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

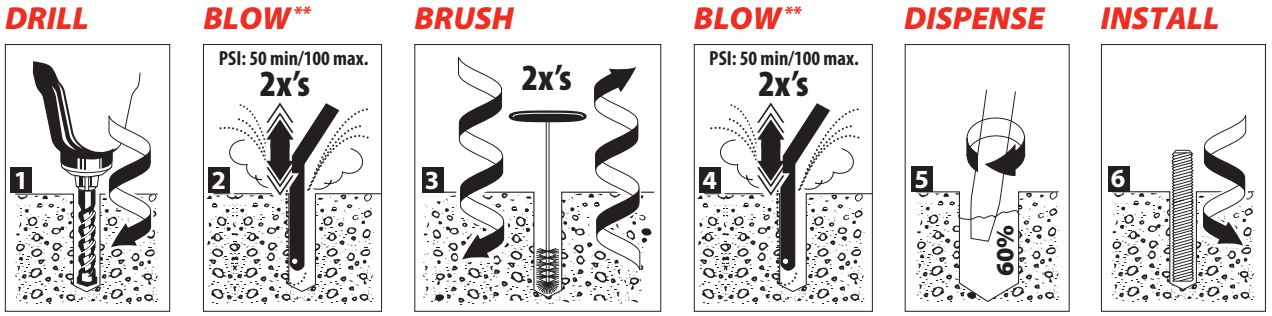
BASE MATERIAL (F°/C°)	GEL TIME[2]	FULL CURE TIME
110°/ 43°	10 minutes	2 hours
90°/ 32°	14 minutes	2.75 hours
70°/ 21°	16 minutes	6.5 hours
50°/ 10°	30 minutes	24 hours
40°/ 4.4°	46 minutes	48 hours

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+

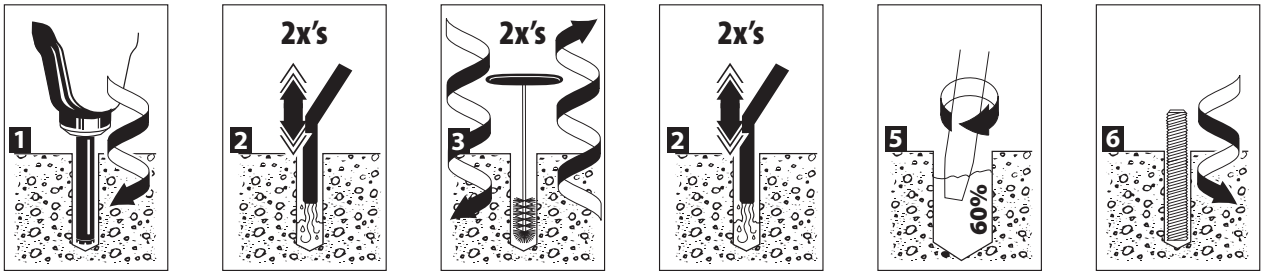
INSTALLATION STEPS *for Carbide-Tipped Bits*



* 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*



Flush with water

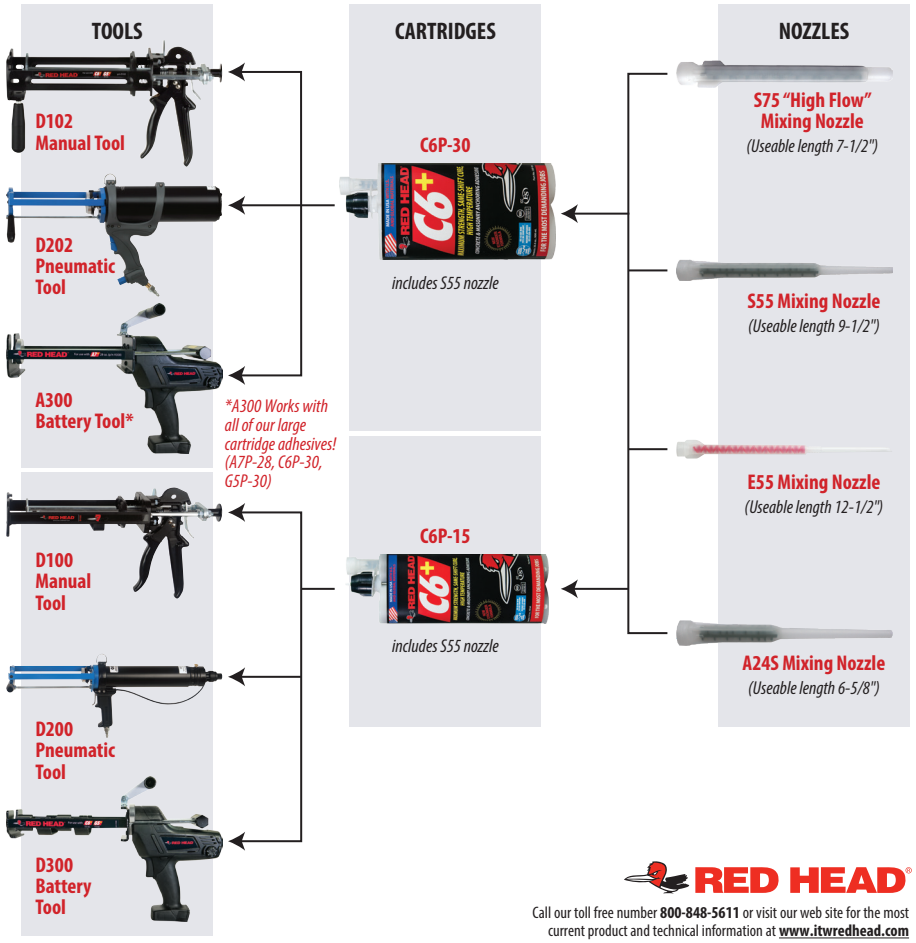
Flush with water & remove any standing water

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



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 useable length for 3/8" and 1/2" anchors, 9-1/2" useable 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 useable length for 3/8" and ½" anchors, 12-1/2" useable 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. 7-1/2" useable length	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.	ANCHOR DIA. # 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 useable length for 3/8" and 1/2" anchors, 9-1/2" useable 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 useable length for 3/8" and ½" anchors, 12-1/2" useable 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. 7-1/2" useable length	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.

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

C6+
For the Most Demanding Jobs

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

C6+
For the Most Demanding Jobs

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

C6+
For the Most Demanding Jobs

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

C6+
For the Most Demanding Jobs

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

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

C6+
For the Most Demanding Jobs

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

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

C6+
For the Most Demanding Jobs

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

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

C6+
For the Most Demanding Jobs

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

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

C6+
For the Most Demanding Jobs

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

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).

MASONRY DESIGN TABLE

C6+
For the Most Demanding Jobs

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.

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.