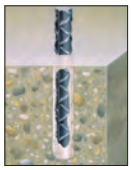
RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

Adhesive Anchoring Selection Guide


Doweling into Concrete with Rebar

Fastening to Concrete with Threaded Rod

Solid Concrete Applications

PRODUCT SYSTEMS	KEY FEATURES	PROPERTIES	STRENGTH DESIGN PERFORMANCE[1]

A7+ *The Most Versatile Quick Cure*

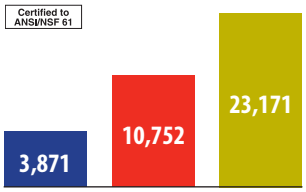
Works in more applications than the competition

5 fluid oz. (150 ml) kit, 9.5 fluid oz. (280 ml) and 28 fluid oz. (825 ml) cartridges

- The only quick-cure ICC-ES listed for use in all wet conditions
- Qualified for use in concrete, block, brick, and clay tile. Solid or hollow base materials
- Cures in only 45 minutes (at substrate temperature of 70°F/21°C)
- ICC-ES listing for cracked concrete and seismic applications (ICC-ES ESR 3903)
- ICC-ES listing for masonry applications (ICC-ES ESR 3951)
- No drip formula that allows direct-injection overhead installation
- 18 month shelf life
- NSF/ANSI 61

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

NSF® Certified to ANSI/NSF 61



C6+ *For the Most Demanding Jobs*

Red Head's highest strength adhesive

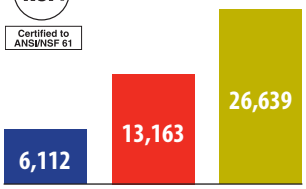
MADE IN USA WITH U.S. AND GLOBAL MATERIALS

15.2 fluid oz. (450 ml) cartridges and 30.4 fluid oz. (900 ml) cartridges

- At least 25% stronger than the old C6+ formulation for threaded rod in cracked concrete and with seismic conditions
- Fastest cure time in its class, curing in just 2.75 hours at 90°F and in only 2 hours at 110°F!
- ICC-ES listing for concrete (uncracked and cracked concrete, and seismic conditions) and masonry
- ICC-ES listing for use in core-drill holes, even in cracked concrete
- Can be used in oversized holes
- Can be used in core drilled holes
- Can be used in all wet conditions (saturated, water-filled, and submerged)
- European fire approval
- 24 month shelf life
- NSF/ANSI 61

BASE MATERIAL (F°/C°)	GEL/WORKING TIME	FULL CURE TIME
110°/ 43°	10 minutes	2 hours
90°/ 32°	14 minutes	2.75 hours
70°/ 21°	16 minutes	6.5 hours
50°/ 13°	30 minutes	24 hours
40°/ 7°	46 minutes	48 hours

NSF® Certified to ANSI/NSF 61



G5+ *Everyday Epoxy*

Economical general-purpose adhesive

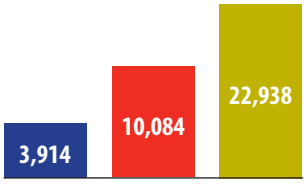
MADE IN USA WITH U.S. AND GLOBAL MATERIALS

15.2 fluid oz. (450 ml) cartridges and 30.4 fluid oz. (900 ml) cartridges

- At least 50% stronger than the old G5 formulation for threaded rod in cracked concrete and with seismic conditions
- Cures 3x faster than the old G5 formula
- Now works down to 40°F
- ICC-ES listing for concrete (uncracked and cracked concrete, and seismic conditions)
- Formulated for warm weather with at least 10 minutes of working time
- Can be used in oversized holes
- Can be used in core drilled holes
- Can be used in all wet conditions (saturated, water-filled, and submerged)
- 24 month shelf life
- NSF/ANSI 61

NSF® Certified to ANSI/NSF 61

BASE MATERIAL (F°/C°)	GEL/WORKING TIME	FULL CURE TIME
110°/ 43°	10 minutes	4 hours
90°/ 32°	14 minutes	6 hours
70°/ 21°	16 minutes	8 hours
50°/ 13°	30 minutes	30 hours
40°/ 7°	46 minutes	48 hours

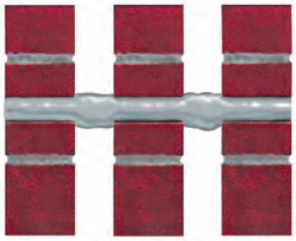


[1] Diameter x Embedment in 4000 psi concrete. All loads given in pounds. Calculated using the ICC-ES threaded rod data in uncracked, dry concrete with periodic inspection. Temperature range A.

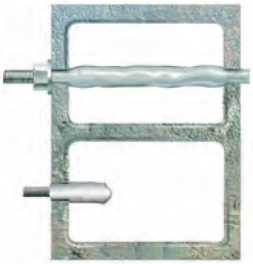
*Red head A7+ replaced Epcon A7 and S7. Red Head C6+ replaced Epcon C6+, and Red Head G5+ replaced Epcon G5. For more information on the retired adhesives (Epcon A7, S7, C6+ and G5), please visit www.itwredhead.com

Hollow Base Material Applications

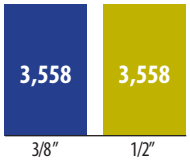
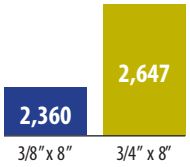
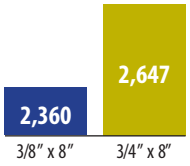
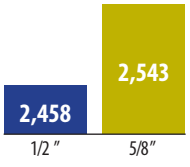
Use the following accessories with the A7+ adhesive anchoring system for all of your hollow base material applications.



Brick Pinning



Fastening to hollow concrete block

SYSTEM ACCESSORIES	KEY FEATURES	ULTIMATE TENSILE [1, 2] PERFORMANCE (LBS.)
Umbrella Anchor Umbrella Anchor **Makes it possible to use adhesive for fastening to the face of hollow block or tile** (see page 60-61)	■ 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	A7+ 
Nylon Screen Tubes **Makes it possible to use adhesive for fastening to hollow block or brick walls** (see page 64)	■ 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	A7+ 
Stainless Steel Screen Tubes **Makes it possible to use adhesive for fastening to hollow block or brick walls** (see page 64)	■ 1/4" & 3/4" diameter sizes ■ Corrosion resistant ■ Available in 1/4" thicknesses	A7+ 
Short Screen Tubes **Makes it possible to use adhesive for fastening to the face of hollow block or tile** (see page 61)	■ 1/4", 3/8", 1/2", 5/8" diameter sizes ■ Fasten to front face of block ■ Anchor remains perpendicular in wall	A7+ 

[1] Testing performed in hollow concrete block. [2] Diameter x Embedment.

RED HEAD®
Call our toll free number **800-848-5611** or visit our web site for the most current product and technical information at **www.itwredhead.com**

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

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 achoring solutions on the market, suitable for use in an extremely wide range of applications and environmental conditions.

- The only quick-cure ICC-ES listed for use in all wet conditions
- Qualified for use in concrete, block, brick, and clay tile. Solid or hollow base materials
- Cures in only 45 minutes (at substrate temperature of 70°F/21°C)
- ICC-ES listed for cracked concrete and seismic applications (ICC-ES ESR 3903)
- ICC-ES listed for masonry applications (ICC-ES ESR 3951)
- No drip formula that allows direct-injection overhead installation
- Low odor - suitable for use indoors and in occupied buildings
- 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 32ºF and 95ºF 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

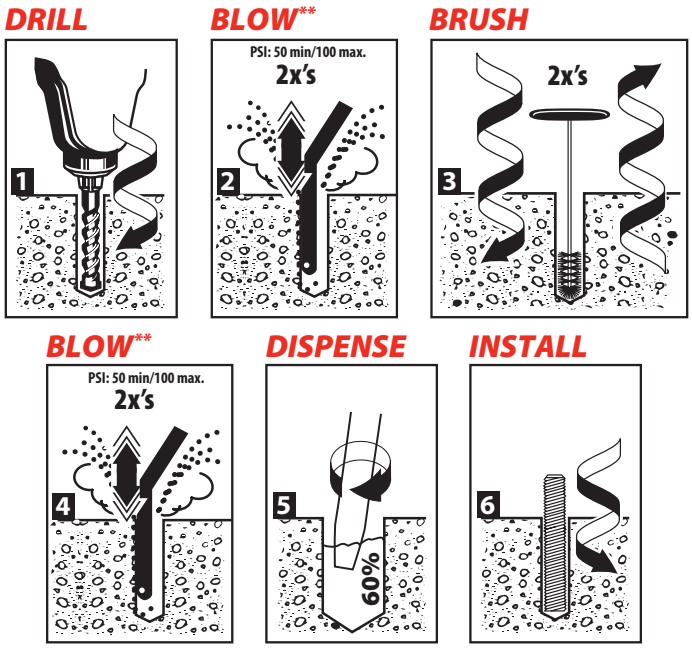
Curing Times

CONCRETE (F°)	CONCRETE (C°)	ADHESIVE (F°)	ADHESIVE (C°)	GEL TIME	FULL CURE TIME
110	43	110	43	1.5 minutes	45 minutes
90	32	90	32	3 minutes	45 minutes
70	21	70	21	5 minutes	45 minutes
50	10	50	10	15 minutes	90 minutes
32	0	32	0	35 minutes	4 hours
14	-10	32	0	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

** Dust is shown for diagram purposes only. To help mitigate airborne dust and comply with OSHA requirements, we recommend that you either wet the concrete before blowing out the hole, or use a drill dust extractor with your pneumatic air nozzle. We recommend vacuum assisted dust extractors like Milwaukee part numbers 5261-DE or 5317-DE. Call our technical services at (800) 848-5611 for more information."

APPROVALS/LISTINGS

ICC-ES ESR 3903 (Concrete Report)

ICC-ES ESR 3951 (Masonry Report)

2018, 2015, 2012, 2009, 2006 International Building Code (IBC) Compliant

Florida Building Code (FBC)

City of Los Angeles (COLA)

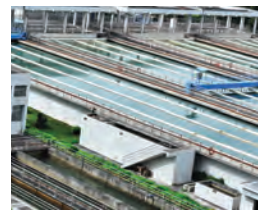
Extensive Department of Transportation (DOT) Listings

NSF/ANSI 61 Approval for use in Drinking Water System Components

ASTM C881, Types I, II, IV, and V, Grade 3, Classes A, B, & C (meets Type III except elongation)

For most current approvals and listings please 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 make it a great fit for waste water treatment plants.

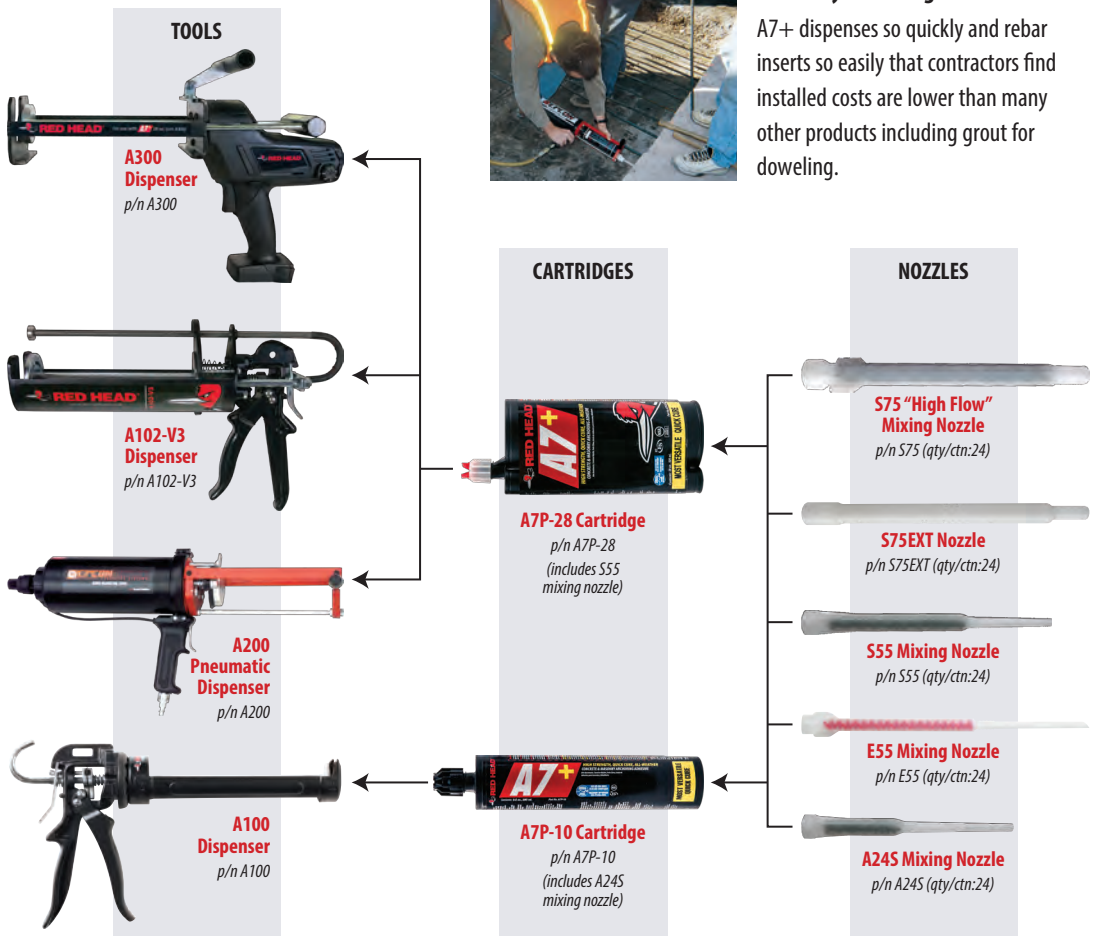
Roadway Doweling

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

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

All Red Head nozzles can be used with all A7+ cartridges. Choose the nozzle that is right for you depending on hole depth and dispensing needs.



A7P–10 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
A7P-10	9.5 Fluid Ounce Cartridge with A24S Nozzle	6
A24S	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 Threaded Rod with A7+ 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

*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+ 9.5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* using Rebar with A7+ 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	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

*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–28 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
A7P-28	28 Fluid Ounce Cartridge A7+ Each cartirdge 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-V3	Heavy-Duty 34:1 thrust ratio 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
A300	Cordless Battery Dispenser for A7P-28, C6P-30 and G5P-30 Cartridge. Includes one battery and charger. Works with all Milwaukee® M18™ batteries	1

*See page 65 for nozzle extension tubes and other accessories

ESTIMATING TABLE

A7+ 28 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* using Threaded Rod with A7+ 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.

ESTIMATING TABLE

A7+ 28 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* using Rebar with A7+ 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.

RED HEAD®
Call our toll free number **800-848-5611** or visit our web site for the most current product and technical information at **www.itwredhead.com**

A7P–5 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
A7P-500KIT	Kit with Dispenser Included (1) Cartridge (1) Dispenser (plastic) (1) Nozzle Nozzle diameter fits 3/8″ to 5/8″ holes	8

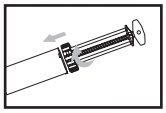
PART NUMBER	DESCRIPTION	BOX QTY
A7P-501KIT	Kit for Standard Caulk Gun (1) Cartridge (1) Sleeve for Caulk Gun (1) Nozzle Nozzle diameter fits 3/8″ to 5/8″ holes	8

AVAILABLE WITH YOUR CHOICE OF TWO, EASY DISPENSING SYSTEMS

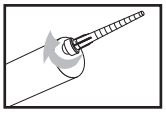
A500 PLASTIC DISPENSER

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

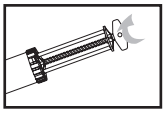
Simple Assembly and Dispensing



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-501KIT

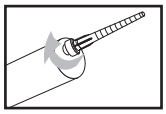
A7P-500KIT (not shown)

A501 CAULKINGGUN ADAPTOR

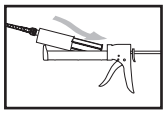
Allows cartridge to work with most standard caulking guns (caulking gun supplied by contractor)

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.

ESTIMATING TABLES

A7+
5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* using Threaded Rod with A7+ 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.

ESTIMATING TABLES

A7+
5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* using Rebar with A7+ 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.

PERFORMANCE TABLE

A7+
The Most Versatile Quick-Cure

Threaded Rod Ultimate Tension and Shear Loads [1,2,3] Installed in Solid Concrete

THREADED ROD DIAMETER		DRILL HOLE DIAMETER		MAX. CLAMPING FORCE AFTER PROPER CURE		EMBEDMENT IN CONCRETE		2000 PSI (13.8 MPa) CONCRETE				4000 PSI (27.6 MPa) CONCRETE			
								ULTIMATE TENSION		ULTIMATE SHEAR		ULTIMATE TENSION		ULTIMATE SHEAR	
in.	(mm)	in	(mm)	ft.-lbs	(Nm)	in.	(mm)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)
3/8	(9.5)	7/16	(11.1)	9	(12)	1-1/2	(38.1)	N/A	N/A	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)	16	(21)	2	(50.8)	N/A	N/A	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)	47	(63)	2-1/2	(63.5)	N/A	N/A	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)	70	(95)	3	(76.2)	N/A	N/A	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)	90	(122)	3-1/2	(88.9)	N/A	N/A	N/A	N/A	13,650	(60.7)	20,920	(92.9)
						7-7/8	(200.0)	N/A	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)	110	(149)	4	(101.6)	N/A	N/A	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	(501)	5	(127.0)	N/A	N/A	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 installation under static loading should not exceed 25% capacity of the ultimate load. To calculate the allowable load of the anchor, divide the ultimate load 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.

RED HEAD®
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PERFORMANCE TABLE

A7+
The most Versatile Quick Cure

Threaded Rod Allowable Tension Loads[1,2] Installed in Solid Concrete

THREADED ROD DIAMETER		DRILL HOLE DIAMETER		MIN. EMBEDMENT DEPTH		ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH				ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH					
						2000 PSI (13.8 MPA) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		ASTM A307 (SAE 1018)		ASTM A193 GR. B7 (SAE4140)		ASTM F593 AISI 304 SS	
in.	(mm)	in.	(mm)	in.	(mm)	lbs.	(kN)	lbs	(kN)	lbs	(kN)	lbs	(kN)	lbs	(kN)
3/8	(9.5)	7/16	(11.1)	1-1/2	(38.1)	N/A	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	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	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	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	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	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	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	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.

2 Larger rods and/or deeper holes may be used. However, it may not be covered by current codes.

PERFORMANCE TABLE

A7+
The most Versatile Quick Cure

Threaded Rod Allowable Shear Loads[1,2] Installed in Solid Concrete

THREADED ROD DIAMETER		DRILL HOLE DIAMETER		MIN. EMBEDMENT DEPTH		ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH				ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH					
						2000 PSI (13.8 MPA) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		ASTM A307 (SAE 1018)		ASTM A193 GR. B7 (SAE4140)		ASTM F593 AISI 304 SS	
in.	(mm)	in.	(mm)	in.	(mm)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)
3/8	(9.5)	7/16	(11.1)	1-1/2	(38.1)	N/A	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	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	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	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	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	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	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.

2 Larger rods and/or deeper holes may be used. However, it may not be covered by current codes.

PERFORMANCE TABLE

A7+
The Most Versatile Quick-Cure

Rebar Ultimate Tension Loads[1,2,3] Installed in Solid Concrete

REINFORCING BAR DIAMETER		EMBEDMENT IN CONCRETE		2000 PSI (13.8 MPa) CONCRETE ULTIMATE TENSION		4000 PSI (27.6 MPa) CONCRETE ULTIMATE TENSION		ULTIMATE TENSILE AND YIELD STRENGTH: GRADE 60 REBAR			
								MINIMUM YIELD STRENGTH		MINIMUM ULTIMATE TENSILE STRENGTH	
in.	(mm)	in.	(mm)	lbs.	(kN)	lbs.	(kN)	lbs.	(kN)	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	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	N/A	57,221	(254.5)	60,000	(266.9)	90,000	(400.4)
		13-1/2	(342.9)	N/A	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 installation 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.

4 Larger rods and/or deeper holes may be used. However, it may not be covered by current codes.

PERFORMANCE TABLE

A7+
The Most Versatile Quick-Cure

Threaded Rod Recommended Edge Distance Requirements for Tension Loads Installed in Solid Concrete

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

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PERFORMANCE TABLE

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Threaded Rod Recommended Edge Distance Requirements for Shear Loads Installed in Solid Concrete

ANCHOR DIAMETER		EMBEDMENT DEPTH (100% LOAD CAPACITY)		CRITICAL EDGE DISTANCE (80% LOAD CAPACITY)		INTERPOLATED EDGE DISTANCE (50% LOAD CAPACITY)		INTERPOLATED EDGE DISTANCE (10% LOAD CAPACITY)		MINIMUM EDGE DISTANCE	
in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
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 REFERENCE TABLE

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Allowable Stress Design Reference Tables

Threaded Rod and Rebar Installation in Solid Concrete Edge / Spacing Distance Load Factor Summary[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+/C6+/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:

$$\left(\frac{Na}{Ns}\right)^{5/3} + \left(\frac{Va}{Vs}\right)^{5/3} \leq 1$$

Na **= Applied Service Tension Load**
Ns **= Allowable Tension Load**
Va **= Applied Service Shear Load**
Vs **= Allowable Shear Load**

A7+
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Threaded Rod Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A193 B7

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	3,870	3,870	3,870	3,870	3,870	3,775
	4-1/2	5,160	5,160	5,160	5,160	5,160	3,775
	7-1/2	7,265	7,265	7,265	7,265	7,265	3,775
1/2	4-1/2	6,880	6,880	6,880	6,880	6,880	6,915
	6	9,175	9,175	9,175	9,175	9,175	6,915
	10	13,305	13,305	13,305	13,305	13,305	6,915
5/8	5-5/8	10,405	10,750	10,750	10,750	10,750	11,015
	7-1/2	14,335	14,335	14,335	14,335	14,335	11,015
	12-1/2	21,185	21,185	21,185	21,185	21,185	11,015
3/4	6-3/4	13,675	14,980	15,480	15,480	15,480	16,305
	9	20,640	20,640	20,640	20,640	20,640	16,305
	15	31,355	31,355	31,355	31,355	31,355	16,305
7/8	7-7/8	17,235	17,740	17,740	17,740	17,740	22,505
	10-1/2	23,650	23,650	23,650	23,650	23,650	22,505
	17-1/2	39,420	39,420	39,420	39,420	39,420	22,505
1	9	21,060	23,070	23,170	23,170	23,170	29,525
	12	30,890	30,890	30,890	30,890	30,890	29,525
	20	51,490	51,490	51,490	51,490	51,490	29,525
1-1/4	11-1/4	29,430	32,240	37,225	41,620	42,785	47,240
	15	45,310	49,635	57,045	57,045	57,045	47,240
	25	90,855	90,855	90,855	90,855	90,855	47,240

1 Tabulated values are for estimation purposes only and should not be used for design (please use our free TruSpec anchorage design software at www.itwredhead.com)
2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths used in calculations are for dry, uncracked concrete with periodic inspection
4 Bond strengths used in calculations are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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STRENGTH DESIGN TABLE

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Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Uncracked Concrete[1,2,3,4]

Anchor Diameter (in.)	Embedment Depth (in.)	ASTM A193 B7 Threaded Rod		Stainless Steel F593		Carbon Steel A36	
		Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
3/8	3-3/8	3,870	3,775	3,375	1,755	3,870	2,280
	4-1/2	5,160	3,775	3,375	1,755	4,785	2,280
	7-1/2	7,265	3,775	3,375	1,755	4,785	2,280
1/2	4-1/2	6,880	6,915	6,170	3,210	6,880	4,040
	6	9,175	6,915	6,170	3,210	8,760	4,040
	10	13,305	6,915	6,170	3,210	8,760	4,040
5/8	5-5/8	10,750	11,015	9,830	5,115	10,750	6,440
	7-1/2	14,335	11,015	9,830	5,115	13,955	6,440
	12-1/2	21,185	11,015	9,830	5,115	13,955	6,440
3/4	6-3/4	15,480	16,305	14,550	7,565	15,480	7,610
	9	20,640	16,305	14,550	7,565	16,500	7,610
	15	31,355	16,305	14,550	7,565	16,500	7,610
7/8	7-7/8	17,740	22,505	17,740	10,445	17,740	10,530
	10-1/2	23,650	22,505	20,085	10,445	22,820	10,530
	17-1/2	39,420	22,505	20,085	10,445	22,820	10,530
1	9	23,170	29,525	23,170	13,700	23,170	13,815
	12	30,890	29,525	26,345	13,700	29,935	13,815
	20	51,490	29,525	26,345	13,700	29,935	13,815
1-1/4	11-1/4	37,225	47,240	37,225	21,920	37,225	22,090
	15	57,045	47,240	42,155	21,920	47,865	22,090
	25	90,855	47,240	42,155	21,920	47,865	22,090

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3 Bond strengths used in calculations are for dry, uncracked concrete with periodic inspection
4 Bond strengths used in calculations are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

A7+
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Threaded Rod Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A193 B7

Anchor Diameter (in.)	Embedment Depth (in.)	Tension (lbf) 2,500-8,000 psi	Shear (lbf) 2,500-8,000 psi
3/8	3-3/8	2,315	3,775
	4-1/2	3,090	3,775
	7-1/2	5,150	3,775
1/2	4-1/2	3,070	6,915
	6	4,095	6,915
	10	6,825	6,915
5/8	5-5/8	5,220	11,015
	7-1/2	6,965	11,015
	12-1/2	11,605	11,015
3/4	6-3/4	7,785	15,365
	9	10,380	16,305
	15	17,300	16,305
7/8	7-7/8	8,270	20,915
	10-1/2	11,030	22,505
	17-1/2	18,385	22,505
1	9	10,185	27,320
	12	13,580	29,525
	20	22,635	29,525
1-1/4	11-1/4	16,795	46,600
	15	22,395	47,240
	25	37,330	47,240

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4 Bond strengths used in calculations are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

A7+
The Most Versatile Quick-Cure

Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Cracked Concrete[1,2,3,4]

Anchor Diameter (in.)	Embedment Depth (in.)	ASTM A193 B7 Threaded Rod		Stainless Steel F593		Carbon Steel A36	
		Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
3/8	3-3/8	2,315	3,245	3,375	1,755	3,870	2,280
	4-1/2	3,090	3,775	3,375	1,755	4,785	2,280
	7-1/2	5,150	3,775	3,375	1,755	4,785	2,280
1/2	4-1/2	3,070	4,295	6,170	3,210	6,670	4,040
	6	4,095	5,730	6,170	3,210	8,760	4,040
	10	6,825	6,915	6,170	3,210	8,760	4,040
5/8	5-5/8	5,220	7,310	9,320	5,115	9,320	6,440
	7-1/2	6,965	9,750	9,830	5,115	13,955	6,440
	12-1/2	11,605	11,015	9,830	5,115	13,955	6,440
3/4	6-3/4	7,785	10,895	12,255	7,565	12,255	7,610
	9	10,380	14,530	14,550	7,565	16,500	7,610
	15	17,300	16,305	14,550	7,565	16,500	7,610
7/8	7-7/8	8,270	11,580	15,440	10,445	15,440	10,530
	10-1/2	11,030	15,445	20,085	10,445	22,820	10,530
	17-1/2	18,385	22,505	20,085	10,445	22,820	10,530
1	9	10,185	14,260	18,865	13,700	18,865	13,815
	12	13,580	19,010	26,345	13,700	29,050	13,815
	20	22,635	29,525	26,345	13,700	29,935	13,815
1-1/4	11-1/4	16,795	23,515	26,370	21,920	26,370	22,090
	15	22,395	31,355	40,600	21,920	40,600	22,090
	25	37,330	47,240	42,155	21,920	47,865	22,090

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Rebar Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A615 Grade 60

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	3,660	3,660	3,660	3,660	3,660	3,560
		4-1/2	4,880	4,880	4,880	4,880	4,880	3,560
		7-1/2	4,835	6,435	6,435	6,435	6,435	3,560
#4	1/2	4-1/2	7,445	7,520	7,520	7,520	7,520	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	10,405	11,395	11,540	11,540	11,540	10,040
		7-1/2	15,385	15,385	15,385	15,385	15,385	10,040
		12-1/2	18,135	18,135	18,135	18,135	18,135	10,040
#6	3/4	6-3/4	13,675	14,870	14,870	14,870	14,870	14,255
		9	19,825	19,825	19,825	19,825	19,825	14,255
		15	25,740	25,740	25,740	25,740	25,740	14,255
#7	7/8	7-7/8	17,235	18,880	19,465	19,465	19,465	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	25,110	25,110	25,110	25,595
		12	32,420	33,485	33,485	33,485	33,485	25,595
		20	46,215	46,215	46,215	46,215	46,215	25,595
#9	1-1/8	10-1/8	25,130	27,525	31,195	31,195	31,195	32,400
		13-1/2	38,690	41,590	41,590	41,590	41,590	32,400
		22-1/2	58,500	58,500	58,500	58,500	58,500	32,400
#10	1-1/4	11-1/4	29,430	32,240	37,225	41,620	44,505	41,145
		15	45,310	49,635	57,315	59,345	59,345	41,145
		25	74,295	74,295	74,295	74,295	74,295	41,145

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths used in calculations are for dry, uncracked concrete with periodic inspection
4 Bond strengths used in calculations are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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Rebar Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A615 Grade 60

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	1,650	2,310
		4-1/2	2,200	3,080
		7-1/2	3,665	3,560
#4	1/2	4-1/2	2,935	4,105
		6	3,910	5,475
		10	6,520	6,480
#5	5/8	5-5/8	4,585	6,420
		7-1/2	6,115	8,560
		12-1/2	10,190	10,040
#6	3/4	6-3/4	5,115	7,160
		9	6,820	9,550
		15	11,370	14,255
#7	7/8	7-7/8	6,965	9,750
		10-1/2	9,285	13,000
		17-1/2	15,475	19,440
#8	1	9	9,095	12,735
		12	12,125	16,980
		20	20,215	25,595
#9	1-1/8	10-1/8	11,510	16,115
		13-1/2	15,350	21,490
		22-1/2	25,585	32,400
#10	1-1/4	11-1/4	16,795	23,515
		15	22,395	31,355
		25	37,330	41,145

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4 Bond strengths used in calculations are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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MASONRY DESIGN TABLE

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Grout-filled Concrete Block: Threaded Rod Allowable Tension and Shear Load Based on Steel Design Information for U.S. Customary Unit [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

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 of ICC ESR 3951as 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

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Grout-filled Concrete Block: Threaded Rod Allowable Tension Loads with Reduction Factors [1,2,3,4,7,9,10,12]

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at *scr* 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	5-5/8	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

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Grout-filled Concrete Block: Threaded Rod Allowable Shear Loads with Reduction Factors [1,2,3,4,7,9,10,12]

Anchor Diameter (in.)	Minimum Embedment (in.)	Load at s_{cr} and c_{cr} (lb.)	Spacing[5]			Edge Distance[6]		
			Critical s_{cr} (in.)	Minimum s_{min} (in.)	Load reduction factor for s_{min} [8]	Critical c_{cr} (in.)	Minimum c_{min} (in.)	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	5-5/8	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)

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).
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 ICC ESR 3951.
5. The critical spacing distance, scr, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, smin, 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, ccr, is the distance where full load values in the table may be used. The minimum edge or end distance, cmin, 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 scr and ccr 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 (smin) and critical spacing (scr) and between minimum edge or end distance (cmin) and critical edge or end distance (ccr) is permitted.
10. Concrete 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.
11. Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 2 of ECC ESR 3951.
12. Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1 of ECC ESR 3951.

MASONRY DESIGN TABLE

A7+
The Most Versatile Quick-Cure

Grout-filled Concrete Block: Rebar Allowable Tension and Shear Loads[1, 2, 3]

Rebar Size	Tension (lb) ASTM A615, Grade 60	Shear (lb) 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 of ICC ESR 3951 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+
The Most Versatile Quick-Cure

Grout-filled Concrete Block: Rebar Allowable Tension Loads with Reduction Factors[1, 2, 3, 4, 7, 9, 10, 12]

Anchor Diameter (in.)	Minimum Embedment (inches)	Load at s_{cr} and c_{cr} (lb.)	Spacing[5]			Edge Distance[6]		
			Critical s_{cr} (in.)	Minimum s_{min} (in.)	Load reduction factor for s_{min} [8]	Critical c_{cr} (in.)	Minimum c_{min} (in.)	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+
The Most Versatile Quick-Cure

Grout-filled Concrete Block: Rebar Allowable Shear Loads with Reduction Factors[1, 2, 3, 4, 7, 9, 10, 12]

Anchor Diameter (in.)	Minimum Embedment (in.)	Load at s_{cr} and c_{cr} ⊥ to edge (lb.)	Spacing[5]			Edge Distance[6]		
			Critical s_{cr} (in.)	Minimum s_{min} (in.)	Load reduction factor for s_{min} [8]	Critical c_{cr} (in.)	Minimum c_{min} (in.)	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).

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 ICC ESR 3951.

5 The critical spacing distance, scr, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, smin, 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, ccr, is the distance where full load values in the table may be used. The minimum edge or end distance, cmin, 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 scr and ccr 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 (smin) and critical spacing (scr) and between minimum edge or end distance (cmin) and critical edge or end distance (ccr) 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 2 of ICC ESR 3951.

12 Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1 of ICC ESR 3951 as applicable.

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RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

C6+

For the Most Demanding Jobs

C6P-15 C6P-30

MADE IN USA WITH U.S. AND GLOBAL MATERIALS

DESCRIPTION

Maximum strength epoxy for your most heavy-duty and specialty applications

Red Head C6+ is the highest strength adhesive in our history. Designed for use in the most demanding anchoring applications, the maximum strength of Red Head C6+ is backed by ICC-ES (AC308, AC58) approvals for both concrete and masonry. It is also the only adhesive approved for core-drilled holes in cracked concrete without the use of a roughening tool.

- At least 25% stronger than the old Epcon C6+ formulation for threaded rod in cracked concrete with seismic conditions
- Fastest Cure time in its class, curing in just 2.75 hours at 90°F and in only 2 hours at 110°F!
- ICC-ES listing for cracked concrete and seismic applications (ICC-ES ESR 4046)
- ICC-ES listing for masonry applications (ICC-ES ESR 4109)
- ICC-ES listing for use in core-drill holes, even in cracked concrete
- ICC-ES listing for all wet conditions (including underwater)
- Rebar fire performance report in accordance with EAD (European Assessment Document)
- At least 10 minutes of nozzle life (Even at 110F!)
- Can be used down to 40°F and up to 110°F
- Can be used in oversized and core drilled holes
- Buy American Compliant. Made in USA with U.S. and Global Materials
- Rugged cartridges resist breakage due to rough handling or cold temperatures
- 24-month shelf life
- Store between 50°F and 95°F in a cool, dry place.

ADVANTAGES

- The industry's first adhesive to be approved for use in core-drilled holes in cracked concrete without the need for a roughening tool
- Install Red Head C6+ and apply the load in the same work shift! (in 70F and above)
- Can be used in wet/damp/underwater applications
- More safe and durable on job sites than sausage packs
- Can use in both concrete and masonry substrates, including hollow and solid base materials

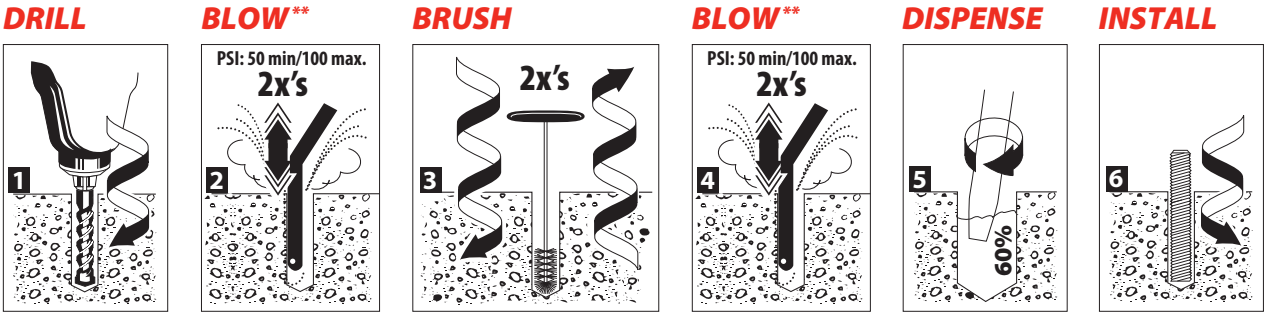
Cure and Gel Times

BASE MATERIAL (F°/C°)	GEL TIME[2]	FULL CURE TIME
110°/ 43°	10 minutes	2 hours
90°/ 32°	14 minutes	2.75 hours
70°/ 21°	16 minutes	6.5 hours
50°/ 10°	30 minutes	24 hours
40°/ 4.4°	46 minutes	48 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.

C6+

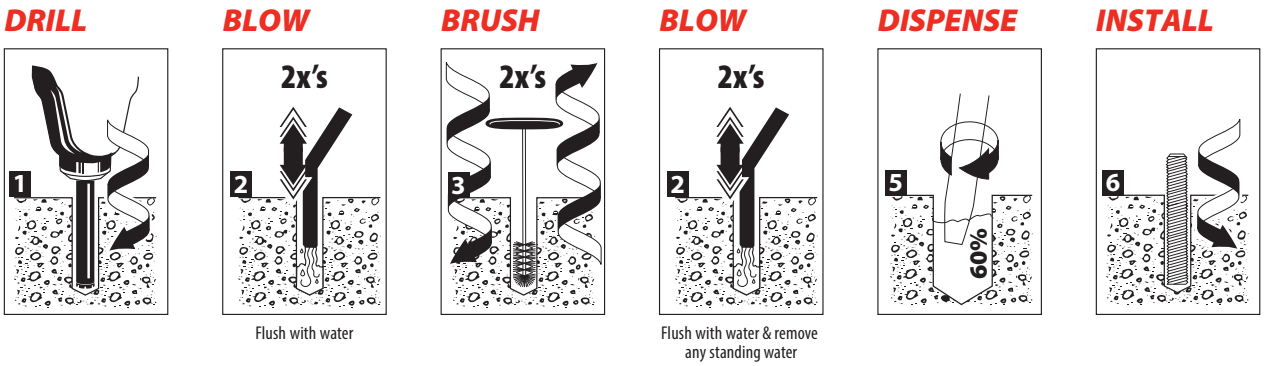
INSTALLATION STEPS *for Carbide-Tipped Bits*



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

** Dust is shown for diagram purposes only. To help mitigate airborne dust and comply with OSHA requirements, we recommend that you either wet the concrete before blowing out the hole, or use a drill dust extractor with your pneumatic air nozzle. We recommend vacuum assisted dust extractors like Milwaukee part numbers 5261-DE or 5317-DE. Call our technical services at (800) 848-5611 for more information."

INSTALLATION STEPS *for Core-Drilled Holes*

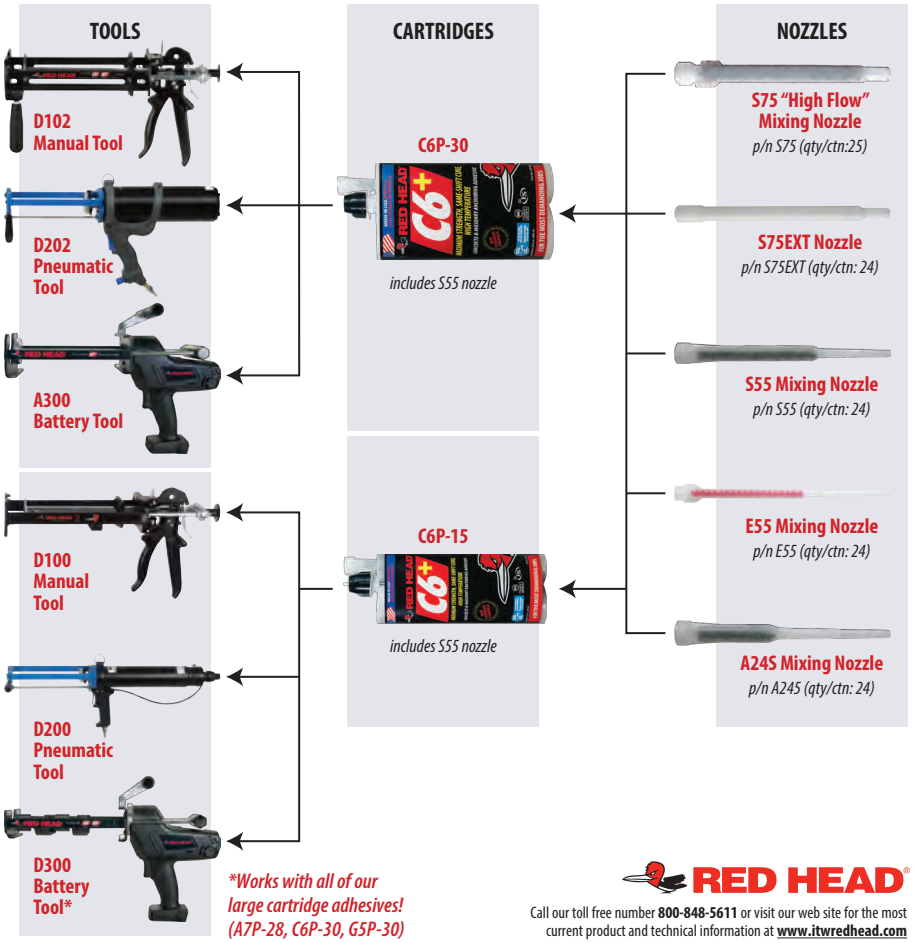


APPROVALS/LISTINGS

- ICC-ES ESR 4046 (Concrete Report)
- ICC-ES ESR 4109 (Masonry Report)
- 2018, 2015, 2012, 2009, 2006 International Building Code (IBC) Compliant
- Florida Building Code (FBC)
- City of Los Angeles (COLA)
- Department of Transportation (DOT) Listings
- NSF/ANSI 61 Approval for use in Drinking Water System Components
- ASTM C881, Types I, II, IV, and V, Grade 3, Classes B & C
- Rebar fire performance report in accordance with EAD (European Assessment Document)

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

Selection Guide



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C6P–15 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
C6P-15	15.2 Fluid Ounce Red Head C6+ Cartridge with S55 Nozzle	4
D100	Heavy-Duty 34:1 thrust ratio hand dispenser for C6P-15 and G5P-15 cartridges	1
S55	Standard Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 3-1/2″ inch usable length for 3/8″ and 1/2″ anchors, 8-1/4″ usable length for 5/8″ anchors and above	24
E55	Long Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 5-3/4″ inch usable length for 3/8″ and ½″ anchors, 12-5/8″ usable length for 5/8″ anchors and above	24

PART NUMBER	DESCRIPTION	BOX QTY
D200	Ergonomic Pneumatic Dispenser for C6P-15 and G5P-15 cartridges	1
D300	Cordless Battery Dispenser for C6P-15 and G5P-15 Cartridge. Includes one battery and charger. Works with all Milwaukee® M18™ batteries	1
S75	High Flow Mixing Nozzle, fits holes for ¾″ diameter anchors and larger. 7-3/8″ usable length	24
S75EXT	Extension for High Flow Mixing Nozzle for ¾″ diameter anchors and larger. 15-5/8″ usable length when attached to S75	24

*See page 65 for nozzle extension tubes and other accessories

ESTIMATING TABLES

C6P-15
15.2 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* using Threaded Rod or Rebar with C6+ in Solid Concrete

ANCHOR DIA. in.	# rebar	DRILL HOLE DIA. (in.)	EMBEDMENT DEPTH IN INCHES 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3/8	#3	7/16	304.5	152.2	101.5	76.1	60.9	50.7	43.5	38.1	33.8	30.4	27.7	25.4	23.4	21.7	20.3
1/2		9/16	184.2	92.1	61.4	46.0	36.8	30.7	26.3	23.0	20.5	18.4	16.7	15.3	14.2	13.2	12.3
	#4	5/8	149.2	74.6	49.7	37.3	29.8	24.9	21.3	18.6	16.6	14.9	13.6	12.4	11.5	10.7	9.9
5/8	#5	3/4	103.6	51.8	34.5	25.9	20.7	17.3	14.8	12.9	11.5	10.4	9.4	8.6	8.0	7.4	6.9
3/4	#6	7/8	76.1	38.1	25.4	19.0	15.2	12.7	10.9	9.5	8.5	7.6	6.9	6.3	5.9	5.4	5.1
7/8	#7	1	58.3	29.1	19.4	14.6	11.7	9.7	8.3	7.3	6.5	5.8	5.3	4.9	4.5	4.2	3.9
1	#8	1-1/8	46.0	23.0	15.3	11.5	9.2	7.7	6.6	5.8	5.1	4.6	4.2	3.8	3.5	3.3	3.1
	#9	1-1/4	37.3	18.6	12.4	9.3	7.5	6.2	5.3	4.7	4.1	3.7	3.4	3.1	2.9	2.7	2.5
1-1/4		1-3/8	30.8	15.4	10.3	7.7	6.2	5.1	4.4	3.9	3.4	3.1	2.8	2.6	2.4	2.2	2.1
	#10	1-1/2	25.9	12.9	8.6	6.5	5.2	4.3	3.7	3.2	2.9	2.6	2.4	2.2	2.0	1.8	1.7
1-1/2"		1-5/8"	22.1	11.0	7.4	5.5	4.4	3.7	3.2	2.8	2.5	2.2	2.0	1.8	1.7	1.6	1.5
	#11	1-3/4	19.0	9.5	6.3	4.8	3.8	3.2	2.7	2.4	2.1	1.9	1.7	1.6	1.5	1.4	1.3

*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–30.4 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
C6P-30	30.4 Fluid Ounce Red Head C6+ Cartridge with S55 Nozzle	4
D102	Heavy-Duty 34:1 thrust ratio hand dispenser for C6P-30 and G5P-30 cartridges	1
S55	Standard Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 3-1/2″ inch usable length for 3/8″ and 1/2″ anchors, 8-1/4″ usable length for 5/8″ anchors and above	24
E55	Long Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 5-3/4″ inch usable length for 3/8″ and ½″ anchors, 12-5/8″ usable length for 5/8″ anchors and above	24

PART NUMBER	DESCRIPTION	BOX QTY
D202	Pneumatic Dispenser for C6P-30 and G5P-30 cartridges	1
A300	Cordless Battery Dispenser for A7P-28, C6P-30 and G5P-30 Cartridge. Includes one battery and charger. Works with all Milwaukee® M18™ batteries (Contact Milwaukee® for more information on batteries)	1
S75	High Flow Mixing Nozzle, fits holes for ¾″ diameter anchors and larger. 7-3/8″ usable length	24
S75EXT	Extension for High Flow Mixing Nozzle for ¾″ diameter anchors and larger. 15-5/8″ usable length when attached to S75	24

*See page 65 for nozzle extension tubes and other accessories

ESTIMATING TABLES

C6P-30
30.4 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* using Threaded Rod or Rebar with C6+ in Solid Concrete

ANCHOR DIA.		DRILL HOLE DIA.	EMBEDMENT DEPTH IN INCHES														
in.	# rebar	(in.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3/8	#3	7/16	608.9	304.5	203.0	152.2	121.8	101.5	87.0	76.1	67.7	60.9	55.4	50.7	46.8	43.5	40.6
1/2		9/16	368.3	184.2	122.8	92.1	73.7	61.4	52.6	46.0	40.9	36.8	33.5	30.7	28.3	26.3	24.6
	#4	5/8	298.4	149.2	99.5	74.6	59.7	49.7	42.6	37.3	33.2	29.8	27.1	24.9	23.0	21.3	19.9
5/8	#5	3/4	207.2	103.6	69.1	51.8	41.4	34.5	29.6	25.9	23.0	20.7	18.8	17.3	15.9	14.8	13.8
3/4	#6	7/8	152.2	76.1	50.7	38.1	30.4	25.4	21.7	19.0	16.9	15.2	13.8	12.7	11.7	10.9	10.1
7/8	#7	1	116.5	58.3	38.8	29.1	23.3	19.4	16.6	14.6	12.9	11.7	10.6	9.7	9.0	8.3	7.8
1	#8	1-1/8	92.1	46.0	30.7	23.0	18.4	15.3	13.2	11.5	10.2	9.2	8.4	7.7	7.1	6.6	6.1
	#9	1-1/4	74.6	37.3	24.9	18.6	14.9	12.4	10.7	9.3	8.3	7.5	6.8	6.2	5.7	5.3	5.0
1-1/4		1-3/8	61.6	30.8	20.5	15.4	12.3	10.3	8.8	7.7	6.8	6.2	5.6	5.1	4.7	4.4	4.1
	#10	1-1/2	51.8	25.9	17.3	12.9	10.4	8.6	7.4	6.5	5.8	5.2	4.7	4.3	4.0	3.7	3.5
1-1/2		1-5/8	44.1	22.1	14.7	11.0	8.8	7.4	6.3	5.5	4.9	4.4	4.0	3.7	3.4	3.2	2.9
	#11	1-3/4	38.1	19.0	12.7	9.5	7.6	6.3	5.4	4.8	4.2	3.8	3.5	3.2	2.9	2.7	2.5

*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.

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PERFORMANCE TABLE

C6+
For the Most Demanding Jobs

Threaded Rod Ultimate Tension and Shear Loads[1,2,3] Installed in Solid Concrete

THREADED ROD DIA. (in.)	EMBEDMENT IN CONCRETE (in.)	MAX. CLAMPING FORCE AFTER PROPER CURE (ft./lbs.)	ULTIMATE TENSION (lbs.)			ULTIMATE SHEAR (lbs.)
			3,000 PSI CONCRETE	5,000 PSI CONCRETE	7,000 PSI CONCRETE	3,000 PSI CONCRETE & HIGHER
3/8	1-1/2	9	3,160	3,785	4,405	N/A
	3-3/8		11,640	12,315	12,985	5,200
1/2	2	16	6,075	7,015	7,950	N/A
	4-1/2		20,005	23,305	26,605	11,420
5/8	2-1/2	47	8,570	9,995	11,420	N/A
	5-5/8		24,905	29,015	33,125	18,300
3/4	3	70	12,030	13,570	15,105	N/A
	6-3/4		36,645	42,695	48,740	25,720
7/8	3-1/2	90	15,005	17,335	19,660	N/A
	7-7/8		55,575	70,338	85,100	32,120
1	4	110	17,735	20,390	23,045	N/A
	9		62,250	73,850	85,450	38,520
1-1/4	5	370	34,695	36,935	39,170	N/A
	11-1/4		77,815	90,655	103,495	65,080
1-1/2	13	450	101,085	117,765	134,445	N/A

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity of the Ultimate Load. To calculate the Allowable Load of the anchor rod, divide the Ultimate Load by 4.
2 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

C6+
For the Most Demanding Jobs

Threaded Rod Allowable Tension Loads[1] Installed in Solid Concrete

THREADED ROD DIA in.	EMBEDMENT IN CONCRETE in.	ALLOWABLE TENSION LOAD BASED ON CONCRETE STRENGTH (lbs.)			ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH (lbs.)		
		3,000 psi concrete	5,000 psi concrete	7,000 psi concrete	ASTM A307	ASTM A193 GRADE B7	ASTM F593 AISI 304 SS
3/8	1-1/2	790	945	1,100	2,080	4,340	3,995
	3-3/8	2,910	3,080	3,245	2,080	4,340	3,995
1/2	2	1,520	1,755	1,990	3,730	7,780	7,155
	4-1/2	5,000	5,825	6,650	3,730	7,780	7,155
5/8	2-1/2	2,145	2,500	2,855	5,870	12,230	11,250
	5-5/8	6,225	7,255	8,280	5,870	12,230	11,250
3/4	3	3,010	3,395	3,775	8,490	17,690	14,860
	6-3/4	9,160	10,675	12,185	8,490	17,690	14,860
7/8	3-1/2	3,750	4,335	4,915	11,600	25,510	20,835
	7-7/8	13,895	17,585	21,275	11,600	25,510	20,835
1	4	4,435	5,100	5,760	15,180	31,620	26,560
	9	15,565	18,465	21,365	15,180	31,620	26,560
1-1/4	5	8,675	9,235	9,795	23,800	49,580	34,670
	11-1/4	19,455	22,665	25,875	23,800	49,580	34,670
1-1/2	13	25,270	29,440	33,610	33,720	70,250	47,770

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

PERFORMANCE TABLE

C6+
For the Most Demanding Jobs

Threaded Rod Allowable Shear Loads[1] Installed in Solid Concrete

THREADED ROD DIA. (in.)	EMBEDMENT IN CONCRETE (in.)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH (lbs.)	ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH (lbs.)		
		3,000 psi concrete & higher	ASTM A307	ASTM A193 GRADE B7	ASTM F593 AISI 304 SS
3/8	1-1/2	N/A	1,040	2,170	1,995
	3-3/8	1,300	1,040	2,170	1,995
1/2	2	N/A	1,870	3,895	3,585
	4-1/2	2,855	1,870	3,895	3,585
5/8	2-1/2	N/A	2,940	6,125	5,635
	5-5/8	4,575	2,940	6,125	5,635
3/4	3	N/A	4,250	8,855	7,440
	6-3/4	6,430	4,250	8,855	7,440
7/8	3-1/2	N/A	5,800	12,760	10,730
	7-7/8	8,030	5,800	12,760	10,730
1	4	N/A	7,590	15,810	13,285
	9	9,630	7,590	15,810	13,285
1-1/4	5	N/A	11,900	24,790	18,840
	11-1/4	16,270	11,900	24,790	18,840

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

PERFORMANCE TABLE

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Rebar Ultimate Tension Loads[1,2,3] Installed in Solid Concrete

REINFORCING BAR	EMBEDMENT IN CONCRETE (in.)	ULTIMATE TENSION (lbs.)			ULTIMATE YIELD STRENGTH GRADE 60 REBAR (lbs.)	ULTIMATE TENSILE STRENGTH GRADE 60 REBAR (lbs.)
		3,000 psi concrete	5,000 psi concrete	7,000 psi concrete		
#3	1-1/2	3,160	3,785	4,405	6,600	9,900
	3-3/8	11,640	12,315	12,985		
#4	2	6,075	7,015	7,950	12,000	18,000
	4-1/2	20,005	23,305	26,605		
#5	2-1/2	8,570	9,995	11,420	18,600	27,900
	5-5/8	24,905	29,015	33,125		
#6	3	12,030	13,570	15,105	26,400	39,600
	6-3/4	36,645	42,695	48,740		
#7	3-1/2	15,005	17,335	19,660	36,000	54,000
	7-7/8	55,575	70,338	85,100		
#8	4	17,735	20,390	23,045	47,400	71,100
	9	62,250	73,850	85,450		
#10	5	34,695	36,935	39,170	79,200	114,300
	11-1/4	77,815	90,655	103,495		
#11	13	101,085	117,764	134,443	93,600	140,400

1 Allowable working loads for the single installation under static loading should not exceed 25% capacity of the Ultimate Load. To calculate the Allowable Load of the anchor, divide the ultimate load by 4.
2 Performance values are based on the use of ASTM A615 Grade 60 reinforcing bar. The use of lower strength rebar 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 REFERENCE TABLE

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Threaded Rod and Rebar Installation in Solid Concrete Edge/Spacing Distance Load Factor Summary[1,2]

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
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	DISTANCE FROM ANOTHER ANCHOR
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

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.

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STRENGTH DESIGN TABLE

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Threaded Rod Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A193 B7

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
3/8	3-3/8	4,835	5,295	6,115	6,380	6,380	6,380	3,775
	4-1/2	7,265	7,265	7,265	7,265	7,265	7,265	3,775
	7-1/2	7,265	7,265	7,265	7,265	7,265	7,265	3,775
1/2	4-1/2	7,445	8,155	9,415	10,530	10,980	10,980	6,915
	6	11,460	12,555	13,305	13,305	13,305	13,305	6,915
	10	13,305	13,305	13,305	13,305	13,305	13,305	6,915
5/8	5-5/8	10,405	11,395	13,160	14,715	16,120	16,615	11,015
	7-1/2	16,020	17,550	20,265	21,185	21,185	21,185	11,015
	12-1/2	21,185	21,185	21,185	21,185	21,185	21,185	11,015
3/4	6-3/4	13,675	14,980	17,300	19,345	19,590	19,590	16,305
	9	21,060	23,070	26,125	26,125	26,125	26,125	16,305
	15	31,355	31,355	31,355	31,355	31,355	31,355	16,305
7/8	7-7/8	17,235	18,880	21,800	24,375	25,715	25,715	22,505
	10-1/2	26,535	29,070	33,565	34,285	34,285	34,285	22,505
	17-1/2	43,280	43,280	43,280	43,280	43,280	43,280	22,505
1	9	21,060	23,070	26,635	29,780	32,420	32,420	29,525
	12	32,420	35,515	41,010	43,230	43,230	43,230	29,525
	20	56,780	56,780	56,780	56,780	56,780	56,780	29,525
1-1/4	11-1/4	29,430	32,240	37,225	41,620	45,595	46,895	47,240
	15	45,310	49,635	57,315	62,525	62,525	62,525	47,240
	25	90,855	90,855	90,855	90,855	90,855	90,855	47,240

1 Tabulated values are for estimation purposes only and should not be used for design (please use our free TruSpec anchorage design software at www.itwredhead.com)
2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

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Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Uncracked Concrete[1,2,3,4]

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	ASTM A193 B7 THREAD ROD		CARBON STEEL A36		STAINLESS STEEL F593	
		TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)
3/8	3-3/8	6,115	3,775	3,375	1,755	4,785	2,280
	4-1/2	7,265	3,775	3,375	1,755	4,785	2,280
	7-1/2	7,265	3,775	3,375	1,755	4,785	2,280
1/2	4-1/2	9,415	6,915	6,170	3,210	8,760	4,040
	6	13,305	6,915	6,170	3,210	8,760	4,040
	10	13,305	6,915	6,170	3,210	8,760	4,040
5/8	5-5/8	13,160	11,015	9,830	5,115	13,160	6,440
	7-1/2	20,265	11,015	9,830	5,115	13,955	6,440
	12-1/2	21,185	11,015	9,830	5,115	13,955	6,440
3/4	6-3/4	17,300	16,305	14,550	7,565	16,500	7,610
	9	26,125	16,305	14,550	7,565	16,500	7,610
	15	31,355	16,305	14,550	7,565	16,500	7,610
7/8	7-7/8	21,800	22,505	20,085	10,445	21,800	10,530
	10-1/2	33,565	22,505	20,085	10,445	22,820	10,530
	17-1/2	43,280	22,505	20,085	10,445	22,820	10,530
1	9	26,635	29,525	26,345	13,700	26,635	13,815
	12	41,010	29,525	26,345	13,700	29,935	13,815
	20	56,780	29,525	26,345	13,700	29,935	13,815
1-1/4	11-1/4	37,225	47,240	37,225	21,920	37,225	22,090
	15	57,315	47,240	42,155	21,920	47,865	22,090
	25	90,855	47,240	42,155	21,920	47,865	22,090

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

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Threaded Rod Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A193 B7

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
3/8	3-3/8	2,905	2,905	2,905	2,905	2,905	2,905	3,775
	4-1/2	3,875	3,875	3,875	3,875	3,875	3,875	3,775
	7-1/2	6,460	6,460	6,460	6,460	6,460	6,460	3,775
1/2	4-1/2	5,165	5,165	5,165	5,165	5,165	5,165	6,915
	6	6,890	6,890	6,890	6,890	6,890	6,890	6,915
	10	11,485	11,485	11,485	11,485	11,485	11,485	6,915
5/8	5-5/8	7,370	8,070	8,075	8,075	8,075	8,075	11,015
	7-1/2	10,765	10,765	10,765	10,765	10,765	10,765	11,015
	12-1/2	17,945	17,945	17,945	17,945	17,945	17,945	11,015
3/4	6-3/4	9,685	10,610	10,975	10,975	10,975	10,975	15,365
	9	14,635	14,635	14,635	14,635	14,635	14,635	16,305
	15	24,395	24,395	24,395	24,395	24,395	24,395	16,305
7/8	7-7/8	12,210	13,375	14,940	14,940	14,940	14,940	20,915
	10-1/2	18,795	19,920	19,920	19,920	19,920	19,920	22,505
	17-1/2	33,200	33,200	33,200	33,200	33,200	33,200	22,505
1	9	14,915	16,340	18,865	19,515	19,515	19,515	27,320
	12	22,965	25,155	26,020	26,020	26,020	26,020	29,525
	20	43,365	43,365	43,365	43,365	43,365	43,365	29,525
1-1/4	11-1/4	20,845	22,835	26,370	29,480	32,295	33,285	46,600
	15	32,095	35,160	40,600	44,380	44,380	44,380	47,240
	25	69,060	73,970	73,970	73,970	73,970	73,970	47,240

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

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Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Cracked Concrete[1,2,3,4]

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	ASTM A193 B7 THREAD ROD		CARBON STEEL A36		STAINLESS STEEL F593	
		TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)
3/8	3-3/8	2,905	3,775	3,375	1,755	4,785	2,280
	4-1/2	3,875	3,775	3,375	1,755	4,785	2,280
	7-1/2	6,460	3,775	3,375	1,755	4,785	2,280
1/2	4-1/2	5,165	6,915	6,170	3,210	8,760	4,040
	6	6,890	6,915	6,170	3,210	8,760	4,040
	10	11,485	6,915	6,170	3,210	8,760	4,040
5/8	5-5/8	8,075	11,015	9,830	5,115	13,160	6,440
	7-1/2	10,765	11,015	9,830	5,115	13,955	6,440
	12-1/2	17,945	11,015	9,830	5,115	13,955	6,440
3/4	6-3/4	10,975	15,365	14,550	7,565	16,500	7,610
	9	14,635	16,305	14,550	7,565	16,500	7,610
	15	24,395	16,305	14,550	7,565	16,500	7,610
7/8	7-7/8	14,940	20,915	20,085	10,445	21,800	10,530
	10-1/2	19,920	22,505	20,085	10,445	22,820	10,530
	17-1/2	33,200	22,505	20,085	10,445	22,820	10,530
1	9	19,515	27,320	26,345	13,700	26,635	13,815
	12	26,020	29,525	26,345	13,700	29,935	13,815
	20	43,365	29,525	26,345	13,700	29,935	13,815
1-1/4	11-1/4	33,285	46,600	37,225	21,920	37,225	22,090
	15	44,380	47,240	42,155	21,920	47,865	22,090
	25	73,970	47,240	42,155	21,920	47,865	22,090

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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STRENGTH DESIGN TABLE

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Rebar Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A615 Grade 60

ANCHOR DIAMETER # Rebar	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
#3	3-3/8	4,835	5,295	6,110	6,110	6,110	6,110	3,560
	4-1/2	6,435	6,435	6,435	6,435	6,435	6,435	3,560
	7-1/2	4,835	6,435	6,435	6,435	6,435	6,435	3,560
#4	4-1/2	7,445	8,155	9,415	10,450	10,450	10,450	6,480
	6	11,460	11,700	11,700	11,700	11,700	11,700	6,480
	10	11,700	11,700	11,700	11,700	11,700	11,700	6,480
#5	5-5/8	10,405	11,395	13,160	14,715	15,650	15,650	10,040
	7-1/2	16,020	17,550	18,135	18,135	18,135	18,135	10,040
	12-1/2	18,135	18,135	18,135	18,135	18,135	18,135	10,040
#6	6-3/4	13,675	14,980	17,300	18,235	18,235	18,235	14,255
	9	21,060	23,070	24,315	24,315	24,315	24,315	14,255
	15	25,740	25,740	25,740	25,740	25,740	25,740	14,255
#7	7-7/8	17,235	18,880	21,800	23,690	23,690	23,690	19,440
	10-1/2	26,535	29,070	31,590	31,590	31,590	31,590	19,440
	17-1/2	35,100	35,100	35,100	35,100	35,100	35,100	19,440
#8	9	21,060	23,070	26,635	29,465	29,465	29,465	25,595
	12	32,420	35,515	39,290	39,290	39,290	39,290	25,595
	20	46,215	46,215	46,215	46,215	46,215	46,215	25,595
#9	10-1/8	25,130	27,525	31,785	35,525	35,525	35,525	32,400
	13-1/2	38,690	42,380	47,365	47,365	47,365	47,365	32,400
	22-1/2	58,500	58,500	58,500	58,500	58,500	58,500	32,400
#10	11-1/4	29,430	32,240	37,225	41,620	42,210	42,210	41,145
	15	45,310	49,635	56,285	56,285	56,285	56,285	41,145
	25	74,295	74,295	74,295	74,295	74,295	74,295	41,145

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3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

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Rebar Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A615 Grade 60

ANCHOR DIAMETER # Rebar	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
#3	3-3/8	2,825	2,905	2,905	2,905	2,905	3,560	3,560
	4-1/2	3,875	3,875	3,875	3,875	3,875	3,560	3,560
	7-1/2	6,435	6,435	6,435	6,435	6,435	3,560	3,560
#4	4-1/2	5,165	5,165	5,165	5,165	5,165	6,480	6,480
	6	6,890	6,890	6,890	6,890	6,890	6,480	6,480
	10	11,485	11,485	11,485	11,485	11,485	6,480	6,480
#5	5-5/8	7,370	7,965	7,965	7,965	7,965	10,040	10,040
	7-1/2	10,620	10,620	10,620	10,620	10,620	10,040	10,040
	12-1/2	17,705	17,705	17,705	17,705	17,705	10,040	10,040
#6	6-3/4	9,685	10,405	10,405	10,405	10,405	14,255	14,255
	9	13,875	13,875	13,875	13,875	13,875	14,255	14,255
	15	23,130	23,130	23,130	23,130	23,130	14,255	14,255
#7	7-7/8	12,210	13,375	13,570	13,570	13,570	19,000	19,440
	10-1/2	18,095	18,095	18,095	18,095	18,095	19,440	19,440
	17-1/2	30,160	30,160	30,160	30,160	30,160	19,440	19,440
#8	9	14,915	16,340	16,950	16,950	16,950	23,730	25,595
	12	22,600	22,600	22,600	22,600	22,600	25,595	25,595
	20	37,665	37,665	37,665	37,665	37,665	25,595	25,595
#9	10-1/8	17,800	19,495	20,465	20,465	20,465	28,655	32,400
	13-1/2	27,290	27,290	27,290	27,290	27,290	32,400	32,400
	22-1/2	45,485	45,485	45,485	45,485	45,485	32,400	32,400
#10	11-1/4	20,845	22,835	26,370	26,660	26,660	37,325	41,145
	15	32,095	35,160	35,545	35,545	35,545	41,145	41,145
	25	59,245	59,245	59,245	59,245	59,245	41,145	41,145

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

MASONRY DESIGN TABLE

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Grout-filled Concrete Block: Threaded Rod Allowable Tension and Shear Loads Based on Steel Design Information for U.S. Customary Unit[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

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 of ICC ESR 4109 as applicable.

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

MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

Grout-filled Concrete Block: Threaded Rod Allowable Tension Loads with Reduction Factors[1,2,3,4,7,9,10,12]

Threaded Rod Size (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	945	13.5	4	1.00	12	4	0.87
1/2	4-1/2	1,395	18	4	0.50	20	4	0.68
5/8	5-5/8	1,825	22.5	4	0.50	20	4	0.68
3/4	6-3/4	2,085	27	4	0.50	20	4	0.68

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

See footnotes below

MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

Grout-filled Concrete Block: Threaded Rod Allowable Shear Loads with Reduction Factors[1,2,3,4,7,9,10,12]

Threaded Rod Size (in.)	Minimum Embedment (inches)	Load at s_{cr} and c_{cr} ⊥ 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	825	13.5	4	0.50	12	4	0.87
1/2	4-1/2	1,560	18	4	0.50	20	4	0.56
5/8	5-5/8	2,680	22.5	4	0.50	20	4	0.30
3/4	6-3/4	3,180	27	4	0.50	20	4	0.27

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

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 of ICC ESR 4109.

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.

5 The critical spacing distance, scr, is the anchor spacing where full load values in the table may be used. The minimum spacing distance, smin, 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, ccr, is the distance where full load values in the table may be used. The minimum edge or end distance, cmin, 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 scr and ccr 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 (smin) and critical spacing (scr) and between minimum edge or end distance (cmin) and critical edge or end distance (ccr) is permitted.

10 Concrete 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.

11 Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel strength values given in Table 2 of ICC ESR 4109.

12 Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1 of ICC ESR 4109 as applicable.

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MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

Grout-filled Concrete Block: Rebar Allowable Tension and Shear Loads Based on Steel Design Information for U.S. Customary Unit[1,2,3]

Rebar Size	Tension (lb) ASTM A615, Grade 60	Shear (lb) ASTM A615, Grade 60
#3	3,270	1,685
#4	5,940	3,060
#5	9,205	4,745
#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 of ICC ESR 4109 as applicable.

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

MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

Grout-filled Concrete Block: Rebar Allowable Tension Loads with Reduction Factors[1,2,3,4,7,9,10,12]

Rebar Size	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	3-3/8	785	13.5	4	1.00	12	4	0.87
#4	4-1/2	1,355	18	4	0.50	20	4	0.68
#5	5-5/8	2,060	22.5	4	0.50	20	4	0.68
#6	6-3/4	2,415	27	4	0.50	20	4	0.68

For SI: 1 inch = 25.4mm, 1 lbf = 0.0044kN, 1 ksi = 6.894 MPa
See footnotes below

MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

Grout-filled Concrete Block: Rebar Allowable Shear Loads with Reduction Factors[1,2,3,4,7,9,10,12]

Rebar Size	Minimum Embedment (inches)	Load at s_{cr} and c_{cr} ⊥ 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	3-3/8	1,230	13.5	4	0.50	12	4	
#4	4-1/2	2,340	18	4	0.50	12	4	
#5	5-5/8	3,600	22.5	4	0.50	20	4	
#6	6-3/4	3,685	27	4	0.50	20	4	

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

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 of ICC ESR 4901.

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.

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 of ICC ESR 4901.

12 Tabulated allowable bond loads must be adjusted for increased in-service base material temperatures in accordance with Figure 1 of ICC ESR 4901.

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

G5+

Everyday Epoxy

G5P-15 G5P-30

MADE IN USA
WITH U.S. AND
GLOBAL MATERIALS

DESCRIPTION/SUGGESTED SPECIFICATIONS*

Economical, general-purpose adhesive for warm-weather anchoring applications

Red Head G5+ is a reliable general-purpose adhesive that is backed by many DOT approvals and ICC-ES listings for cracked, uncracked concrete, and seismic conditions. The new G5+ is also Buy American compliant and helps to support jobs here in the U.S.

- At least 50% stronger than the old Epcon G5 for threaded rod in cracked concrete and with seismic conditions
- Cures 3x faster than the old Epcon G5 formula
- Now works down to 40F, and all the way up to 110F
- ICC-ES listing for concrete (uncracked and cracked concrete, and all seismic conditions)
- At least 10 minutes of nozzle life (10 mins. at 110°F)
- Made In USA with U.S. and Global Components
- Can be used in oversized and core drilled holes
- 24-month shelf life
- NSF/ANSI 61
- Store between 50°F and 95°F in a cool, dry place

ADVANTAGES

- Get more pull out strength with Red Head G5+ vs. other general-purpose adhesives (per comparison of data in ICC-ES reports)
- Continue to work on chilly mornings, with curing abilities now down to 40°F
- ICC-ES listing for all wet conditions (including underwater)
- More time to set anchors in warm weather with at least 10 minutes of nozzle life
- More safe and durable on job sites than sausage packs
- Help support US jobs with G5+

Cure and Gel Times

BASE MATERIAL (F°/C°)	GEL TIME[2]	FULL CURE TIME
110°/ 43°	10 minutes	4 hours
90°/ 32°	14 minutes	6 hours
70°/ 21°	16 minutes	8 hours
50°/ 10°	30 minutes	30 hours
40°/ 4.4°	46 minutes	48 hours

APPROVALS/LISTINGS

- ICC-ES ESR 4138 (Concrete Report)
- 2018, 2015, 2012, 2009, 2006 International Building Code (IBC) Compliant
- Florida Building Code (FBC)
- City of Los Angeles (COLA)
- Extensive Department of Transportation (DOT) Listings
- NSF/ANSI 61 Approval for use in Drinking Water System Components
- ASTM C881, Types I, II, IV, and V, Grade 3, Classes B & C

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

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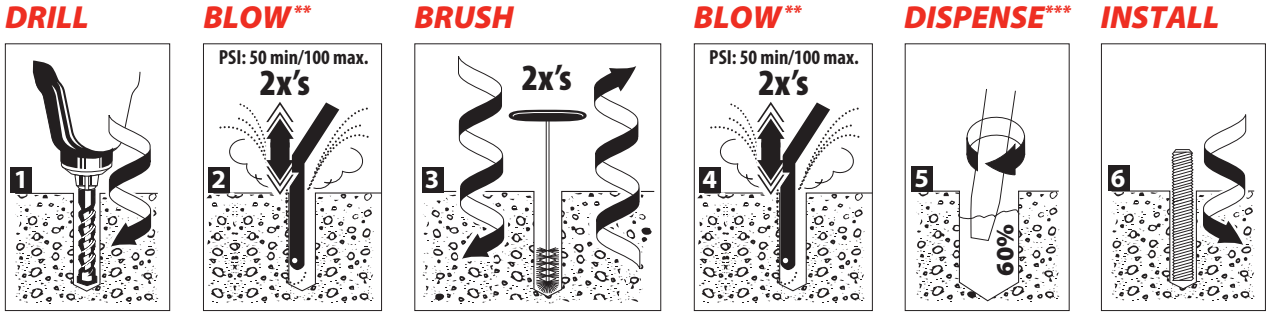
INSTALLATION STEPS *for Carbide-Tipped Bits**

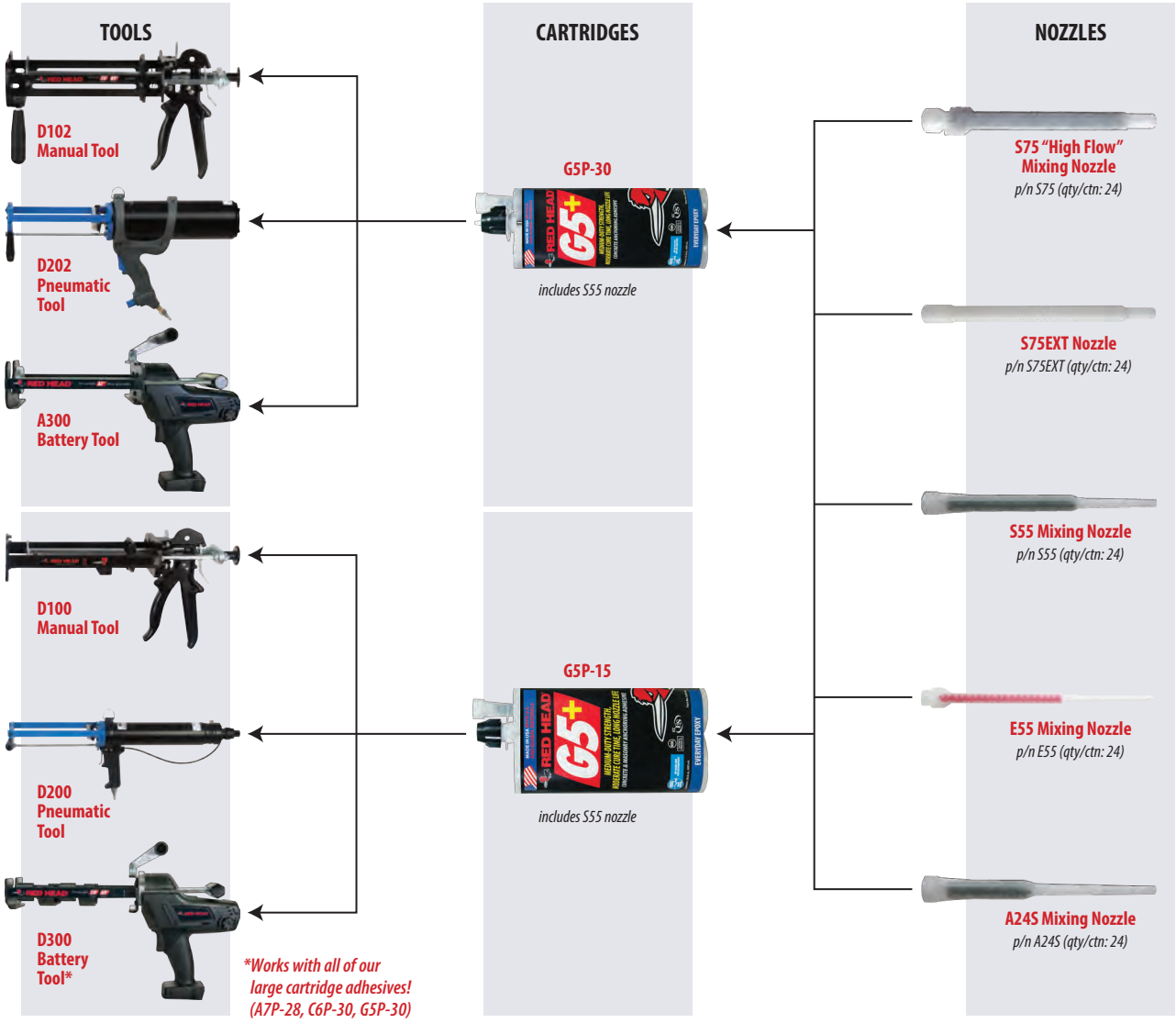


* Damp, submerged and underwater applications require 4x's air, 4x's brushing and 4x's air

** Dust is shown for diagram purposes only. To help mitigate airborne dust and comply with OSHA requirements, we recommend that you either wet the concrete before blowing out the hole, or use a drill dust extractor with your pneumatic air nozzle. We recommend vacuum assisted dust extractors like Milwaukee part numbers 5261-DE or 5317-DE. Call our technical services at (800) 848-5611 for more information.

*** Dispense mixed adhesive outside of hole until uniform color is achieved.

Selection Guide



G5P–15 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
G5P-15	15.2 Fluid Ounce Red Head C6+ Cartridge with S55 Nozzle	4
D100	Heavy-Duty 34:1 thrust ratio hand dispenser for C6P-15 and G5P-15 cartridges	1
S55	Standard Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 3-1/2″ inch usable length for 3/8″ and 1/2″ anchors, 8-1/4″ usable length for 5/8″ anchors and above	24
E55	Long Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 5-3/4″ inch usable length for 3/8″ and ½″ anchors, 12-5/8″ usable length for 5/8″ anchors and above	24

PART NUMBER	DESCRIPTION	BOX QTY
D200	Ergonomic Pneumatic Dispenser for C6P-15 and G5P-15 cartridges	1
D300	Cordless Battery Dispenser for C6P-15 and G5P-15 Cartridge. Includes one battery and charger. Works with all Milwaukee® M18™ batteries	1
S75	High Flow Mixing Nozzle, fits holes for ¾″ diameter anchors and larger. 7-3/8″ usable length	24
S75EXT	Extension for High Flow Mixing Nozzle for ¾″ diameter anchors and larger. 15-5/8″ usable length when attached to S75	24

*See page 65 for nozzle extension tubes and other accessories

ESTIMATING TABLES

G5P-30
15.2 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* using Threaded Rod or Rebar with G5+ in Solid Concrete

ANCHOR DIA. in.	# rebar	DRILL HOLE DIA. (in.)	EMBEDMENT DEPTH IN INCHES 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3/8	#3	7/16	304.5	152.2	101.5	76.1	60.9	50.7	43.5	38.1	33.8	30.4	27.7	25.4	23.4	21.7	20.3
1/2		9/16	184.2	92.1	61.4	46.0	36.8	30.7	26.3	23.0	20.5	18.4	16.7	15.3	14.2	13.2	12.3
	#4	5/8	149.2	74.6	49.7	37.3	29.8	24.9	21.3	18.6	16.6	14.9	13.6	12.4	11.5	10.7	9.9
5/8	#5	3/4	103.6	51.8	34.5	25.9	20.7	17.3	14.8	12.9	11.5	10.4	9.4	8.6	8.0	7.4	6.9
3/4	#6	7/8	76.1	38.1	25.4	19.0	15.2	12.7	10.9	9.5	8.5	7.6	6.9	6.3	5.9	5.4	5.1
7/8	#7	1	58.3	29.1	19.4	14.6	11.7	9.7	8.3	7.3	6.5	5.8	5.3	4.9	4.5	4.2	3.9
1	#8	1-1/8	46.0	23.0	15.3	11.5	9.2	7.7	6.6	5.8	5.1	4.6	4.2	3.8	3.5	3.3	3.1
	#9	1-1/4	37.3	18.6	12.4	9.3	7.5	6.2	5.3	4.7	4.1	3.7	3.4	3.1	2.9	2.7	2.5
1-1/4		1-3/8	30.8	15.4	10.3	7.7	6.2	5.1	4.4	3.9	3.4	3.1	2.8	2.6	2.4	2.2	2.1
	#10	1-1/2	25.9	12.9	8.6	6.5	5.2	4.3	3.7	3.2	2.9	2.6	2.4	2.2	2.0	1.8	1.7
1-1/2"		1-5/8"	22.1	11.0	7.4	5.5	4.4	3.7	3.2	2.8	2.5	2.2	2.0	1.8	1.7	1.6	1.5
	#11	1-3/4	19.0	9.5	6.3	4.8	3.8	3.2	2.7	2.4	2.1	1.9	1.7	1.6	1.5	1.4	1.3

*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.

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G5P–30.4 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
G5P-30	30.4 Fluid Ounce Red Head C6+ Cartridge with S55 Nozzle	4
D102	Heavy-Duty 34:1 thrust ratio hand dispenser for C6P-30 and G5P-30 cartridges	1
S55	Standard Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 3-1/2″ inch usable length for 3/8″ and 1/2″ anchors, 8-1/4″ usable length for 5/8″ anchors and above	24
E55	Long Mixing Nozzle, fits holes for 3/8″ diameter anchors and larger. 5-3/4″ inch usable length for 3/8″ and ½″ anchors, 12-5/8″ usable length for 5/8″ anchors and above	24

PART NUMBER	DESCRIPTION	BOX QTY
D202	Pneumatic Dispenser for C6P-30 and G5P-30 cartridges	1
A300	Cordless Battery Dispenser for A7P-28, C6P-30 and G5P-30 Cartridge. Includes one battery and charger. Works with all Milwaukee® M18™ batteries	1
S75	High Flow Mixing Nozzle, fits holes for ¾″ diameter anchors and larger. 7-3/8″ usable length	24
S75EXT	Extension for High Flow Mixing Nozzle for ¾″ diameter anchors and larger. 15-5/8″ usable length when attached to S75	24

*See page 65 for nozzle extension tubes and other accessories

ESTIMATING TABLES

G5P-30
30.4 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* using Threaded Rod or Rebar with G5+ in Solid Concrete

ANCHOR DIA.		DRILL HOLE DIA.	EMBEDMENT DEPTH IN INCHES														
in.	# rebar	(in.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3/8	#3	7/16	608.9	304.5	203.0	152.2	121.8	101.5	87.0	76.1	67.7	60.9	55.4	50.7	46.8	43.5	40.6
1/2		9/16	368.3	184.2	122.8	92.1	73.7	61.4	52.6	46.0	40.9	36.8	33.5	30.7	28.3	26.3	24.6
	#4	5/8	298.4	149.2	99.5	74.6	59.7	49.7	42.6	37.3	33.2	29.8	27.1	24.9	23.0	21.3	19.9
5/8	#5	3/4	207.2	103.6	69.1	51.8	41.4	34.5	29.6	25.9	23.0	20.7	18.8	17.3	15.9	14.8	13.8
3/4	#6	7/8	152.2	76.1	50.7	38.1	30.4	25.4	21.7	19.0	16.9	15.2	13.8	12.7	11.7	10.9	10.1
7/8	#7	1	116.5	58.3	38.8	29.1	23.3	19.4	16.6	14.6	12.9	11.7	10.6	9.7	9.0	8.3	7.8
1	#8	1-1/8	92.1	46.0	30.7	23.0	18.4	15.3	13.2	11.5	10.2	9.2	8.4	7.7	7.1	6.6	6.1
	#9	1-1/4	74.6	37.3	24.9	18.6	14.9	12.4	10.7	9.3	8.3	7.5	6.8	6.2	5.7	5.3	5.0
1-1/4		1-3/8	61.6	30.8	20.5	15.4	12.3	10.3	8.8	7.7	6.8	6.2	5.6	5.1	4.7	4.4	4.1
	#10	1-1/2	51.8	25.9	17.3	12.9	10.4	8.6	7.4	6.5	5.8	5.2	4.7	4.3	4.0	3.7	3.5
1-1/2"		1-5/8"	44.1	22.1	14.7	11.0	8.8	7.4	6.3	5.5	4.9	4.4	4.0	3.7	3.4	3.2	2.9
	#11	1-3/4	38.1	19.0	12.7	9.5	7.6	6.3	5.4	4.8	4.2	3.8	3.5	3.2	2.9	2.7	2.5

*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

G5+ Everyday Epoxy

Threaded Rod Ultimate Tension and Shear Loads[1,2,3] Installed in Solid Concrete

THREADED ROD DIAM. (in.)	EMBEDMENT IN CONCRETE (in.)	MAX. CLAMPING FORCE AFTER PROPER CURE ft./lbs.	ULTIMATE TENSION (lbs.)			ULTIMATE SHEAR (lbs.)
			3,000 PSI CONCRETE	5,000 PSI CONCRETE	7,000 PSI CONCRETE	3,000 PSI CONCRETE & HIGHER
3/8	1-1/2	9	2,685	2,980	3,275	N/A
	3-3/8		9,890	10,385	10,800	4,420
1/2	2	16	5,160	5,835	6,535	N/A
	4-1/2		17,600	20,245	23,075	9,705
5/8	2-1/2	47	7,280	8,450	9,630	N/A
	5-5/8		22,910	26,575	30,295	16,470
3/4	3	70	10,225	11,450	12,710	N/A
	6-3/4		32,980	37,925	42,855	23,145
7/8	3-1/2	90	12,750	14,665	16,570	N/A
	7-7/8		48,350	58,020	70,200	27,300
1	4	110	15,070	17,335	19,585	N/A
	9		54,780	65,185	75,615	34,665
1-1/4	5	370	31,225	33,095	34,750	N/A
	11-1/4		73,920	86,490	98,600	58,570
1-1/2	13	450	85,920	100,095	114,275	N/A

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity of the Ultimate Load. To calculate the Allowable Load of the anchor, divide the ultimate load by 4.
2 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+ Everyday Epoxy

Threaded Rod Allowable Tension Loads[1] Installed in Solid Concrete

THREADED ROD DIA (in.)	EMBEDMENT IN CONCRETE (in.)	ALLOWABLE TENSION LOAD BASED ON CONCRETE STRENGTH (lbs.)			ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH (lbs.)		
		3,000 psi concrete	5,000 psi concrete	7,000 psi concrete	ASTM A307	ASTM A193 GRADE B7	ASTM F593 AISI 304 SS
3/8	1-1/2	670	745	815	2,080	4,340	3,995
	3-3/8	2,470	2,595	2,700	2,080	4,340	3,995
1/2	2	1,290	1,455	1,630	3,730	7,780	7,155
	4-1/2	4,400	5,060	5,765	3,730	7,780	7,155
5/8	2-1/2	1,820	2,110	2,405	5,870	12,230	11,250
	5-5/8	5,725	6,640	7,570	5,870	12,230	11,250
3/4	3	2,555	2,860	3,175	8,490	17,690	14,860
	6-3/4	8,245	9,480	10,710	8,490	17,690	14,860
7/8	3-1/2	3,185	3,665	4,140	11,600	25,510	20,835
	7-7/8	12,085	14,505	17,550	11,600	25,510	20,835
1	4	3,765	4,330	4,895	15,180	31,620	26,560
	9	13,695	16,295	18,900	15,180	31,620	26,560
1-1/4	5	7,805	8,270	8,685	23,800	49,580	34,670
	11-1/4	18,480	21,620	24,650	23,800	49,580	34,670
1-1/2	13	21,480	25,025	28,570	33,720	70,250	47,770

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

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PERFORMANCE TABLE

G5+
Everyday Epoxy

Threaded Rod Allowable Shear Loads[1] Installed in Solid Concrete

THREADED ROD DIA. (in.)	EMBEDMENT IN CONCRETE (in.)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH (lbs.)	ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH (lbs.)		
		3,000 psi concrete & higher	ASTM A307	ASTM A193 GRADE B7	ASTM F593 AISI 304 SS
3/8	1-1/2	N/A	1,040	2,170	1,995
	3-3/8	1,105	1,040	2,170	1,995
1/2	2	N/A	1,870	3,895	3,585
	4-1/2	2,455	1,870	3,895	3,585
5/8	2-1/2	N/A	2,940	6,125	5,635
	5-5/8	4,115	2,940	6,125	5,635
3/4	3	N/A	4,250	8,855	7,440
	6-3/4	5,915	4,250	8,855	7,440
7/8	3-1/2	N/A	5,800	12,760	10,730
	7-7/8	7,065	5,800	12,760	10,730
1	4	N/A	7,590	15,810	13,285
	9	8,570	7,590	15,810	13,285
1-1/4	5	N/A	11,900	24,790	18,840
	11-1/4	14,805	11,900	24,790	18,840

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

PERFORMANCE TABLE

G5+
Everyday Epoxy

Rebar Allowable Tension Loads[1,2,3] Installed in Solid Concrete

REINFORCING BAR	EMBEDMENT IN CONCRETE (in.)	ULTIMATE TENSION (lbs.)			ULTIMATE YIELD STRENGTH GRADE 60 REBAR (lbs.)	ULTIMATE TENSILE STRENGTH GRADE 60 REBAR (lbs.)
		3,000 psi concrete	5,000 psi concrete	7,000 psi concrete		
#3	1-1/2	2,685	3,165	3,640	6,600	9,900
	3-3/8	9,960	10,460	10,950		
#4	2	5,465	4,770	5,365	12,000	18,000
	4-1/2	17,600	20,420	23,075		
#5	2-1/2	7,710	9,020	10,240	18,600	27,900
	5-5/8	20,295	23,745	27,070		
#6	3	10,825	12,230	13,455	26,400	39,600
	6-3/4	32,980	38,405	43,855		
#7	3-1/2	13,800	15,875	18,015	36,000	54,000
	7-7/8	51,125	63,090	76,140		
#8	4	17,535	20,170	22,830	47,400	71,100
	9	61,565	73,100	85,015		
#10	5	29,835	31,295	33,205	79,200	114,300
	11-1/4	67,695	79,340	89,655		
#11	13	85,920	100,095	114,275	93,600	140,400

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity of the ultimate load (to get the allowable load of the anchor rod, divide the ultimate load by 4).
2 Performance values are based on the use of ASTM A615 Grade 60 reinforcing bar. The use of lower strength rebar 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 REFERENCE TABLE

G5+
Everyday Epoxy

Threaded Rod and Rebar Installation in Solid Concrete Edge/Spacing Distance Load Factor Summary[1,2]

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
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	DISTANCE FROM ANOTHER ANCHOR
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

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.

STRENGTH DESIGN TABLE

G5+ Everyday Epoxy

Threaded Rod Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A193 B7

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
3/8	3-3/8	3,910	3,910	3,910	3,910	3,910	3,910	3,775
	4-1/2	5,215	5,215	5,215	5,215	5,215	5,215	3,775
	7-1/2	7,265	7,265	7,265	7,265	7,265	7,265	3,775
1/2	4-1/2	6,705	6,705	6,705	6,705	6,705	6,705	6,915
	6	8,940	8,940	8,940	8,940	8,940	8,940	6,915
	10	13,305	13,305	13,305	13,305	13,305	13,305	6,915
5/8	5-5/8	10,080	10,080	10,080	10,080	10,080	10,080	11,015
	7-1/2	13,445	13,445	13,445	13,445	13,445	13,445	11,015
	12-1/2	21,185	21,185	21,185	21,185	21,185	21,185	11,015
3/4	6-3/4	13,675	13,950	13,950	13,950	13,950	13,950	16,305
	9	18,600	18,600	18,600	18,600	18,600	18,600	16,305
	15	31,000	31,000	31,000	31,000	31,000	31,000	16,305
7/8	7-7/8	17,235	18,275	18,275	18,275	18,275	18,275	22,505
	10-1/2	24,365	24,365	24,365	24,365	24,365	24,365	22,505
	17-1/2	40,610	40,610	40,610	40,610	40,610	40,610	22,505
1	9	21,060	22,935	22,935	22,935	22,935	22,935	29,525
	12	30,580	30,580	30,580	30,580	30,580	30,580	29,525
	20	50,970	50,970	50,970	50,970	50,970	50,970	29,525
1-1/4	11-1/4	29,430	32,240	35,475	35,475	35,475	35,475	47,240
	15	45,310	47,300	47,300	47,300	47,300	47,300	47,240
	25	78,830	78,830	78,830	78,830	78,830	78,830	47,240

1 Tabulated values are for estimation purposes only and should not be used for design (please use our free TruSpec anchorage design software at www.itwredhead.com)
2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

G5+ Everyday Epoxy

Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Uncracked Concrete[1,2,3,4]

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	ASTM A193 B7 THREAD ROD		CARBON STEEL A36		STAINLESS STEEL F593	
		TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)
3/8	3-3/8	3,910	3,777	3,375	1,755	3,910	2,280
	4-1/2	5,215	3,777	3,375	1,755	4,785	2,280
	7-1/2	7,265	3,777	3,375	1,755	4,785	2,280
1/2	4-1/2	6,705	6,916	6,170	3,210	6,705	4,040
	6	8,940	6,916	6,170	3,210	8,760	4,040
	10	13,305	6,916	6,170	3,210	8,760	4,040
5/8	5-5/8	10,080	11,018	9,830	5,115	10,080	6,440
	7-1/2	13,445	11,018	9,830	5,115	13,445	6,440
	12-1/2	21,185	11,018	9,830	5,115	13,955	6,440
3/4	6-3/4	13,950	16,309	13,950	7,565	13,950	7,610
	9	18,600	16,309	14,550	7,565	16,500	7,610
	15	31,000	16,309	14,550	7,565	16,500	7,610
7/8	7-7/8	18,275	22,510	18,275	10,445	18,275	10,530
	10-1/2	24,365	22,510	20,085	10,445	22,820	10,530
	17-1/2	40,610	22,510	20,085	10,445	22,820	10,530
1	9	22,935	29,530	22,935	13,700	22,935	13,815
	12	30,580	29,530	26,345	13,700	29,935	13,815
	20	50,970	29,530	26,345	13,700	29,935	13,815
1-1/4	11-1/4	35,475	47,242	35,475	21,920	35,475	22,090
	15	47,300	47,242	42,155	21,920	47,300	22,090
	25	78,830	47,242	42,155	21,920	47,865	22,090

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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STRENGTH DESIGN TABLE

G5+ Everyday Epoxy

Threaded Rod Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A193 B7

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
3/8	3-3/8	1,865	1,865	1,865	1,865	1,865	1,865	2,615
	4-1/2	2,490	2,490	2,490	2,490	2,490	2,490	3,490
	7-1/2	4,155	4,155	4,155	4,155	4,155	4,155	3,775
1/2	4-1/2	3,185	3,185	3,185	3,185	3,185	3,185	4,460
	6	4,250	4,250	4,250	4,250	4,250	4,250	5,950
	10	7,080	7,080	7,080	7,080	7,080	7,080	6,915
5/8	5-5/8	4,765	4,765	4,765	4,765	4,765	4,765	6,675
	7-1/2	6,355	6,355	6,355	6,355	6,355	6,355	8,900
	12-1/2	10,595	10,595	10,595	10,595	10,595	10,595	11,015
3/4	6-3/4	6,645	6,645	6,645	6,645	6,645	6,645	9,305
	9	8,860	8,860	8,860	8,860	8,860	8,860	12,405
	15	14,770	14,770	14,770	14,770	14,770	14,770	16,305
7/8	7-7/8	8,750	8,750	8,750	8,750	8,750	8,750	12,250
	10-1/2	11,665	11,665	11,665	11,665	11,665	11,665	16,335
	17-1/2	19,445	19,445	19,445	19,445	19,445	19,445	22,505
1	9	11,040	11,040	11,040	11,040	11,040	11,040	15,455
	12	14,720	14,720	14,720	14,720	14,720	14,720	20,610
	20	24,535	24,535	24,535	24,535	24,535	24,535	29,525
1-1/4	11-1/4	16,520	16,520	16,520	16,520	16,520	16,520	23,130
	15	22,030	22,030	22,030	22,030	22,030	22,030	30,840
	25	36,715	36,715	36,715	36,715	36,715	36,715	47,240

1 Tabulated values are for estimation purposes only and should not be used for design (please use our free TruSpec anchorage design software at www.itwredhead.com)
2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

STRENGTH DESIGN TABLE

G5+ Everyday Epoxy

Threaded Rod Tension (lbf) and Shear (lbf) Loads in 4,000 psi Cracked Concrete[1,2,3,4]

ANCHOR DIAMETER (in.)	EMBEDMENT DEPTH (in.)	ASTM A193 B7 THREAD ROD		STAINLESS STEEL F593		CARBON STEEL A36	
		TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)	TENSION (lbf)	SHEAR (lbf)
3/8	3-3/8	1,865	2,615	1,865	1,755	1,865	2,280
	4-1/2	2,490	3,490	2,490	1,755	2,490	2,280
	7-1/2	4,155	3,775	3,375	1,755	4,155	2,280
1/2	4-1/2	3,185	4,460	3,185	3,210	3,185	4,040
	6	4,250	5,950	4,250	3,210	4,250	4,040
	10	7,080	6,915	6,170	3,210	7,080	4,040
5/8	5-5/8	4,765	6,675	4,765	5,115	4,765	6,440
	7-1/2	6,355	8,900	6,355	5,115	6,355	6,440
	12-1/2	10,595	11,015	9,830	5,115	10,595	6,440
3/4	6-3/4	6,645	9,305	6,645	7,565	6,645	7,610
	9	8,860	12,405	8,860	7,565	8,860	7,610
	15	14,770	16,305	14,550	7,565	14,770	7,610
7/8	7-7/8	8,750	12,250	8,750	10,445	8,750	10,530
	10-1/2	11,665	16,335	11,665	10,445	11,665	10,530
	17-1/2	19,445	22,505	19,445	10,445	19,445	10,530
1	9	11,040	15,455	11,040	13,700	11,040	13,815
	12	14,720	20,610	14,720	13,700	14,720	13,815
	20	24,535	29,525	24,535	13,700	24,535	13,815
1-1/4	11-1/4	16,520	23,130	16,520	21,920	16,520	22,090
	15	22,030	30,840	22,030	21,920	22,030	22,090
	25	36,715	47,240	36,715	21,920	36,715	22,090

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

G5+
Everyday Epoxy

Rebar Tension (lbf) and Shear (lbf) Loads in Uncracked Concrete[1,2,3,4] ASTM A615 Grade 60

ANCHOR DIAMETER # Rebar	EMBEDMENT DEPTH (in.)	TENSION (lbf)						SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000 psi	7000-8000 psi	2500-8000 psi
#3	3-3/8	3,910	3,910	3,910	3,910	3,910	3,910	3,560
	4-1/2	5,215	5,215	5,215	5,215	5,215	5,215	3,560
	7-1/2	4,835	6,435	6,435	6,435	6,435	6,435	3,560
#4	4-1/2	6,705	6,705	6,705	6,705	6,705	6,705	6,480
	6	8,940	8,940	8,940	8,940	8,940	8,940	6,480
	10	11,700	11,700	11,700	11,700	11,700	11,700	6,480
#5	5-5/8	10,080	10,080	10,080	10,080	10,080	10,080	10,040
	7-1/2	13,445	13,445	13,445	13,445	13,445	13,445	10,040
	12-1/2	18,135	18,135	18,135	18,135	18,135	18,135	10,040
#6	6-3/4	13,675	13,950	13,950	13,950	13,950	13,950	14,255
	9	18,600	18,600	18,600	18,600	18,600	18,600	14,255
	15	25,740	25,740	25,740	25,740	25,740	25,740	14,255
#7	7-7/8	17,235	18,275	18,275	18,275	18,275	18,275	19,440
	10-1/2	24,365	24,365	24,365	24,365	24,365	24,365	19,440
	17-1/2	35,100	35,100	35,100	35,100	35,100	35,100	19,440
#8	9	21,060	22,935	22,935	22,935	22,935	22,935	25,595
	12	30,580	30,580	30,580	30,580	30,580	30,580	25,595
	20	46,215	46,215	46,215	46,215	46,215	46,215	25,595
#9	10-1/8	25,130	27,525	29,030	29,030	29,030	29,030	32,400
	13-1/2	38,690	38,705	38,705	38,705	38,705	38,705	32,400
	22-1/2	58,500	58,500	58,500	58,500	58,500	58,500	32,400
#10	11-1/4	29,430	32,240	35,475	35,475	35,475	35,475	41,145
	15	45,310	47,300	47,300	47,300	47,300	47,300	41,145
	25	74,295	74,295	74,295	74,295	74,295	74,295	41,145

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2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, uncracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

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G5+
Everyday Epoxy

Rebar Tension (lbf) and Shear (lbf) Loads in Cracked Concrete[1,2,3,4] ASTM A615 Grade 60

ANCHOR DIAMETER # Rebar	EMBEDMENT DEPTH (in.)	TENSION (lbf)					SHEAR (lbf)
		2500 psi	3000 psi	4000 psi	5000 psi	6000-8000 psi	2500-8000 psi
#3	3-3/8	1,865	1,865	1,865	1,865	1,865	2,615
	4-1/2	2,490	2,490	2,490	2,490	2,490	3,490
	7-1/2	4,155	4,155	4,155	4,155	4,155	3,560
#4	4-1/2	3,185	3,185	3,185	3,185	3,185	4,460
	6	4,250	4,250	4,250	4,250	4,250	5,950
	10	7,080	7,080	7,080	7,080	7,080	6,480
#5	5-5/8	4,765	4,765	4,765	4,765	4,765	6,675
	7-1/2	6,355	6,355	6,355	6,355	6,355	8,900
	12-1/2	10,595	10,595	10,595	10,595	10,595	10,040
#6	6-3/4	6,645	6,645	6,645	6,645	6,645	9,305
	9	8,860	8,860	8,860	8,860	8,860	12,405
	15	14,770	14,770	14,770	14,770	14,770	14,255
#7	7-7/8	8,750	8,750	8,750	8,750	8,750	12,250
	10-1/2	11,665	11,665	11,665	11,665	11,665	16,335
	17-1/2	19,445	19,445	19,445	19,445	19,445	19,440
#8	9	11,040	11,040	11,040	11,040	11,040	15,455
	12	14,720	14,720	14,720	14,720	14,720	20,610
	20	24,535	24,535	24,535	24,535	24,535	25,595
#9	10-1/8	13,970	13,970	13,970	13,970	13,970	19,560
	13-1/2	18,630	18,630	18,630	18,630	18,630	26,080
	22-1/2	31,050	31,050	31,050	31,050	31,050	32,400
#10	11-1/4	16,520	16,520	16,520	16,520	16,520	23,130
	15	22,030	22,030	22,030	22,030	22,030	30,840
	25	36,715	36,715	36,715	36,715	36,715	41,145

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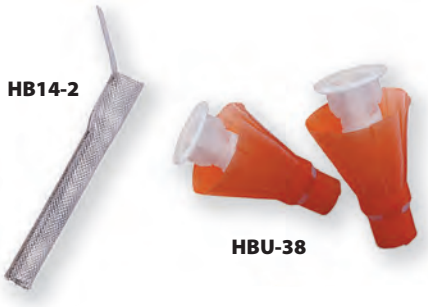
2 Tabulated values represent strength design per ACI 318 for a single anchor in adequate concrete thickness, not near an edge nor adjacent anchorage, and not for sustained loading.
3 Bond strengths are for dry, cracked concrete with periodic inspection
4 Bond strengths are for Temperature Range A (maximum long term temperature of 110F, maximum short term temperature of 142F).

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

Umbrella Inserts and Screen Tubes

High Performance Adhesive Systems for Fastening to Hollow Base Materials

A7P-10 A7P-28



HB14-2

HBU-38

DESCRIPTION/ADVANTAGES

Hollow Block Fastening with A7+/C6+ G5+ Adhesive

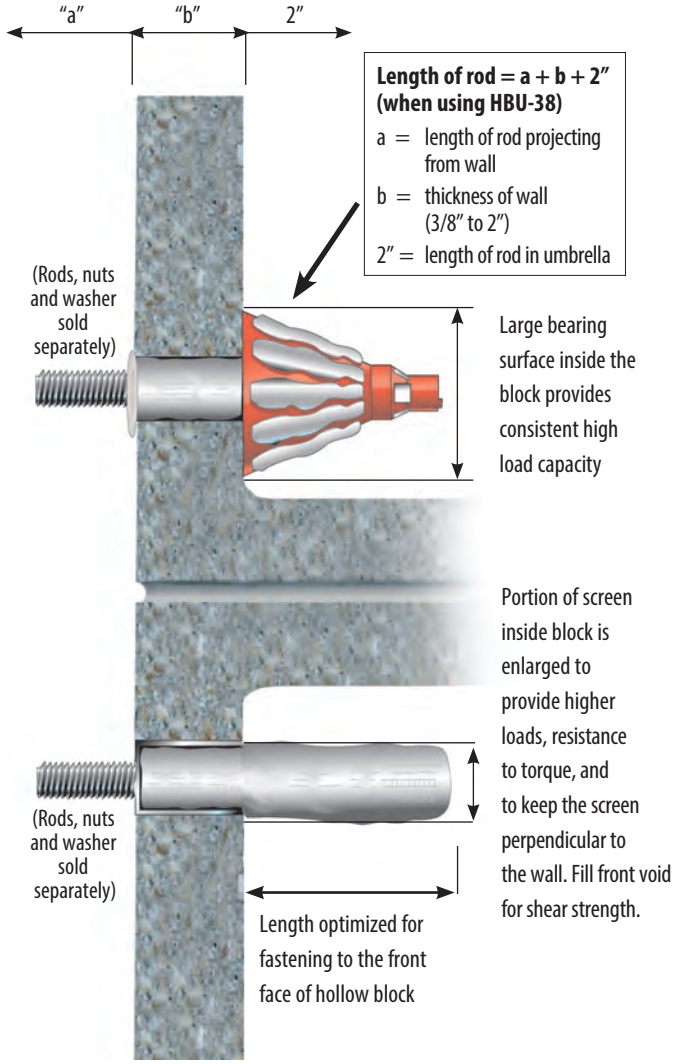
HBU-38

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"

For umbrella to open correctly, air gap must be a minimum of 2-1/4"

SHORT 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+/C6+/G5+ 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

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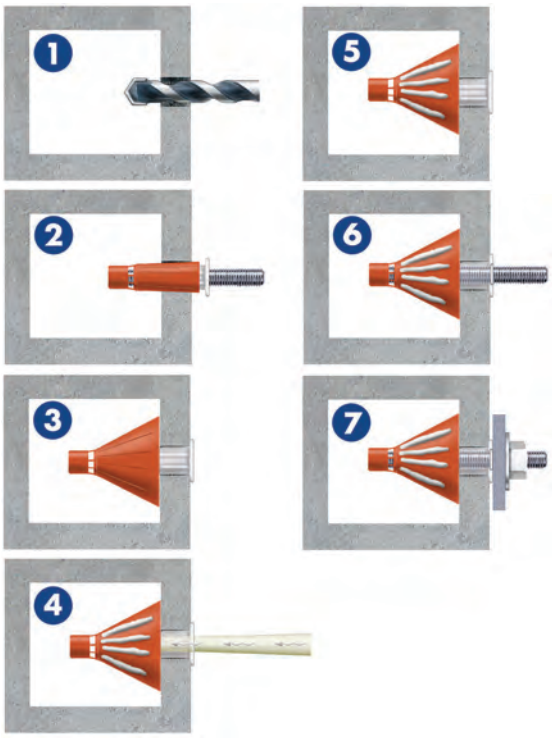
Umbrella Inserts and Screens

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. With the rod, push umbrella body through the hole and completely into void until umbrella opens behind wall. 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 screens provided on page 63.

SELECTION CHART

Umbrella Inserts

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

SELECTION CHART

Short Screen Tubes

PART NO.	DESCRIPTION		QTY/BOX
HB14-2	1/4" x 2"	Stainless Screen	100
HB38-312	3/8" x 3-1/2"	Stainless Screen	100
HB12-312	1/2" x 3-1/2"	Stainless Screen	50
HB58-412	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+ in Hollow Block

ROD in.	ROD (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIGE	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

Short Screens

Number of Anchoring Installations per Cartridge* Threaded Rod using Short Screen Tubes in A7+ in Hollow Block

ROD in.	ROD (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIGE		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]

Hollow Concrete Block: Ultimate Tension and Shear Loads using Umbrellas and Short Screen Tubes[1,2]

	ROD DIA. in.	ROD DIA. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE ft. lbs.	MAX CLAMPING FORCE AFTER PROPER CURE (Nm)	DRILL HOLE DIA. in.	DRILL HOLE DIA. (mm)	EMBEDMENT (SCREEN LENGTH) in.	EMBEDMENT (SCREEN LENGTH) (mm)	ULTIMATE TENSION lbs.	ULTIMATE TENSION (Kn)	ULTIMATE SHEAR lbs.	ULTIMATE SHEAR (Kn)
Umbrella	3/8	(9.5)	10	(13)	3/4	(19.1	3-3/4	(95.3)	3,600	(16)	3,200	(14.2)
	1/2"	(12.7)	10	(13)	3/4	(19.1	3-3/4	(95.3)	3,600	(16)	3,200	(14.2)
Short Screen Tubes	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 5.
2 The tabulated values are for anchors installed at a minimum 12 inch edge distance and minimum 8 inch spacing.

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Screen Tubes

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

A7P-10 A7P-28

Screen Tubes

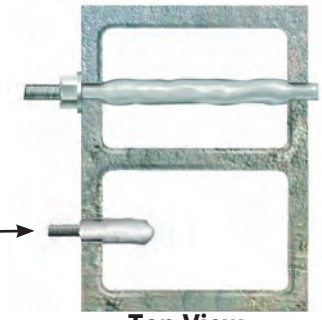
DESCRIPTION/SUGGESTED SPECIFICATIONS

Screens Tubes Used with A7+/C6+ /G5+

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.

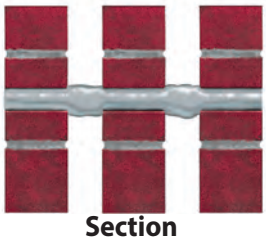
For attachment of screens to front face of a block, see Installation Steps below



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

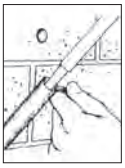
- 30%-50% savings from stainless steel screens
- Comparable performance values
- Easier to insert and span across voids
- Flexible material is less susceptible to damage from crushing

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

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).



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).

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

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.		SCREEN LENGTH		STAINLESS STEEL SCREENS		NYLON SCREENS	
in.	(mm)	in.	(mm)	PART NO.	QTY/BOX	PART NO.	QTY/BOX
1/4	(6.4)	6	(152.4)	HB14-6	100		
1/4	(6.4)	8	(203.2)	HB14-8	100		
1/4	(6.4)	10	(254.0)	HB14-10	100		
3/8	(9.5)	6	(152.4)			HBP38-6	50
3/8	(9.5)	8	(203.2)			HBP38-8	25
3/8	(9.5)	10	(254.0)			HBP38-10	25
1/2	(12.7)	6	(152.4)			HBP12-6	50
1/2	(12.7)	8	(203.2)			HBP12-8	25
1/2	(12.7)	10	(254.0)			HBP12-10	25
5/8	(15.9)	6	(152.4)			HBP58-6	40
5/8	(15.9)	8	(203.2)			HBP58-8	40
5/8	(15.9)	10	(254.0)			HBP58-10	40
3/4	(19.1)	8	(203.2)	HB34-8	20		
3/4	(19.1)	10	(254.0)			HBP34-10	20
3/4	(19.1)	13	(330.2)			HBP34-13	20

*Not available in standard strength nylon screens.

ESTIMATING TABLE

Screen Tubes

Number of Holes per Cartridge using Threaded Rod and Screen Tubes with A7+ in Hollow Base Materials*

ROD		DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE		SCREEN LENGTH			
in.	(mm)				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.

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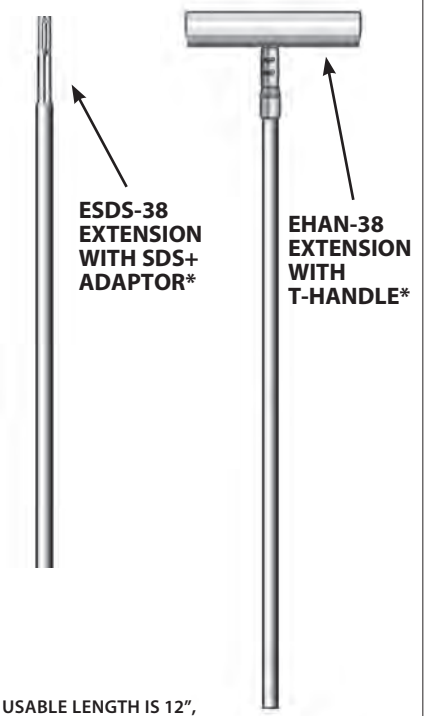
Accessories

Wire Brush Extensions



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

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DESCRIPTION/ADVANTAGES

Hole Plugs

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

ANCHOR DIAMETER	HOLE DIAMETER	PART NO.	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

Use with E916-6 extension tube

HOLE PLUGS	PART NO.	HOLE DIAMETER	QTY
Piston Plug for 5/8" and 3/4" anchor diameter	PL-5834	3/4"	25
		7/8"	25
Piston Plug for 7/8" and 1" anchor diameter	PL-7810	1"	20
		1-1/8"	20
Piston Plug for 1-1/4" anchor diameter	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.	HOLE 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"	10
WB-034	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 NO.	QTY
6-Foot Straight Tubing (.39 in. I.D. x .43 in. O.D.) (works with A245, S55, and E55 nozzle)	E25-6	6
6-Foot Long Extension Tube for use with Piston Plugs (works with all nozzles, use the S75 ext. to use with S75)	E916-6	5

Blow Pump

DESCRIPTION	PART NO.	QTY/BAG
Blow Pump	BP-10	1

Minimum hole 7/16".