum long term temperature 110F, maximum short term temp 130F).

STRENGTH DESIGN TABLE

A7+ Quick-Cure Adhesive

Threaded Rod- ASTM A193 B7 in Uncracked Concrete

Anchor Diameter (in.)	Embedment Depth (in.)	Tension (lbf)					Shear (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi - 8000 psi	2500 psi - 8000 psi
3/8	3 3/8	3,871	3,871	3,871	3,871	3,871	3,777
	4 1/2	5,161	5,161	5,161	5,161	5,161	3,777
	7 1/2	7,268	7,268	7,268	7,268	7,268	3,777
1/2	4 1/2	6,881	6,881	6,881	6,881	6,881	6,916
	6	9,175	9,175	9,175	9,175	9,175	6,916
	10	13,305	13,305	13,305	13,305	13,305	6,916
5/8	5 5/8	10,406	10,406	10,406	10,406	10,406	11,018
	7 1/2	14,336	14,336	14,336	14,336	14,336	11,018
	12 1/2	21,188	21,188	21,188	21,188	21,188	11,018
3/4	6 3/4	13,679	14,984	14,984	14,984	15,483	16,309
	9	20,644	20,644	20,644	20,644	20,644	16,309
	15	31,358	31,358	31,358	31,358	31,358	16,309
7/8	7 7/8	17,237	17,740	17,740	17,740	17,740	22,510
	10 1/2	23,654	23,654	23,654	23,654	23,654	22,510
	17 1/2	39,423	39,423	39,423	39,423	39,423	22,510
1	9	21,060	23,070	23,070	23,070	23,171	29,530
	12	30,894	30,894	30,894	30,894	30,894	29,530
	20	51,491	51,491	51,491	51,491	51,491	29,530
1 1/4	11 1/2	30,419	33,322	38,477	43,019	43,738	47,242
	15 1/4	46,406	50,835	57,962	57,962	57,962	47,242
	25 7/16	90,855	90,855	90,855	90,855	90,855	47,242

Tabulated values are for estimation purposes only and should not be used for design (please use our TruSpec anchorage design software at www.itwredhead.com)

Tabulated values represent design strengths per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, not for sustained nor seismic loading
Bond strengths are for dry, cracked concrete with periodic inspection.

Bond strengths are for Temperature Range A (maximum long term temperature 110F, maximum short term temp 130F).

STRENGTH DESIGN TABLE

A7+
Quick-Cure Adhesive

**Threaded Rod in 2,500 - 8,000 psi
Uncracked Concrete - Tension (lbf) and Shear (lbf)**

Anchor Diameter (in.)	Embedment Depth (in.)	Carbon Steel A36		Stainless Steel F593		ASTM A193 B7 Threaded Rod	
		Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
3/8	3 3/8	3,375	1,755	3,871	2,280	3,871	3,777
	4 1/2	3,375	1,755	4,787	2,280	5,161	3,777
	7 1/2	3,375	1,755	4,787	2,280	7,268	3,777
1/2	4 1/2	6,173	3,211	6,881	4,044	6,881	6,916
	6	6,173	3,211	8,762	4,044	9,175	6,916
	10	6,173	3,211	8,762	4,044	13,305	6,916
5/8	5 5/8	9,833	5,116	10,752	6,441	10,752	11,018
	7 1/2	9,833	5,116	13,956	6,441	14,336	11,018
	12 1/2	9,833	5,116	13,956	6,441	21,188	11,018
3/4	6 3/4	14,550	7,566	15,483	7,614	15,483	16,309
	9	14,550	7,566	16,500	7,614	20,644	16,309
	15	14,550	7,566	16,500	7,614	31,358	16,309
7/8	7 7/8	17,740	10,446	17,740	10,533	17,740	22,510
	10 1/2	20,085	10,446	22,822	10,533	23,654	22,510
	17 1/2	20,085	10,446	22,822	10,533	39,423	22,510
1	9	23,171	13,702	23,171	13,818	23,171	29,530
	12	26,348	13,702	29,936	13,818	30,894	29,530
	20	26,348	13,702	29,936	13,818	51,491	29,530
1 1/4	11 1/2	38,477	21,925	38,477	22,092	38,477	47,242
	15 1/4	42,158	21,925	47,869	22,092	57,049	47,242
	25 7/16	42,158	21,925	47,869	22,092	90,855	47,242

Tabulated values are for estimation purposes only and should not be used for design (please use our TruSpec anchorage design software at www.itwredhead.com)

Tabulated values represent design strengths per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, not for sustained nor seismic loading
Bond strengths are for dry, cracked concrete with periodic inspection.

Bond strengths are for Temperature Range A (maximum long term temperature 110F, maximum short term temp 130F).

STRENGTH DESIGN TABLE

A7+
Quick-Cure Adhesive

**Rebar- ASTM A615 Grade 60 Steel in Cracked Concrete -
Tension (lbf) and Shear (lbf)**

Rebar	Anchor Diameter (in.)	Embedment Depth (in.)	Tension (lbf) 2500 - 8000 psi concrete	Shear (lbf) 2500 - 8000 psi concrete
#3	3/8	3 3/8	1,651	2,311
		4 1/2	2,201	3,082
		7 1/2	3,669	3,564
#4	1/2	4 1/2	2,935	4,109
		6	3,914	5,479
		10	6,523	6,480
#5	5/8	5 5/8	4,586	6,421
		7 1/2	6,115	8,561
		12 1/2	10,192	10,044
#6	3/4	6 3/4	5,117	7,164
		9	6,823	9,552
		15	11,372	14,256
#7	7/8	7 7/8	6,965	9,751
		10 1/2	9,287	13,002
		17 1/2	15,478	19,440
#8	1	9	9,097	12,736
		12	12,130	16,982
		20	20,216	25,596
#9	1 1/8	10 3/16	11,616	16,262
		13 1/2	15,434	21,607
		22 9/16	25,726	32,400
#10	1 1/4	11 1/2	17,447	24,426
		15 1/4	23,121	32,369
		25 7/16	38,592	41,148

Tabulated values are for estimation purposes only and should not be used for design (please use our TruSpec anchorage design software at www.itwredhead.com)

Tabulated values represent design strengths per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, not for sustained nor seismic loading

Bond strengths are for dry, cracked concrete with periodic inspection.

Bond strengths are for Temperature Range A (maximum long term temperature 110F, maximum short term temp 130F).

STRENGTH DESIGN TABLE

A7+
Quick-Cure Adhesive

**Threaded Rod in 2,500 - 8,000 psi Cracked Concrete -
Tension (lbf) and Shear (lbf)**

Anchor Diameter (in.)	Embedment Depth (in.)	Tension (lbf)	Shear (lbf)		
			Carbon Steel A36	Stainless Steel F593	ASTM A193 B7 Threaded Rod
3/8	3 3/8	2,318	1,755	2,280	3,245
	4 1/2	3,091	1,755	2,280	3,777
	7 1/2	5,151	1,755	2,280	3,777
1/2	4 1/2	3,071	3,211	4,044	4,300
	6	4,095	3,211	4,044	5,733
	10	6,825	3,211	4,044	6,916
5/8	5 5/8	5,224	5,116	6,441	7,314
	7 1/2	6,965	5,116	6,441	9,752
	12 1/2	11,609	5,116	6,441	11,018
3/4	6 3/4	7,785	7,566	7,614	10,899
	9	10,380	7,566	7,614	14,532
	15	17,300	7,566	7,614	16,309
7/8	7 7/8	8,275	10,446	10,533	11,585
	10 1/2	11,033	10,446	10,533	15,446
	17 1/2	18,388	10,446	10,533	22,510
1	9	10,186	13,702	13,818	14,260
	12	13,581	13,702	13,818	19,014
	20	22,635	13,702	13,818	29,530
1 1/4	11 1/2	17,172	21,925	22,092	24,041
	15 1/4	22,757	21,925	22,092	31,860
	25 7/16	37,984	21,925	22,092	47,242

Tabulated values are for estimation purposes only and should not be used for design (please use our TruSpec anchorage design software at www.itwredhead.com)

Tabulated values represent design strengths per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, not for sustained nor seismic loading
Bond strengths are for dry, cracked concrete with periodic inspection.

Bond strengths are for Temperature Range A (maximum long term temperature 110F, maximum short term temp 130F).

MASONRY DESIGN TABLE

A7+ Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Tension and Shear Loads based on Steel Design Information for U.S. Customary Unit Threaded Rod ^{1, 2, 3}

Anchor Diameter (in.)	Tension (lb)			Shear (lb)		
	ASTM A307 F _u = 60 ksi	ASTM A193 Grade B7 F _u = 125 ksi	ASTM F593 SS 304 F _u = 100 ksi	ASTM A307 F _u = 60 ksi	ASTM A193 Grade B7 F _u = 125 ksi	ASTM F593 SS 304 F _u = 100 ksi
3/8	2,185	4,555	3,645	1,125	2,345	1,875
1/2	3,885	8,100	6,480	2,000	4,170	3,335
5/8	6,075	12,655	10,125	3,130	6,520	5,215
3/4	8,750	18,225	12,390	4,505	9,390	6,385

For SI: 1 inch = 25.4mm, 1 lbf = 4.45N, 1ft-lbf = 1.356 N-M, 1 psi = 0.006895 MPa

¹Allowable load used in the design must be the lesser of bond values and tabulated steel element values.

²Allowable tension and shear loads for threaded rods to resist short term loads, such as wind or seismic, must be calculated in accordance with Section 4.1 as applicable.

³Allowable steel loads are based on allowable tension and shear stresses equal to 0.33X Fu and 0.17XFu, respectively.

MASONRY DESIGN TABLE

A7+ Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Tension Loads for Threaded Rod ^{1, 2, 3, 4, 7, 9, 10, 11, 12}

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at s _{cr} and c _{cr} (lb)	Spacing ⁵			Edge Distance ⁶		
			Critical s _{cr} (inches)	Minimum s _{min} (inches)	Load reduction factor for s _{min} ⁸	Critical c _{cr} (inches)	Minimum c _{min} (inches)	Load reduction factor for c _{min} ⁸
3/8	3 3/8	1,125	13.5	4	1.00	12	4	1.00
1/2	4 1/2	1,695	18	4	0.60	20	4	0.90
5/8	5 3/8	2,015	22.5	4	0.60	20	4	0.90
3/4	6 3/4	3,145	27	4	0.60	20	4	0.63

MASONRY DESIGN TABLE

A7+ Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Shear Loads for Threaded Rod ^{1, 2, 3, 4, 7, 9, 10, 11, 12}

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at s _{cr} and c _{cr} (lb)	Spacing ⁵			Edge Distance ⁶		
			Critical s _{cr} (inches)	Minimum s _{min} (inches)	Load reduction factor for s _{min} ⁸	Critical c _{cr} (inches)	Minimum c _{min} (inches)	Load reduction factor for c _{min} ⁸
3/8	3 3/8	750	13.5	4	0.50	12	4	0.95
1/2	4 1/2	1,520	18	4	0.50	20	4	0.44
5/8	5 3/8	2,285	22.5	4	0.50	12	4	0.26
3/4	6 3/4	2,345	27	4	0.50	20	4	0.26

For SI: 1 inch = 25.4mm, 1 lbf = 0.0044 kN, 1 ksi = 6.894 MPa. (Refer to Table 4 for footnotes)

¹All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium-, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.

³Anchors may be installed in any location in the face of the masonry wall (cell, web, bed joint) as shown in Figure 2.

⁴A maximum of two anchors may be installed in a single masonry cell in accordance with the spacing and edge or end distance requirements. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor. See Figure 2 of this report.

⁵The critical spacing distance, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, s_{min}, is the minimum anchor spacing for which values are available and installation is permitted. Spacing distance is measured from the centerline to centerline between two anchors.

⁶The critical edge or end distance, c_{cr}, is the distance where full load values in the table may be used. The minimum edge or end distance, c_{min}, is the minimum distance for which values are available and installation is permitted. Edge or end distance is measured from anchor centerline to the closest unrestrained edge.

⁷The tabulated values are applicable for anchors in the ends of grout-filled concrete masonry units where minimum edge distances are maintained.

⁸Load values for anchors installed less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s) or edge distance (c). Load factors are multiplicative; both spacing and edge reduction factors must be considered.

⁹Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge or end distance (c_{min}) and critical edge or end distance (c_{cr}) is permitted.

¹⁰Concrete masonry width (wall thickness) must be equal to or greater than 1.5 times the anchor embedment depth (e.g. 3/8-inch- and 1/2-inch-diameter anchors are permitted in minimum nominally 6-inch-thick concrete masonry). The 5/8- and 3/4-inch-diameter anchors must be installed in minimum nominally 8-inch-thick concrete masonry.

¹¹Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 2.

¹²Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.

MASONRY DESIGN TABLE

A7+
Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Tension and Shear Loads for Rebar ^{1, 2, 3}

Rebar Size	Tension (lb)	Shear (lb)
	ASTM A615, Grade 60	ASTM A615, Grade 60
No. 3	3,270	1,685
No. 4	5,940	3,060
No. 5	9,205	4,745
No. 6	13,070	6,730

For SI: 1 inch = 25.4mm, 1 lbf = 4.45N, 1ft-lbf = 1.356 N-M, 1 psi = 0.006895 MPa

1 Allowable load used in the design must be the lesser of bond values and tabulated steel element values.

2 Allowable tension and shear loads for threaded rods to resist short term loads, such as wind or seismic, must be calculated in accordance with Section 4.1 as applicable.

3 Allowable steel loads are based on allowable tension and shear stresses equal to 0.33X Fu and 0.17XFu, respectively.

MASONRY DESIGN TABLE

A7+
Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Tension Loads for Rebar ^{1, 2, 3, 4, 7, 9, 10, 11, 12}

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at s_{cr} and c_{cr} (lb)	Spacing ⁵			Edge Distance ⁶		
			Critical s_{cr} (inches)	Minimum s_{min} (inches)	Load reduction factor for s_{min} ⁸	Critical c_{cr} (inches)	Minimum c_{min} (inches)	Load reduction factor for c_{min} ⁸
3/8	3 3/8	1,530	13.5	4	1.00	12	4	1.00
1/2	4 1/2	1,845	18	4	0.60	20	4	0.90
5/8	5 5/8	2,465	22.5	4	0.60	20	4	0.90
3/4	6 3/4	2,380	27	4	0.60	20	4	0.63

MASONRY DESIGN TABLE

A7+
Quick-Cure Adhesive

Grout-filled Concrete Block: Allowable Shear Loads for Rebar ^{1, 2, 3, 4, 7, 9, 10, 11, 12}

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at s_{cr} and c_{cr} \perp to edge (lb)	Spacing ⁵			Edge Distance ⁶		
			Critical s_{cr} (inches)	Minimum s_{min} (inches)	Load reduction factor for s_{min} ⁸	Critical c_{cr} (inches)	Minimum c_{min} (inches)	Load reduction factor for c_{min} ⁸
3/8	3 3/8	1,410	13.5	4	0.50	12	4	0.95
1/2	4 1/2	1,680	18	4	0.50	20	4	0.44
5/8	5 5/8	3,245	22.5	4	0.50	12	4	0.26
3/4	6 3/4	4,000	27	4	0.50	20	4	0.26

For SI: 1 inch = 25.4 mm; 1 lbf = 0.0044 kN, 1 ksi = 6.894 MPa.

(The following footnotes apply to both Tables 6 and 7)

1 All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi (10.3 MPa). Concrete masonry units must be light-, medium, or normal-weight conforming to ASTM C 90. Allowable loads have been calculated using a safety factor of 5.0.

3 Anchors may be installed in any location in the face of the masonry wall (cell, web, bed joint) as shown in figure 2.

4 A maximum of two anchors may be installed in a single masonry cell in accordance with the spacing and edge or end distance requirements. Embedment is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor. See Figure 2 of this report.

5 The critical spacing distance, s_{cr} , is the anchor spacing where full load values in the table may be used. The minimum spacing distance, s_{min} , is the minimum anchor spacing for which values are available and installation is permitted. Spacing distance is measured from the centerline to centerline between two anchors.

6 The critical edge or end distance, c_{cr} , is the distance where full load values in the table may be used. The minimum edge or end distance, c_{min} , is the minimum distance for which values are available and installation is permitted. Edge or end distance is measured from anchor centerline to the closest unrestrained edge.

7 The tabulated values are applicable for anchors in the ends of grout-filled concrete masonry units where minimum edge distances are maintained.

8 Load values for anchors installed less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s) or edge distance (c). Load factors are multiplicative; both spacing and edge reduction factors must be considered.

9 Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge or end distance (c_{min}) and critical edge or end distance (c_{cr}) is permitted.

10 Concrete masonry width (wall thickness) must be equal to or greater than 1.5 times the anchor embedment depth (e.g. No. 3 and No. 4 reinforcing bars are permitted in minimum nominally 6-inch-thick concrete masonry). No. 5 and No. 6 reinforcing bars must be installed in minimum nominally 8-inch-thick concrete masonry.

11 Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 4.

12 Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1, as applicable.

C6+

High Strength Epoxy for All Conditions



C6P-20

DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see page 44

One product for most environmental conditions and weather conditions

Design and use with confidence with Epcon C6+ featuring 35% greater bond strength than the closest competition in 70° cracked concrete, and better performance in dry, saturated and water filled conditions.

ADVANTAGES

- Higher average bond strength than competition in cracked concrete
- Excellent performance in diamond cored and oversized holes.
- Better performance in dry, saturated, and water-filled conditions.
- Safe & durable to use at job sites (cartridges vs. sausage packs)
- Simplifies specification process by providing a comprehensive list of 3rd-party approvals
- 24-month shelf life.
- One formula for both **solid** and **hollow** base materials.



Easy to open, snap-off tip, no cutting required

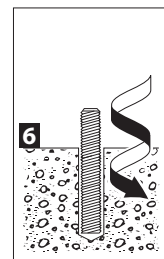
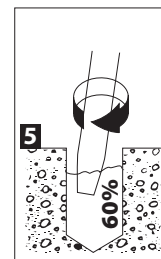
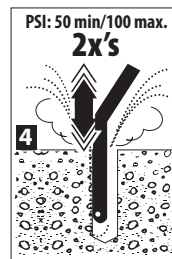
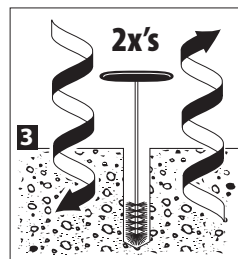
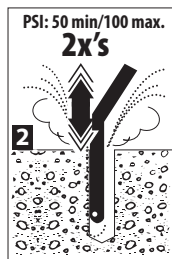
Curing Times

BASE MATERIAL (F°/C°)	GEL TIME ²	FULL CURE TIME
104°/ 40°	3 minutes	3 hours
95°/ 35°	4 minutes	4 hours
86°/ 30°	6 minutes	5 hours
77°/ 25°	8 minutes	6 hours
72°/ 22°	11 minutes	7 hours
59°/ 15°	15 minutes	8 hours
50°/ 10°	20 minutes	12 hours
40°/ 4.4°	20 minutes	24 hours

¹ For concrete temperatures between 40-50°F adhesive must be maintained at a minimum of 50°F during installation.

² Gel time is max time from the end of mixing to when the insertion of the threaded rod or rebar into the adhesive shall be completed.

INSTALLATION STEPS



*Damp, submerged, and underwater applications require 4x's air, 4x's brushing, and 4x's air

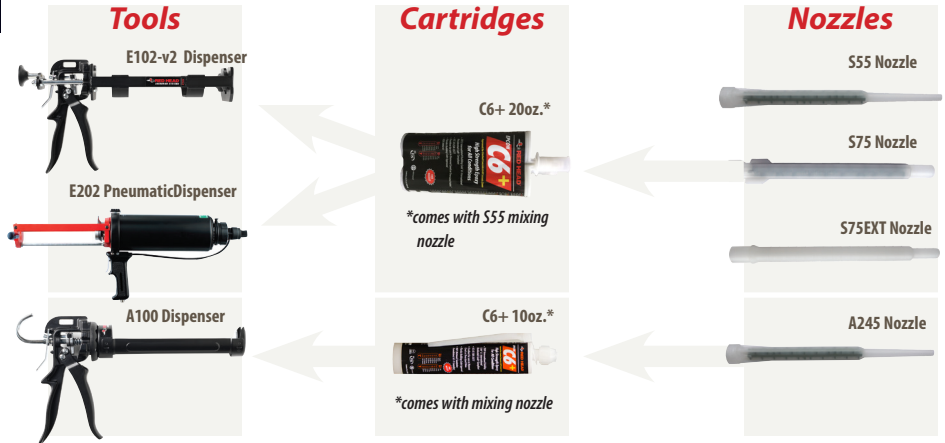
Selection Guide

APPROVALS/LISTINGS

- ICC-ES ESR Report No. 3577, approved for Cracked, Uncracked, and all Seismic Zones (A~F)
- Florida Building Code
- IBC 2003/2006/2009/2012/2015
- IRC 2003/2006/2009/2012/2015
- NSF/ANSI 61

For the most current approvals/listings visit:
www.itw-redhead.com

*nozzle included in purchase



Product Category	Part No.	Description	Carton Qty
Epcon C6+ Epoxy			
Epcon C6+ 20 fl. Oz cartridge	C6P-20	Epcon C6+ 20 fl. oz cartridge	6
Epcon C6+ 10 fl. Oz cartridge	C6P-10	Epcon C6+ 10 fl. oz cartridge, installs with 10oz. dispensing tool	6
Mixing Nozzles			
Mixing Nozzle	A245	Mixing Nozzle for C6P-10	24
Mixing Nozzle	S55	Mixing Nozzle for C6P-20	24
High Flow Mixing Nozzle	S75	High Flow Nozzle for C6P-20 (for 5/8" diameter hole or larger)	24
Mixing Nozzle Extension	S75EXT	Nozzle Extension For S75 High Flow Nozzle	24
Dispensing Guns			
Dispensing Gun - 10 oz.	A100	Manual Dispenser for C6P-10	1
Dispensing Gun - 20 oz.	E102-V2	Manual Dispenser for C6P-20	1
Pneumatic Dispensing Gun - 20 oz.	E202	Pneumatic Dispenser for C6P-20	1
Piston Plug			
Piston plugs for deep embedment installations greater than 10"	PL-5834	Piston Plug for 5/8" and 3/4" diameter anchors	10
	PL-7810	Piston Plug for 7/8" and 1" diameter anchors	10
	PL-1250	Piston Plug for 1-1/4" diameter anchors	10
Extension Tubing			
6-Foot Straight Tubing	E916-6	6-Foot Straight Tubing for use with piston plugs	1

Wire Brushes	Part No.	Anchor Dia.	Rebar	Drill Bit Dia.	Brush Dia.	Overall Length	Qty
3/8" Diameter Brush	WB-038	3/8"	No.3	7/16"	5/8"	4-7/8"	10
1/2" Diameter Brush	WB-012	1/2"	No. 4	9/16"	3/4"	4-7/8"	10
5/8" Diameter Brush	WB-058	5/8"	No.5	3/4"	1"	4-7/8"	10
3/4" Diameter Brush	WB-034	3/4"	No.6	7/8"	1-1/4"	4-7/8"	10
7/8" Diameter Brush	WB-078	7/8"	No. 7	1"	1-1/2"	5-1/8"	10
1" Diameter Brush	WB-010	1"	No.7	1-1/8"	1-5/8"	5-1/4"	10
1-1/4" Diameter Brush	WB-125	1-1/4"	No. 10	1-3/8"	1-3/4"	5-1/4"	10
Brush Extension	ESDS-38	Wire brush 12" usable extension with SDS+ adaptor					1
Brush Extension	EHAN-38	Wire brush 12" usable extension with T-Handle					1
Hole Plugs	Part No.	Hole Diameter				Qty	
3/8" Diameter Hole Plug	E038	7/16"				25	
1/2" Diameter Hole Plug	E012	9/16"				25	
5/8" Diameter Hole Plug	E058	3/4"				20	
3/4" Diameter Hole Plug	E034	7/8"				20	
7/8" Diameter Hole Plug	E078	1"				10	
1" Diameter Hole Plug	E010	1-1/8"				10	



SB038 - 3/8" Diameter Brush



PL-7810 - Piston plug for 7/8" and 1" diameter anchors

ESTIMATING TABLES

C6P-20 Number of Anchoring Installations Per Cartridge* 20 Fluid Ounce Cartridge Using Reinforcing Bar with C6+ Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#3	7/16	558.2	279.1	186.1	139.5	111.6	93.0	79.7	69.8	62.0	55.8	50.7	46.5	42.9	39.9	37.2
#4	5/8	273.5	136.7	91.2	68.4	54.7	45.6	39.1	34.2	30.4	27.3	24.9	22.8	21.0	19.5	18.2
#5	3/4	189.9	95.0	63.3	47.5	38.0	31.7	27.1	23.7	21.1	19.0	17.3	15.8	14.6	13.6	12.7
#6	7/8	139.5	69.8	46.5	34.9	27.9	23.3	19.9	17.4	15.5	14.0	12.7	11.6	10.7	10.0	9.3
#7	1	106.8	53.4	35.6	26.7	21.4	17.8	15.3	13.4	11.9	10.7	9.7	8.9	8.2	7.6	7.1
#8	1-1/8	84.4	42.2	28.1	21.1	16.9	14.1	12.1	10.6	9.4	8.4	7.7	7.0	6.5	6.0	5.6
#9	1-1/4	68.4	34.2	22.8	17.1	13.7	11.4	9.8	8.5	7.6	6.8	6.2	5.7	5.3	4.9	4.6
#10	1-1/2	47.5	23.7	15.8	11.9	9.5	7.9	6.8	5.9	5.3	4.7	4.3	4.0	3.7	3.4	3.2
#11	1-3/4	34.9	17.4	11.6	8.7	7.0	5.8	5.0	4.4	3.9	3.5	3.2	2.9	2.7	2.5	2.3

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

C6P-20 Number of Anchoring Installations Per Cartridge* 20 Fluid Ounce Cartridge Using Threaded Rod with C6+ Adhesive in Solid Concrete

ROD (In.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1/4	5/16	795.7	397.8	265.2	198.9	159.1	132.6	113.7	99.5	88.4	79.6	72.3	66.3	61.2	56.8	53.0
3/8	7/16	406.0	203.0	135.3	101.5	81.2	67.7	58.0	50.7	45.1	40.6	36.9	33.8	31.2	29.0	27.1
1/2	9/16	245.6	122.8	81.9	61.4	49.1	40.9	35.1	30.7	27.3	24.6	22.3	20.5	18.9	17.5	16.4
5/8	3/4	138.1	69.1	46.0	34.5	27.6	23.0	19.7	17.3	15.3	13.8	12.6	11.5	10.6	9.9	9.2
3/4	7/8	101.5	50.7	33.8	25.4	20.3	16.9	14.5	12.7	11.3	10.1	9.2	8.5	7.8	7.2	6.8
7/8	1	77.7	38.9	25.9	19.4	15.5	13.0	11.1	9.7	8.6	7.8	7.1	6.5	6.0	5.6	5.2
1	1-1/8	61.4	30.7	20.5	15.3	12.3	10.2	8.8	7.7	6.8	6.1	5.6	5.1	4.7	4.4	4.1
1-1/4	1-3/8	41.1	20.5	13.7	10.3	8.2	6.8	5.9	5.1	4.6	4.1	3.7	3.4	3.2	2.9	2.7
1-1/2	1-5/8	29.4	14.7	9.8	7.4	5.9	4.9	4.2	3.7	3.3	2.9	2.7	2.5	2.3	2.1	2.0

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

C6P-10 Number of Anchoring Installations Per Cartridge* 8.5 Fluid Ounce Cartridge Using Reinforcing Bar with C6+ Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES									
		1	2	3	4	5	6	7	8	9	10
#3	7/16	169.1	84.6	56.4	42.3	33.8	28.2	24.2	21.1	18.8	16.9
#4	5/8	82.9	41.4	27.6	20.7	16.6	13.8	11.8	10.4	9.2	8.3
#5	3/4	57.6	28.8	19.2	14.4	11.5	9.6	8.2	7.2	6.4	5.8
#6	7/8	42.3	21.1	14.1	10.6	8.5	7.0	6.0	5.3	4.7	4.2
#7	1	32.4	16.2	10.8	8.1	6.5	5.4	4.6	4.0	3.6	3.2
#8	1-1/8	25.6	12.8	8.5	6.4	5.1	4.3	3.7	3.2	2.8	2.6
#9	1-1/4	20.7	10.4	6.9	5.2	4.1	3.5	3.0	2.6	2.3	2.1
#10	1-1/2	14.4	7.2	4.8	3.6	2.9	2.4	2.1	1.8	1.6	1.4
#11	1-3/4	10.6	5.3	3.5	2.6	2.1	1.8	1.5	1.3	1.2	1.1

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

C6P-10

8.5 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* Using Threaded Rod with C6+ Adhesive in Solid Concrete

ROD (In.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES									
		1	2	3	4	5	6	7	8	9	10
1/4	5/16	331.5	165.8	110.5	82.9	66.3	55.3	47.4	41.4	36.8	33.2
3/8	7/16	169.1	84.6	56.4	42.3	33.8	28.2	24.2	21.1	18.8	16.9
1/2	9/16	102.3	51.2	34.1	25.6	20.5	17.1	14.6	12.8	11.4	10.2
5/8	3/4	57.6	28.8	19.2	14.4	11.5	9.6	8.2	7.2	6.4	5.8
3/4	7/8	42.3	21.1	14.1	10.6	8.5	7.0	6.0	5.3	4.7	4.2
7/8	1	32.4	16.2	10.8	8.1	6.5	5.4	4.6	4.0	3.6	3.2
1	1-1/8	25.6	12.8	8.5	6.4	5.1	4.3	3.7	3.2	2.8	2.6
1-1/4	1-3/8	17.1	8.6	5.7	4.3	3.4	2.9	2.4	2.1	1.9	1.7
1-1/2	1-5/8	12.3	6.1	4.1	3.1	2.5	2.0	1.8	1.5	1.4	1.2

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

PACKAGING

1. Disposable, self-contained cartridge system capable of dispensing both epoxy components in the proper mixing ratio
2. Epoxy components dispensed through a static mixing nozzle that thoroughly mixes the material, and places the epoxy at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

SUGGESTED SPECIFICATIONS

EPOXY ADHESIVE

High Strength EPOXY ADHESIVE:

1. Two component resin and hardener, non-sag paste, insensitive to moisture, grey in color, suitable for extreme temperature ranges, for all conditions or substrate materials.
2. Meets NSF Standard 61, certified for use in conjunction with drinking water systems.
3. Works in wet, damp, and submerged hole.
4. Extended Shelf life: Best if used within 2 years.
5. Oversized and/or diamond cored holes permitted.
6. Recommended storage: 40°F - 80°F

PERFORMANCE TABLE

Bond Strength Design Information For Fractional Threaded Rod^{1,7}

Design Information	Symbol	Units	Nominal Threaded Rod Diameter							
			3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/4"	
Minimum Effective Installation Depth	$h_{ef,min}$	in	1-5/8"	2"	2-1/2"	3-1/2"	4	4	5	
		mm	60	70	79	89	102	102	127	
Maximum Effective Installation Depth	$h_{ef,max}$	in	7-1/2	10	12-1/2	15	17-1/2	20	25	
		mm	191	254	318	381	445	508	635	
Temperature Range A, ^{2,5}	Characteristic Bond Strength in Uncracked Concrete	psi	1,350							
		N/mm ²	9.3							
	Characteristic Bond Strength in Cracked Concrete	psi	1,150	1,090	1,025	965	900	840	715	
		N/mm ²	7.9	7.5	7.1	5.1	4.7	4.4	3.8	
Temperature Range B, ^{1,5}	Characteristic Bond Strength in Uncracked Concrete	psi	1,030							
		N/mm ²	7.1							
	Characteristic Bond Strength in Cracked Concrete	psi	875	830	780	735	685	640	545	
		N/mm ²	6.1	5.7	5.4	5.1	4.7	4.4	3.8	
Temperature Range C, ^{4,5}	Characteristic Bond Strength in Uncracked Concrete	psi	725							
		N/mm ²	5.0							
	Characteristic Bond Strength in Cracked Concrete	psi	620	620	620	620	620	620	620	
		N/mm ²	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
Permissible Installation Conditions ⁶	Dry Concrete	ϕ_d	0.65							
	Water-saturated Concrete	ϕ_{ws}	0.55				0.65			
	Water-filled Hole	ϕ_{wf}	0.65							
	Submerged Concrete	ϕ_{sub}	0.65							0.55
	Dry Concrete	ϕ_d	0.65							
	Water-saturated Concrete	ϕ_{ws}	0.65							
	Water-filled Hole	ϕ_{wf}	0.65							
	Submerged Concrete	ϕ_{sub}	0.65							

For SI: 1 inch = 25.4 mm, 1 in.² = 645.16 mm², 1 lb = 0.004448 kN

¹ Bond strength values correspond to concrete compressive strength $f_c = 2,500$ psi. Bond strength values must not be increased for increased concrete compressive strength.

² Temperature Range A = Maximum Long Term Temperature: 110°F (43°C); Maximum Short Term Temperature: 130°F (55°C)

³ Temperature Range B = Maximum Long Term Temperature: 110°F (43°C); Maximum Short Term Temperature: 162°F (72°C)

⁴ Temperature Range C = Maximum Long Term Temperature: 110°F (43°C); Maximum Short Term Temperature: 176°F (80°C) Short-term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long-term concrete temperatures are roughly constant over significant periods of time.

⁶ The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, or ACI 318 Section 9.2 are used in accordance with ACI 318 D.4.3. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4.

⁷ For sustained loads, bond strengths must be multiplied by 0.73.

⁸ See ICC-ES ESR 3577 for further design information in accordance with ACI 318

PERFORMANCE TABLE

Bond Strength Design Information For Fractional Reinforcing Bar ^{1,7}

Design Information		Symbol	Units	Nominal Threaded Bar Diameter					
				No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Minimum Effective Installation Depth	$h_{ef,min}$	in	1-5/8"	2"	2-1/2"	3-1/2"	4	4	5
		mm	60	70	79	89	102	102	127
Maximum Effective Installation Depth	$h_{ef,max}$	in	7-1/2	10	12-1/2	15	17-1/2	20	25
		mm	191	254	318	381	445	508	635
Temperature Range A, ^{2,5}	Characteristic Bond Strength in Uncracked Concrete	psi	1,350						
		N/mm ²	9.3						
	Characteristic Bond Strength in Cracked Concrete	psi	1,150	1,090	1,025	965	900	840	715
		N/mm ²	7.9	7.5	7.1	5.1	4.7	4.4	3.8
Temperature Range B, ^{3,5}	Characteristic Bond Strength in Uncracked Concrete	psi	1,030						
		N/mm ²	7.1						
	Characteristic Bond Strength in Cracked Concrete	psi	875	830	780	735	685	640	545
		N/mm ²	6.1	5.7	5.4	5.1	4.7	4.4	3.8
Temperature Range C, ^{4,5}	Characteristic Bond Strength in Uncracked Concrete	psi	725						
		N/mm ²	5.0						
	Characteristic Bond Strength in Cracked Concrete	psi	620	620	620	620	620	620	620
		N/mm ²	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Permissible Installation Conditions ⁶	Dry Concrete	ϕ_d	0.65						
	Water-saturated Concrete	ϕ_{ws}							
	Water-filled Hole	ϕ_{wf}	0.55	0.65					
	Submerged Concrete	ϕ_{sub}	0.65						
	Dry Concrete	ϕ_d	0.65						
	Water-saturated Concrete	ϕ_{ws}							
	Water-filled Hole	ϕ_{wf}	0.65						
	Submerged Concrete	ϕ_{sub}	0.65						

For 51: 1 inch = 25.4 mm, 1 in.² = 645.16 mm², 1 lb = 0.004448 kN

¹ Bond strength values correspond to concrete compressive strength $f_c = 2,500$ psi. Bond strength values must not be increased for increased concrete compressive strength.

² Temperature Range A = Maximum Long Term Temperature: 110° F (43° C); Maximum Short Term Temperature: 130° F (55° C)

³ Temperature Range B = Maximum Long Term Temperature: 110° F (43° C); Maximum Short Term Temperature: 162° F (72° C)

⁴ Temperature Range C = Maximum Long Term Temperature: 110° F (43° C); Maximum Short Term Temperature: 176° F (80° C)

⁵ Short-term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long-term concrete temperatures are roughly constant over significant periods of time.

⁶ The tabulated value of ϕ applies when the load combinations of Section 1605.2 of the IBC, or ACI 318 Section 9.2 are used in accordance with ACI 318 D.4.3. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4.

⁷ For sustained loads, bond strengths must be multiplied by 0.73.

⁸ See ICC-ES ESR 3577 for further design information in accordance with ACI 318

PERFORMANCE TABLE

C6+ Epoxy Adhesive

Allowable Tension Loads ^{1,2,3} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA In. (mm)	EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,800 (8.0)	2,110 (9.4)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
	4-1/2 (114.3)	2,080 (9.2)	2,505 (11.1)			
1/2 (12.7)	4-1/2 (114.3)	3,315 (14.8)	4,420 (19.7)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
	6 (152.4)	4,780 (21.3)	4,900 (21.8)			
5/8 (15.9)	5-5/8 (142.9)	4,425 (19.7)	6,130 (27.3)	11,250 (50.0)	12,230 (54.4)	11,250 (50.0)
	7-1/2 (190.5)	5,660 (25.2)	7,190 (32.0)			
3/4 (19.1)	6-3/4 (171.5)	7,195 (32.0)	7,885 (35.1)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
	9 (228.6)	7,940 (35.3)	10,345 (46.0)			
7/8 (22.2)	7-7/8 (200.0)	8,810 (39.2)	9,430 (41.9)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
	10-1/2 (266.7)	N/A	12,080 (57.0)			
1 (25.4)	9 (228.6)	10,085 (44.9)	11,970 (53.3)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
	12 (304.8)	12,180 (54.2)	15,545 (69.2)			
1-1/4 (31.8)	11-1/4 (285.8)	13,915 (61.9)	14,245 (63.4)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
	15 (381.0)	16,340 (72.7)	19,930 (88.7)			

PERFORMANCE TABLE

C6+
Epoxy Adhesive

Allowable Shear Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH			ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	6000 PSI (41.4 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,300 (5.8)	1,465 (6.5)	1,500 (6.7)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	4-1/2 (114.3)	2,855 (12.7)	3,145 (14.0)	3,145 (14.0)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	5-5/8 (142.9)	4,575 (20.3)	4,950 (22.0)	4,950 (22.0)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	6-3/4 (171.5)	6,430 (28.6)	6,430 (28.6)	6,430 (28.6)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	7-7/8 (200.0)	N/A	7,575 (33.7)	8,140 (36.2)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
1 (25.4)	9 (228.6)	9,630 (42.8)	10,085 (44.9)	11,600 (51.6)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
1-1/4 (31.8)	11-1/4 (285.8)	16,270 (72.4)	16,270 (72.4)	16,270 (72.4)	11,900 (52.9)	24,790 (110.3)	18,840 (83.8)

1 Use lower value of either concrete or steel strength for allowable shear load.

2 Allowable loads taken from ICC Evaluation Report #4285 (formerly ICBO).

3 Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

C6+
Epoxy Adhesive

Average Ultimate Tension and Shear Loads^{1,2,3} for Threaded Rod Installed in Grout Filled Concrete Block

THREADED ROD DIA.	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR LOCATION In. (mm)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	3 (76.2)	GRouted CELL	4,862 (21.6)	N/A
1/2 (12.7)	5/8 (15.9)	3 (76.2)	GRouted CELL	4,953 (22.0)	N/A
1/2 (12.7)	5/8 (15.9)	6 (152.4)	GRouted CELL	8,214 (36.5)	N/A
5/8 (15.9)	3/4 (19.1)	5 (127.0)	GRouted CELL	7,355 (32.7)	N/A
3/4 (19.1)	7/8 (22.2)	6 (152.4)	Note 1	17,404 (77.4)	19,588 (87.1)
3/4 (19.1)	7/8 (22.2)	6 (152.4)	Note 2	17,404 (77.4)	8,668 (38.6)

1 Anchor can be located in grouted cell, "T" joint, or bed joint.

2 Anchor can be located in first grouted cell from edge.

3 Allowable working loads for the single installations under static loading should not exceed 20% (an industry standard) capacity or the allowable load of the anchor rod. Loads based upon testing with ASTM A193, Grade B7 rods.

C6+
Epoxy Adhesive

Average Ultimate Tension Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete, Shallow Embedment

ANCHOR DIAMETER In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	3500 PSI (24.2 MPa) ULTIMATE TENSION Lbs. (kN)
1/4 (6.4)	5/16 (7.9)	1 (25.4)	1,653 (7.4)
		2-1/4 (57.2)	2,818 (12.5)
		3 (76.2)	3,599 (16.0)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	3,426 (15.2)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	6,100 (27.1)
5/8 (15.9)	3/4 (19.1)	2-1/2 (63.5)	8,775 (39.0)
3/4 (19.1)	7/8 (22.2)	3 (76.2)	12,625 (56.2)
7/8 (22.2)	1 (25.4)	3-1/2 (88.9)	18,650 (83.0)
1 (25.4)	1-1/8 (28.6)	4 (101.6)	25,034 (111.4)
1-1/4 (31.8)	1-3/8 (34.9)	5 (127.0)	37,100 (165.0)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000, 4000, and 6000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances (see page 35).

PERFORMANCE TABLE

C6+ Epoxy Adhesive

Average Ultimate Tension Loads^{1,2,3} for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	7,020 (31.2)	9,200 (40.9)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	9,000 (40.1)	11,540 (51.3)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	11,940 (53.1)	15,140 (67.3)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	16,703 (74.3)	18,880 (84.0)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	14,120 (62.8)	27,740 (123.4)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	20,040 (89.1)	30,727 (136.7)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	17,940 (79.8)	29,200 (129.9)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	25,520 (113.5)	41,640 (185.2)	26,400 (117.4)	39,600 (176.2)
	10 (254.0)	N/A	45,000 (200.2)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	45,850 (204.0)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	N/A	60,375 (268.6)	36,000 (160.1)	54,000 (240.2)
	13 (330.2)	N/A	65,300 (290.5)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	30,960 (137.7)	54,180 (241.1)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	30,960 (137.7)	65,420 (291.0)	47,400 (210.9)	71,100 (316.3)
	16 (406.4)	N/A	86,700 (385.7)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	61,530 (273.7)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	81,240 (361.4)	60,000 (266.9)	90,000 (400.4)
	19 (482.6)	N/A	108,000 (480.4)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	44,600 (198.4)	76,500 (340.3)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	49,220 (218.9)	82,320 (366.2)	76,200 (339.0)	114,300 (508.5)
	19 (482.6)	N/A	120,000 (533.8)	76,200 (339.0)	114,300 (508.5)

1 Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod. **Divide by 4.**

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension and shear loads.

3 SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

C6+ PERFORMANCE REFERENCE TABLES

Combined Tension and Shear Loading—for Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{N_a}{N_s}\right)^{5/3} + \left(\frac{V_a}{V_s}\right)^{5/3} \leq 1$$

N_a = Applied Service Tension Load

N_s = Allowable Tension Load

V_a = Applied Service Shear Load

V_s = Allowable Shear Load

C6+ Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar^{1,2}

LOAD FACTOR

Critical Edge Distance—Tension

100% Tension Load

→ 1.25 x Anchor Embedment (or greater)

Minimum Edge Distance—Tension

70% Tension Load

→ 0.50 x Anchor Embedment

Critical Edge Distance—Shear

100% Shear Load

→ 1.25 x Anchor Embedment (or greater)

Minimum Edge Distance—Shear

30% Shear Load

→ 0.30 x Anchor Embedment

LOAD FACTOR

Critical Spacing—Tension

100% Tension Load

→ 1.50 x Anchor Embedment (or greater)

Minimum Spacing—Tension

75% Tension Load

→ 0.75 x Anchor Embedment

Critical Spacing—Shear

100% Shear Load

→ 1.50 x Anchor Embedment (or greater)

Minimum Spacing—Shear

30% Shear Load

→ 0.50 x Anchor Embedment

DISTANCE FROM EDGE OF CONCRETE

DISTANCE FROM ANOTHER ANCHOR

1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.

2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

G5

**High Strength
Epoxy Tested in
Accordance with
ICC-ES AC308**



G5-22

**2015 IBC
Compliant
ICC-ES ESR
1137**

DESCRIPTION/SUGGESTED SPECIFICATIONS*

The 100% epoxy resin and hardener are completely mixed as they are dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole.

Compliant with 2015 IBC. Category 1 performance rating. For use in uncracked, cracked concrete and seismic applications.

ADVANTAGES

FORMULATED FOR HOT OR WARM WEATHER

- Fire rated: tested up to 4hrs FRP
- High strength Epoxy
- 15 minute nozzle life at 70° degrees F



Easy to open, snap-off tip, no cutting required



**International Standard
Fire Resistance
Performance**

NON-OFFENSIVE ODOR

- Virtually odorless, can be used indoors

Curing Times



BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
110°/ 43°	9 minutes	24 hours
90°/ 32°	9 minutes	24 hours
70°/ 20°	15 minutes	24 hours



E102-V2

APPLICATIONS



Anchoring a concrete traffic barrier wall to concrete bridge deck.



Steel column anchoring with threaded rod

FEATURES



ANCHORAGE TO SOLID CONCRETE

Rebar (shown) or Threaded Rod (carbon or stainless steel) supplied by contractor

G5 adhesive completely fills area between rod and hole creating a stress-free, high load anchorage

Pre-drilled hole in concrete; see performance tables for suggested hole sizes

APPROVALS/LISTINGS

ICC -ES Evaluation Report No. ESR-1137

Conforms to ASTM C881-10; Type II & III, Grade 2, Class C with exception of gel time and elongation

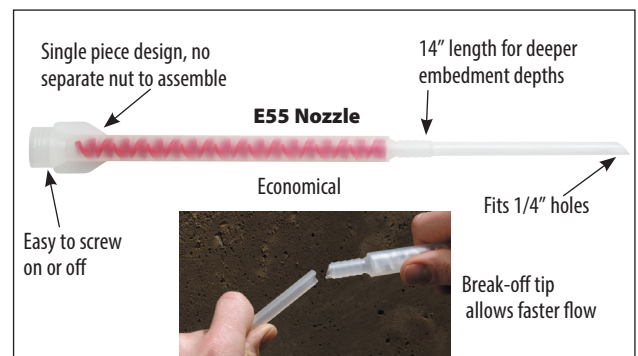
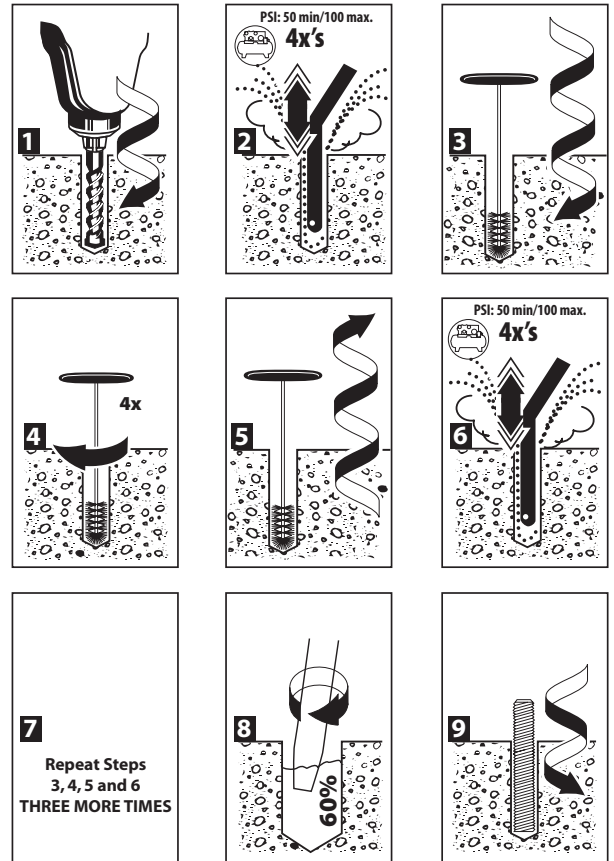
U.S. Department of Transportation Approvals

Certified to ANSI/NSF61




Florida Building Code Approved


For the most current approvals/listings visit: www.itwredhead.com

INSTALLATION STEPS



G5-22 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 G5-22	G5 Adhesive, 22 Fl. Oz. Cartridge	6
 E55	Mixing Nozzle for G5-22 Cartridge Nozzle diameter fits 3/8" to 5/8" holes (overall length of nozzle 14")	24
 E102v2	Hand Dispenser for G5-22 Cartridges Dispenses both 18 oz. and 22 oz. Cartridges	1

PART NUMBER	DESCRIPTION	BOX QTY
 E202	Pneumatic Tool for G5-22 Cartridge	1

Refer to page 56 for ordering information on brushes, hole plugs, and extension tubing for deep holes.

ESTIMATING TABLE

G5 Number of Anchoring Installations Per Cartridge* 22 Fluid Ounce Cartridge Using Reinforcing Bar with G5 Adhesive in Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#3	7/16	439.8	219.9	146.6	109.9	88.0	73.3	62.8	55.0	48.9	44.0	40.0	36.6	33.8	31.4	29.3
#4	5/8	215.5	107.7	71.8	53.9	43.1	35.9	30.8	26.9	23.9	21.5	19.6	18.0	16.6	15.4	14.4
#5	3/4	149.6	74.8	49.9	37.4	29.9	24.9	21.4	18.7	16.6	15.0	13.6	12.5	11.5	10.7	10.0
#6	7/8	109.9	55.0	36.6	27.5	22.0	18.3	15.7	13.7	12.2	11.0	10.0	9.2	8.5	7.9	7.3
#7	1	84.2	42.1	28.1	21.0	16.8	14.0	12.0	10.5	9.4	8.4	7.7	7.0	6.5	6.0	5.6
#8	1-1/8	66.5	33.3	22.2	16.6	13.3	11.1	9.5	8.3	7.4	6.7	6.0	5.5	5.1	4.8	4.4
#9	1-1/4	53.9	26.9	18.0	13.5	10.8	9.0	7.7	6.7	6.0	5.4	4.9	4.5	4.1	3.8	3.6
#10	1-1/2	37.4	18.7	12.5	9.4	7.5	6.2	5.3	4.7	4.2	3.7	3.4	3.1	2.9	2.7	2.5
#11	1-3/4	27.5	13.7	9.2	6.9	5.5	4.6	3.9	3.4	3.1	2.7	2.5	2.3	2.1	2.0	1.8

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

ESTIMATING TABLE

G5 Number of Anchoring Installations Per Cartridge* 22 Fluid Ounce Cartridge Using Threaded Rod with G5 Adhesive in Concrete

ROD (in.)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1/4	5/16	862.0	431.0	287.3	215.5	172.4	143.7	123.1	107.7	95.8	86.2	78.4	71.8	66.3	61.6	57.5
3/8	7/16	439.8	219.9	146.6	109.9	88.0	73.3	62.8	55.0	48.9	44.0	40.0	36.6	33.8	31.4	29.3
1/2	9/16	266.0	133.0	88.7	66.5	53.2	44.3	38.0	33.3	29.6	26.6	24.2	22.2	20.5	19.0	17.7
5/8	3/4	149.6	74.8	49.9	37.4	29.9	24.9	21.4	18.7	16.6	15.0	13.6	12.5	11.5	10.7	10.0
3/4	7/8	109.9	55.0	36.6	27.5	22.0	18.3	15.7	13.7	12.2	11.0	10.0	9.2	8.5	7.9	7.3
7/8	1	84.2	42.1	28.1	21.0	16.8	14.0	12.0	10.5	9.4	8.4	7.7	7.0	6.5	6.0	5.6
1	1-1/8	66.5	33.3	22.2	16.6	13.3	11.1	9.5	8.3	7.4	6.7	6.0	5.5	5.1	4.8	4.4
1-1/4	1-3/8	44.5	22.3	14.8	11.1	8.9	7.4	6.4	5.6	4.9	4.5	4.0	3.7	3.4	3.2	3.0
1-1/2	1-5/8	31.9	15.9	10.6	8.0	6.4	5.3	4.6	4.0	3.5	3.2	2.9	2.7	2.5	2.3	2.1

*The estimated number of anchoring installations per cartridge is based upon calculations of filling the hole 60% full of adhesive per the recommendation in our installation instructions. Hole volumes are calculated using ANSI tolerance carbide tipped drill bits. These estimates do not account for any waste.

PACKAGING

1. Disposable, self-contained 22 ounce cartridge system capable of dispensing both epoxy components in the proper mixing ratio
2. Epoxy components dispensed through a static mixing nozzle that thoroughly mixes the material and places the epoxy at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

SUGGESTED SPECIFICATIONS

EPOXY ADHESIVE:

High Strength EPOXY ADHESIVE: USA Made, ARRA Certified

1. Odorless, two component resin and hardener, 100% solids (containing no solvents or VOC's), non-sag paste, insensitive to moisture, grey in color, extended working time.
2. Works in wet, damp, or submerged holes.
3. Conforms to ASTM C881-10; Type II & III, Grade 2, Class C with exception of gel time and elongation.
4. Compressive Strength, ASTM D695-02: 14,797 psi minimum.
5. Heat Deflection Temperature; 200°F minimum.
6. Shelf life: Best if used within 18 months.
7. Formulated for use in concrete.
8. Oversized and/or Core drilled holes permitted.
9. Fire-Resistance Performance of 4 Hours
10. Recommended storage: 50°F - 80°F

PERFORMANCE TABLE

G5 Epoxy Adhesive

Average Ultimate Tension and Shear Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
			ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	9 (12.2)	3-3/8 (85.7)	5,060 (22.5)	6,227 (27.7)	8,396 (37.3)	6,227 (27.7)
		4-1/2 (114.3)	6,465 (28.8)	6,227 (27.7)	10,490 (46.7)	6,227 (27.7)
1/2 (12.7)	16 (21.6)	4-1/2 (114.3)	10,484 (46.6)	12,016 (53.5)	13,476 (59.9)	12,016 (53.5)
		6 (152.4)	12,392 (55.1)	12,016 (53.5)	19,166 (85.3)	12,016 (53.5)
		7-1/2 (190.5)	N/A	12,016 (53.5)	20,572 (91.5)	12,016 (53.5)
5/8 (15.9)	47 (63.5)	5-5/8 (142.9)	14,634 (65.1)	17,547 (78.1)	20,880 (92.9)	17,547 (78.1)
		7-1/2 (190.5)	20,182 (89.8)	17,547 (78.1)	27,939 (124.3)	17,547 (78.1)
		9-3/8 (238.1)	N/A	17,547 (78.1)	32,249 (143.5)	17,547 (78.1)
3/4 (19.1)	90 (121.5)	6-3/4 (171.5)	18,966 (84.4)	24,918 (110.8)	29,019 (129.1)	24,918 (110.8)
		9 (228.6)	25,988 (115.6)	24,918 (110.8)	43,812 (194.9)	24,918 (110.8)
		11-1/4 (285.8)	N/A	24,918 (110.8)	47,927 (213.2)	24,918 (110.8)
1 (25.4)	276 (372.6)	9 (228.6)	43,804 (194.9)	43,648 (194.2)	53,531 (238.1)	43,648 (194.2)
		12 (304.8)	45,351 (201.6)	43,648 (194.2)	64,022 (284.8)	43,648 (194.2)
		15 (381.0)	N/A	43,648 (194.2)	82,547 (367.2)	43,648 (194.2)

1 Allowable working loads for the single installations under static loading should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod. **Divide by 4.**

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

G5 Epoxy Adhesive

Allowable Tension Loads¹ for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON EPOXY BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,265 (5.6)	2,092 (9.3)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
	4-1/2 (114.3)	1,616 (7.2)	2,622 (11.7)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,369 (15.0)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
	6 (152.4)	3,098 (13.8)	4,791 (21.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	5-5/8 (142.9)	3,659 (16.3)	5,220 (23.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
	7-1/2 (190.5)	5,046 (22.4)	6,985 (31.1)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	6-3/4 (171.5)	4,742 (21.1)	7,255 (32.3)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
	9 (228.6)	6,497 (28.9)	10,057 (44.7)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
1 (25.4)	9 (228.6)	10,951 (48.7)	11,209 (49.9)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)
	12 (304.8)	11,338 (50.4)	15,923 (70.8)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)

1 Use lower value of either bond or steel strength for allowable tensile load.

2 Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

G5 Epoxy Adhesive

Allowable Shear Loads^{1,2} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,557 (6.9)	1,557 (6.9)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,004 (13.4)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	5-5/8 (142.9)	4,387 (19.5)	4,387 (19.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	6-3/4 (171.5)	6,230 (27.7)	6,230 (27.7)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
1 (25.4)	9 (228.6)	10,912 (48.5)	10,912 (48.5)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)

1 Use lower value of either concrete or steel strength for allowable shear load.

2 Linear interpolation may be used for intermediate spacing and edge distances. (See page 49)

Combined Tension and Shear Loading—for G5 Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{N_a}{N_s}\right) + \left(\frac{V_a}{V_s}\right) \leq 1$$

N_a = Applied Service Tension Load

N_s = Allowable Tension Load

V_a = Applied Service Shear Load

V_s = Allowable Shear Load

PERFORMANCE TABLE

G5 Epoxy Adhesive Average Ultimate Tension Loads^{1,2,3} for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	7,480 (33.3)	8,090 (35.9)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	N/A	10,488 (46.6)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	N/A	14,471 (64.4)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	11,235 (50.0)	20,396 (90.7)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	N/A	21,273 (94.6)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	18,108 (80.6)	31,863 (141.7)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	N/A	27,677 (123.1)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	29,338 (130.5)	47,879 (212.9)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	43,905 (195.3)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	N/A	52,046 (231.5)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	N/A	55,676 (247.7)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	48,000 (213.5)	77,358 (344.1)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	62,443 (277.8)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	71,959 (320.1)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	N/A	70,165 (312.1)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	N/A	78,545 (349.4)	76,200 (339.0)	114,300 (508.5)

- Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod. **Divide by 4.**
- Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension and shear loads.
- SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

G5 Epoxy Adhesive Average Ultimate Tension Loads^{1,2} for Threaded Rod Installed in Solid Concrete

THREADED ROD In. (mm)	HOLE DIAMETER In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	≥ 3000 PSI (13.8 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)
1-1/2 (38.1)	1-3/4 (44.5)	13 (330.2)	100,250 (490.4)
		17 (431.8)	143,600 (638.8)
		19 (482.6)	150,000 (667.3)
2 (50.8)	2-1/4 (57.2)	16 (406.4)	150,000 (667.3)
		17 (431.8)	169,700 (754.9)

- Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod.
- Ultimate load values are ≥ 3000 psi in stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension loads. See chart below.

G5 Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar^{1,2}

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load	→ 1.25 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load	→ 0.50 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load	→ 1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
30% Shear Load	→ 0.30 x Anchor Embedment
LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load	→ 1.50 x Anchor Embedment
Minimum Spacing—Tension	
75% Tension Load	→ 0.75 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load	→ 1.50 x Anchor Embedment
Minimum Spacing—Shear	
30% Shear Load	→ 0.50 x Anchor Embedment

- Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.
- Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

Umbrella Inserts and Stubby Screens

High Performance Adhesive Systems for Fastening to Hollow Base Materials



A7P-28

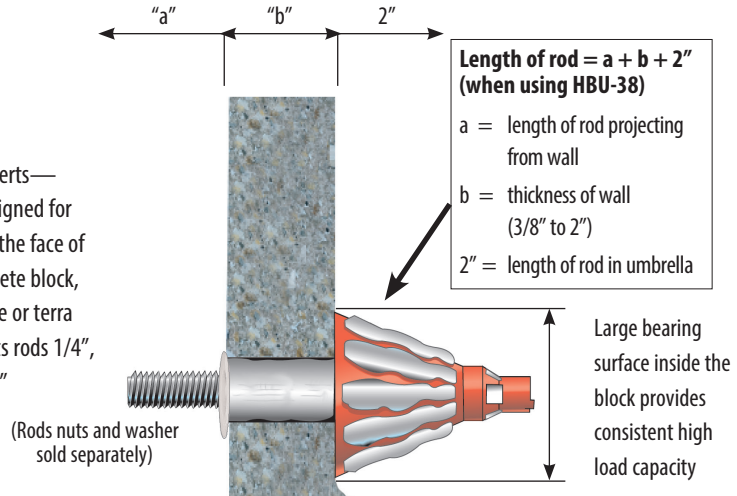


DESCRIPTION/ADVANTAGES

Hollow Block Fastening with A7+ Adhesive

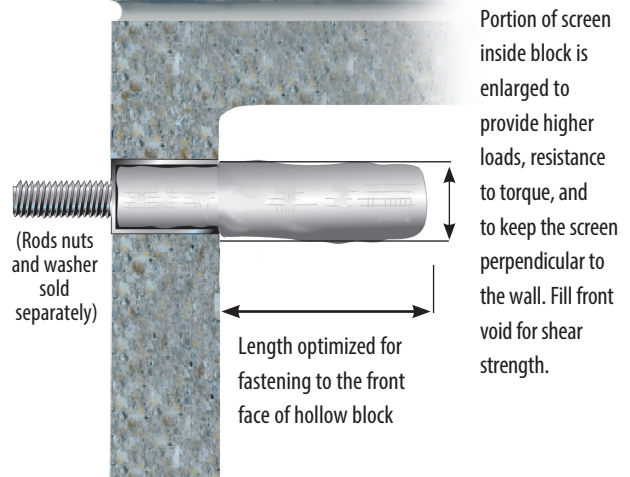
HBU-38

Umbrella Inserts— specially designed for fastening to the face of hollow concrete block, brick, clay tile or terra cotta. Accepts rods 1/4", 3/8" and 1/2"



STUBBY SCREENS

Specially designed stainless steel screens provide maximum performance for a screen in the front face of hollow concrete block. Screens available for rods 1/4" to 5/8"



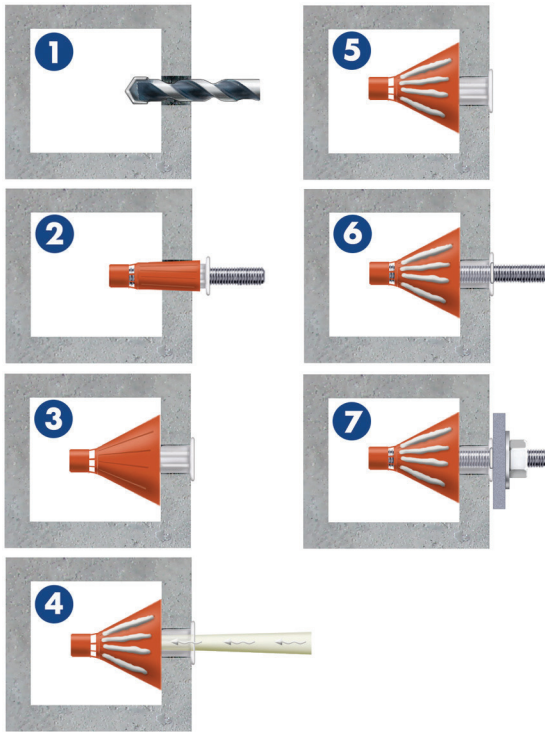
Section View—Concrete Block

COMBINE WITH A7+ OR C6+ TO CREATE AN ADHESIVE FASTENING SYSTEM IDEAL FOR HOLLOW BLOCK, TERRA COTTA, CLAY TILE, MASONRY AND MORE

- Accepts 1/4", 3/8, and 1/2" threaded rods
- Use with A7+ Acrylic adhesive for fast dispensing, fast curing installation
- Use with C6+ Epoxy for fast curing extended working time installation

Umbrella Inserts and Screens

INSTALLATION STEPS




1. Drill 3/4" diameter hole, 3-3/4" deep using rotation only drilling mode and carbide tipped drill bit. Clean out hole with forced air. Complete hole preparation with use of a brush and repeat cleaning with compressed air (leave no dust or slurry).
2. Place umbrella on piece of threaded rod, stretch umbrella over the rod by pulling the white collar back approximately 1". Squeeze orange portion of umbrella and push umbrella into hole.
3. Push umbrella body through the hole and completely into void. Remove threaded rod. (Do not use in solid base materials. For anchoring into block web, ends and mortar joints, use screens.)
4. Dispense and discard a sufficient amount of adhesive from new cartridge until a uniform adhesive mix is achieved. Inject approximately 1-1/2 fl. oz. of adhesive into umbrella (7 to 8 pumps using manual dispenser) to completely fill umbrella.
5. 3/8" rod uses a centering ring (supplied with inserts) to keep rod perpendicular to the wall.
6. Insert rod into the filled umbrella using a slow, soft twisting motion until it contacts the back of umbrella.
7. Wait for appropriate temperature/cure time before tightening fixture to the recommended torque of 10 ft./lbs.

Installation instructions for stubby screens provided on page 56.

SELECTION CHART

Umbrella Inserts



DESCRIPTION	PART NO.	BOX CONTENTS
Umbrella Anchor 	HBU-38	20 Umbrellas 20 Centering Rings

SELECTION CHART

Stubby Screens



PART NO.	DESCRIPTION	QTY/BOX
HB 14-2	1/4" x 2" Stainless Screen	100
HB 38-312	3/8" x 3-1/2" Stainless Screen	100
HB 12-312	1/2" x 3-1/2" Stainless Screen	50
HB 58-412	5/8" x 4-1/2" Stainless Screen	50

ESTIMATING TABLE

Umbrella Inserts

Number of Anchoring Installations Per Cartridge* Using Threaded Rod and Umbrella Inserts with A7+

ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE	UMBRELLA INSERT WITH EMBEDMENT OF 3-3/4"
3/8 (9.5)	3/4	A7+ 9.5 fluid oz.	6
		A7+ 28 fluid oz.	17

* These estimates do not account for waste.

ESTIMATING TABLE

Stubby Screens

Number of Anchoring Installations Per Cartridge* Using Threaded Rod and Stubby Screens with A7+

ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE	SCREEN LENGTH PLUS 1 DIAMETER (INCHES)		
			2"	3-1/2"	4-1/2"
1/4 (6.4)	3/8	A7+ 9.5 fluid oz.	48		
		A7+ 28 fluid oz.	135		
3/8 (9.5)	1/2	A7+ 9.5 fluid oz.		21	
		A7+ 28 fluid oz.		62	
1/2 (12.7)	5/8	A7+ 9.5 fluid oz.		15	
		A7+ 28 fluid oz.		43	
5/8 (15.9)	3/4	A7+ 9.5 fluid oz.			11
		A7+ 28 fluid oz.			24

*These estimates do not account for waste.

PERFORMANCE TABLE

Load Values^{1, 2}

Using A7+ in Hollow Concrete Block

	ROD DIA. In. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	DRILL HOLE DIA. In. (mm)	EMBEDMENT (SCREEN LENGTH) In. (mm)	ULTIMATE TENSION Lbs. (Kn)	ULTIMATE SHEAR Lbs. (Kn)
Umbrella	3/8 (9.5)	10 (13)	3/4 (19.1)	3-3/4 (95.3)	3,558 (15.8)	3,109 (13.8)
Stubby Screens	1/4 (6.4)	4 (5)	3/8 (9.5)	2-1/4 (57.1)	1,550 (6.9)	1,900 (8.5)
	3/8 (9.5)	7 (9)	1/2 (12.7)	3-7/8 (98.4)	1,661 (7.4)	2,071 (9.2)
	1/2 (12.7)	10 (13)	5/8 (15.9)	4 (101.6)	2,458 (10.9)	4,467 (19.9)
	5/8 (15.9)	13 (17)	3/4 (19.1)	5-1/8 (130.2)	2,543 (10.9)	5,047 (22.4)

¹ Allowable working loads should not exceed 20% ultimate capacity. Based upon testing using ASTM A193, Grade B7 rod. Divide by 4.

² The tabulated values are for anchors installed at a minimum 12 inch edge distance and minimum 8 inch spacing.

Screen Tubes

Quality Adhesive Systems for Fastening Through Block and for Brick Pinning Applications



A7P-28

Nylon Screens



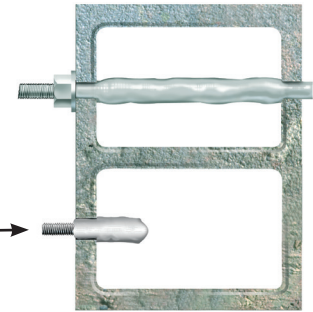
DESCRIPTION/SUGGESTED SPECIFICATIONS

Screens Used with A7+

HOLLOW CONCRETE BLOCK

Maximum holding strength in concrete block can be obtained by fastening to both the front and back of the block using an adhesive screen tube and threaded rod.

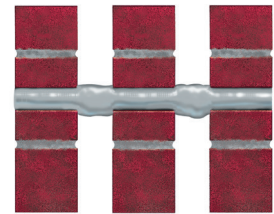
For attachments to single face of block, see page 53 for information on "umbrella anchors" and "stubby screens"



Top View

BRICK WALL

Systems designed for Seismic Retrofit, Brick Pinning or fastening to brick— various lengths and diameters available to accommodate site conditions.



Section

The no-drip feature of A7+ adhesive makes it particularly well suited for brick pinning applications.

ADVANTAGES

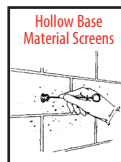
HBP SERIES—NYLON SCREENS

- 30%-50% savings from stainless steel screens
- Comparable performance values
- Easier to insert and span across voids
- Flexible material is less susceptible to damage from crushing

HB SERIES—STAINLESS SCREENS

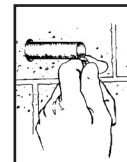
- Corrosion resistant
- Available in 1/4" to 3/4" diameters
- Special version, "dosage control" available for overhead and underwater installations

INSTALLATION STEPS

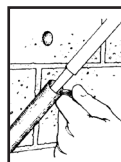


Hollow Base Material Screens

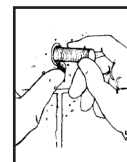
1. Drill hole to the length of the screen plus 1 diameter, using rotation-only drilling mode. Clean out hole with forced air. Complete hole preparation with use of a brush and repeat cleaning with forced air (leave no dust or slurry).



3. Insert the filled screen completely into the hole (subflush).



2. When starting new cartridge or new nozzle, dispense and discard enough adhesive until uniform adhesive mix is achieved. Insert the nozzle into the bottom of the screen and fill screen completely full (use extension tube if needed to reach bottom of screen).



4. While holding the tab of the screen against the wall, hand insert the selected rod slowly into the screen tube with a slow twisting motion. Pull screen flush to face and coat with adhesive. Wait for appropriate cure time before torquing fixture in place.

SELECTION CHART

Screen Tubes

HB Stainless Screen

HBP Nylon Screen

ROD DIA. In. (mm)	SCREEN LENGTH In. (mm)	STAINLESS STEEL SCREENS		NYLON SCREENS	
		PART NO.	QTY/BOX	PART NO.	QTY/BOX
1/4 (6.4)	6 (152.4)	HB 14-6	100		
1/4 (6.4)	8 (203.2)	HB 14-8	100		
1/4 (6.4)	10 (254.0)	HB 14-10	100		
3/8 (9.5)	6 (152.4)			HBP 38-6	50
3/8 (9.5)	8 (203.2)			HBP 38-8	25
3/8 (9.5)	10 (254.0)			HBP 38-10	25
1/2 (12.7)	6 (152.4)			HBP 12-6	50
1/2 (12.7)	8 (203.2)			HBP 12-8	25
1/2 (12.7)	10 (254.0)			HBP 12-10	25
5/8 (15.9)	6 (152.4)			HBP 58-6	40
5/8 (15.9)	8 (203.2)			HBP 58-8	40
5/8 (15.9)	10 (254.0)			HBP 58-10	40
3/4 (19.1)	8 (203.2)	HB 34-8	20		
3/4 (19.1)	10 (254.0)			HBP 34-10	20
3/4 (19.1)	13 (330.2)			HBP 34-13	20

*Not available in standard strength nylon screens. Longer screens available through specials.

ESTIMATING TABLE

Screen Tubes

Number of Holes Per Cartridge* Using Threaded Rod and Screen Tubes with A7+ Adhesives in Hollow Base Material

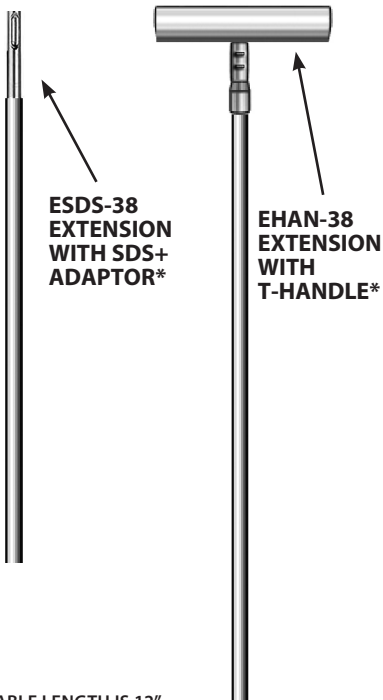
ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE	SCREEN LENGTH (INCHES)			
			6"	8"	10"	13"
1/4 (6.4)	3/8	A7 9.5 fluid oz.	16	12	10	
		A7 28 fluid oz.	45	35	28	
3/8 (9.5)	1/2	A7 9.5 fluid oz.	12	10	7.5	
		A7 28 fluid oz.	37	29	23	
1/2 (12.7)	5/8	A7 9.5 fluid oz.	9	6	5	
		A7 28 fluid oz.	26	18	14	
5/8 (15.9)	3/4	A7 9.5 fluid oz.	6	5	4	
		A7 28 fluid oz.	18	14	10	
3/4 (19.1)	7/8	A7 9.5 fluid oz.		3	2.5	1.75
		A7 28 fluid oz.		9	6	5

* These estimates do not account for waste.

Accessories



Wire Brush Extensions



* USABLE LENGTH IS 12", GOOD FOR ALL HOLES EXCEPT 7/16" DIAMETER

DESCRIPTION/ADVANTAGES

Hole Plugs

Special plugs make overhead installations easier, centers rod in hole, and keeps adhesive off threads



ROD DIAMETER	HOLE DIAMETER	PART #	QTY
3/8"	7/16"	E038	25
1/2"	9/16"	E012	25
5/8"	3/4"	E058	20
3/4"	7/8"	E034	20
7/8"	1"	E078	10
1"	1-1/8"	E010	10
1-1/4"	1-3/8"	E114	10

Piston Plugs



Hole Plugs	Part No.	Hole Diameter	Qty
Piston Plug for 5/8" and 3/4" Diameter Hole	PL-5834	3/4"	25
		7/8"	25
Piston Plug for 7/8" and 1" Diameter Hole	PL-7810	1"	20
		1-1/8"	20
Piston Plug for 1-1/4" Diameter Hole	PL-1250	1-3/8"	10
			10

Wire Brushes

Proper hole cleaning using a brush is essential to achieve optimum performance



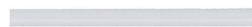
1/8" NPT
(National Pipe Thread Taper)

PART No.	ANCHOR DIA.	REBAR DIA.	DRILL BIT DIA.	OVERALL LENGTH	BRUSH DIA.	QTY/BAG
WB-038	3/8	No. 3	7/16	4-7/8	5/8	10
WB-012	1/2	No. 4	5/8	4-7/8	3/4	10
WB-058	5/8	No. 5	3/4	4-7/8	1.0	10
WB-34	3/4	No. 6	7/8	4-7/8	1-1/4	10
WB-078	7/8	No. 7	1	5-1/8	1-1/2	10
WB-100	1	No. 8	1-1/8	5-1/4	1-5/8	10
WB-125	1-1/4	No. 10	1-3/8	5-1/4	1-3/4	10
ESDS-38	Wire brush 12" usable extension with SDS+ adaptor					1
EHAN-38	Wire brush 12" usable extension with T-Handle					1

* Proper hole cleaning using a wire brush is essential to achieve optimum performance. Brush may be used up to 50 holes depending on concrete strength. Brushes required for installation of No. 4, No. 8 rebar and larger are available with lead time.

Plastic Extension Tubing

Attaches to Adhesive System nozzles for deep hole installations



DESCRIPTION	PART #	QTY
6-Foot Straight Tubing can cut to proper size (.39 in I.D. x .43 in. O.D.)	E25-6	6
6-Foot Long Extension Tube for use with Piston Plugs	E916-6	1

Blow Pump



DESCRIPTION	PART #	QTY/BAG
Blow Pump	BP-10	1

Minimum hole 7/16"

Conversion Table (soft)

6.35 mm =	1/4"	50 mm =	2"
9.5 mm =	3/8"	98 mm =	3-7/8"
10 mm =	3/8"	100 mm =	4"
12 mm =	1/2"	130 mm =	5-1/8"
16 mm =	5/8"	153 mm =	6"
20 mm =	3/4"	156 mm =	6-1/8"
22 mm =	7/8"	178 mm =	7"
24 mm =	1"	183 mm =	7-1/4"
25 mm =	1"	190 mm =	7-1/2"
30 mm =	1-3/16"	200 mm =	7-7/8"
35 mm =	1-3/8"	213 mm =	8-3/8"
40 mm =	1-1/2"	250 mm =	9-7/8"

