
MADE IN USA
RED HEAD®
CONCRETE ANCHORING SPECIALISTS
BUILDING AMERICA'S INFRASTRUCTURE FOR 100 YEARS
Trubolt®+
Seismic Wedge Anchors
ESR-2427
Approved for:
• Seismic
• Cracked and Uncracked Concrete

Dependable, Heavy-Duty, Inspectable, Wedge Type Expansion Anchor

Trubolt® Wedge Anchors

Trubolt®+ *Seismic Wedge Anchors*

DESCRIPTION/SUGGESTED SPECIFICATIONS

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Trubolt Wedge anchors feature a stainless steel expansion clip, threaded stud body, nut and washer. Anchor bodies are made of plated carbon steel, hot-dipped galvanized carbon steel, type 304 stainless steel or type 316 stainless steel as identified in the drawings or other notations.

Trubolt**+** Wedge anchors consist of a high-strength threaded stud body, expansion clip, nut and washer. Anchor bodies are made of plated carbon steel. The expansion clip consists of a split cylindrical ring with undercutting grooves.

The exposed end of the anchor is stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

Use carbide tipped hammer drill bits made in accordance with ANSI B212.15-1994 to install anchors.

Anchors are tested to ACI 355.2 and ICC-ES AC193. Anchors are listed by the following agencies as required by the local building code: ICC-ES, UL, FM, City of Los Angeles, California State Fire Marshal and Caltrans.

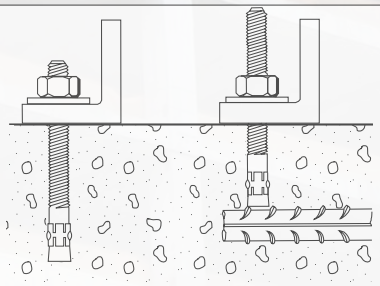
See Appendix B and C for performance values in accordance to 2006 and 2009 IBC. (Found online in our Product and Resource Catalog at www.itwredhead.com

ADVANTAGES

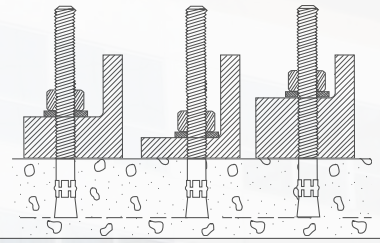
- ✔ 2006 and 2009 International Building Code (IBC) Compliant
- ✔ Versatile fully threaded design is standard on sizes up to 3/4" diameter and 10" length
- ✔ Anchor diameter equals hole diameter
- ✔ Standard carbon and stainless steel anchors
- ✔ 360° contact with concrete assures full expansion for reliable working loads
- ✔ Non bottom-bearing, may be used in hole depth exceeding anchor length
- ✔ Can be installed through the work fixture, eliminating hole spotting
- ✔ Inspectable torque values, indicating proper installation

Fully Threaded Advantage

Trubolt's fully threaded feature eliminates subsurface obstruction problems.



Fully threaded design accommodates various material thicknesses at the same embedment. One anchor length saves time and money.



APPROVALS/LISTINGS

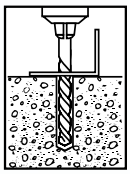
Trubolt®
Wedge Anchors

- ICC Evaluation Service, Inc. # ESR-2251
  - Category 1 performance rating
  - 2006 IBC compliant
  - Meets ACI 318 ductility requirements
  - Tested in accordance with ACI 355.2 and ICC-ES AC193
  - For use in seismic zones A & B
  - 1/4", 3/8" & 1/2" diameter anchors listed in ESR-2251
- Underwriters Laboratories
- Factory Mutual
- City of Los Angeles - #RR2748
- California State Fire Marshall
- Caltrans
- Meets or exceeds U.S. Government G.S.A. Specification A-A-1923A Type 4 (formerly GSA: FF-S-325 Group II, Type 4, Class 1)

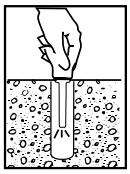
Trubolt®+
Seismic Wedge Anchors

- ICC Evaluation Service, Inc. # ESR-2427
  - Category 1 performance rating
  - 2006 IBC and 2009 IBC compliant
  - Meets ACI 318 ductility requirements
  - Tested in accordance with ACI 355.2 and ICC-ES AC193
  - For use in seismic zones A, B, C, D, E, & F
  - 3/8", 1/2", 5/8" & 3/4" diameter anchors listed in ESR-2427
- City of Los Angeles - #RR25867

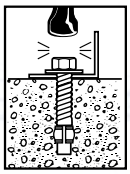
INSTALLATION STEPS



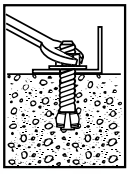
1. Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole to any depth exceeding the desired embedment. See chart for minimum recommended embedment.



2. Clean hole or continue drilling additional depth to accommodate drill fines.



3. Assemble washer and nut, leaving nut flush with end of anchor to protect threads. Drive anchor through material to be fastened until washer is flush to surface of material.



4. Expand anchor by tightening nut 3-5 turns past the hand tight position, or to the specified torque requirement.

ID STAMP

LENGTH INDICATION CODE*

CODE	LENGTH OF ANCHOR	CODE	LENGTH OF ANCHOR
A	1-1/2 < 2 (38.1 < 50.8)	K	6-1/2 < 7 (165.1 < 177.8)
B	2 < 2-1/2 (50.8 < 63.5)	L	7 < 7-1/2 (177.8 < 190.5)
C	2-1/2 < 3 (63.5 < 76.2)	M	7-1/2 < 8 (190.5 < 203.2)
D	3 < 3-1/2 (76.2 < 88.9)	N	8 < 8-1/2 (203.2 < 215.9)
E	3-1/2 < 4 (88.9 < 101.6)	O	8-1/2 < 9 (215.9 < 228.6)
F	4 < 4-1/2 (101.6 < 114.3)	P	9 < 9-1/2 (228.6 < 241.3)
G	4-1/2 < 5 (114.3 < 127.0)	Q	9-1/2 < 10 (241.3 < 254.0)
H	5 < 5-1/2 (127.0 < 139.7)	R	10 < 11 (254.0 < 279.4)
I	5-1/2 < 6 (139.7 < 152.4)	S	11 < 12 (279.4 < 304.8)
J	6 < 6-1/2 (152.4 < 165.1)	T	12 < 13 (304.8 < 330.2)

*Located on top of anchor for easy inspection.

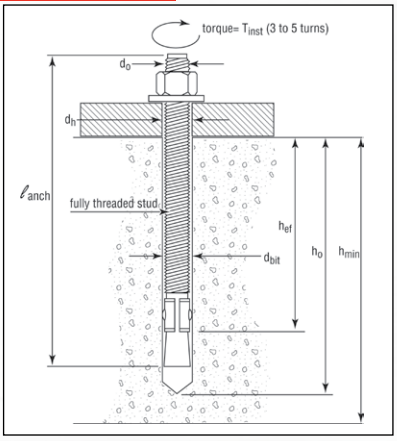
ITW RED HEAD TRUBOLT WEDGE ANCHOR
DESIGN INFORMATION TESTED TO ICC-ES AC193 AND ACI 355.2, IN ACCORDANCE WITH 2006 IBC

TRUBOLT WEDGE ANCHOR DESIGN INFORMATION[1,2,3]

DESIGN INFORMATION	Symbol	Units	Nominal Anchor Diameter									
			1/4		3/8		1/2		5/8		3/4	
Anchor O.D.	d_o	in	0.250		0.375		0.500		0.625		0.750	
Effective embedment	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Minimum member thickness	h_{min}	in	4	4	4	5	5	6	5	8	6	8
Critical edge distance	c_{ac}	in	2-5/8	3	2-5/8	5-1/4	3-3/4	6-3/4	5	8	7	9
Minimum edge distance	c_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Minimum anchor spacing	s_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Min. Specified Yield Strength	f_y	lb/in^2	55,000									
Min. Specified Ultimate Strength	f_{uta}	lb/in^2	75,000									
Effective tensile stress area	A_{se}	in^2	0.032		0.078		0.142		0.226		0.334	
Steel strength in tension	N_s	lb	2,385		5,815		10,645		16,950		25,050	
Steel strength in shear	V_s	lb	1,430		2,975	3,490	4,450	6,385	6,045	10,170	10,990	15,030
Pullout strength, uncracked concrete	$N_{p,uncr}$	lb	1,392	1,706	2,198	3,469	2,400	4,168	4,155	6,638	8,031	10,561
Anchor Category (All anchors are ductile)			1									
Effectiveness factor k_{uncr} uncracked concrete			24									
Axial stiffness in service load range	β	lb/in	14,651	9,385	17,515	26,424	32,483	26,136	42,899	21,749	43,576	28,697
Coefficient for variation for axial stiffness in service load range			34	47	28	45	17	33	55	22	63	28
Strength reduction factor ϕ for tension, steel failure modes			0.75									
Strength reduction factor ϕ for shear, steel failure modes			0.65									
Strength reduction factor ϕ for tension, concrete failure modes, Condition B			0.65									
Strength reduction factor ϕ for shear, concrete failure modes, Condition B			0.70									

[1] Trubolt+ Anchor Design Strengths must be determined in accordance with ACI 318-05 Appendix D and this table
[2] The Trubolt+ Wedge Anchor is a ductile steel element as defined by ACI 318 D.1
[3] 1/4", 3/8", & 1/2" diameter data is listed in ICC-ES ESR-2251.

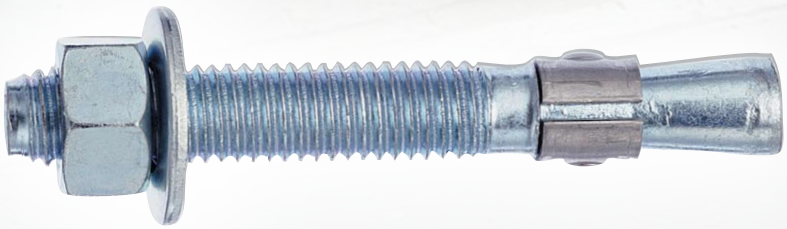
TRUBOLT WEDGE ANCHOR (INSTALLED)



TRUBOLT WEDGE INSTALLATION INFORMATION

Trubolt® Wedge Anchors

	Symbol	Units	Nominal Anchor Diameter (in.)									
			1/4		3/8		1/2		5/8		3/4	
Anchor outer diameter	d_o	in	0.25		0.375		0.5		0.625		0.750	
Nominal carbide bit diameter	d_{bit}	in	1/4		3/8		1/2		5/8		3/4	
Effective embedment depth	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Min hole depth	h_o	in	2	2-1/2	2-1/2	3-3/8	2-3/4	4-1/4	3-3/4	5-1/4	4-3/4	6
Min slab thickness	h_{min}	in	4		4	5	5	6	5	8	6	8
Installation torque	T_{inst}	ft-lb	4		25		55		90		110	
Min hole diameter in fixute	d_h	in	5/16		7/16		9/16		11/16		13/16	



2009 IBC Compliant

Trubolt®
Wedge Anchors

Performance values in accordance with 2006 IBC

TRUBOLT WEDGE PULLOUT STRENGTH ($N_{p, unc}$) (POUNDS) [1]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	1,392	1,525	1,610	1,822
	2	1,706	1,869	1,947	2,151
3/8	1-3/4	2,198	2,408	2,621	3,153
	2-5/8	3,469	3,800	3,936	4,275
1/2	1-7/8	2,400	2,629	3,172	4,520
	3-3/8	4,168	4,520	4,520	4,520
5/8	2-1/2	4,155	4,155	4,376	5,578
	4	6,638	6,900	7,968	10,157
3/4	3-1/2	8,031	8,322	9,610	12,251
	4-3/4	10,561	10,561	10,561	12,251

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
1 Values are for single anchors with no edge distance or spacing reduction.

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC TENSION (ASD), NORMAL-WEIGHT UNCRACKED CONCRETE [1-6]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	611	670	707	800
	2	749	821	855	945
3/8	1-3/4	965	1,058	1,151	1,385
	2-5/8	1,524	1,669	1,729	1,878
1/2	1-7/8	1,054	1,155	1,393	1,985
	3-3/8	1,831	1,985	1,985	1,985
5/8	2-1/2	1,825	1,825	1,922	2,450
	4	2,915	3,030	3,499	4,461
3/4	3-1/2	3,527	3,655	4,221	5,381
	4-3/4	4,638	4,638	4,638	5,381

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static tension load only.
2 Concrete determined to remain uncracked for the life of the anchorage.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
4 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
5 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
6 Values do not include edge distance or spacing reductions.

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC SHEAR (ASD), STEEL (POUNDS) [1-5]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Allowable Steel Capacity, Static Shear
1/4	1-1/2	628
	2	
3/8	1-3/4	1,307
	2-5/8	1,533
1/2	1-7/8	1,954
	3-3/8	2,804
5/8	2-1/2	2,655
	4	4,467
3/4	3-1/2	4,827
	4-3/4	6,601

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static shear load only.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
3 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
4 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
5 Values do not include edge distance or spacing reductions.

ITW RED HEAD TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION TESTED TO ICC-ES AC 193 AND ACI 355.2, IN ACCORDANCE WITH 2006 and 2009 IBC

TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)[4]									
			3/8"		1/2"				5/8"		3/4"	
Anchor category	1, 2 or 3	—	1		1				1		1	
Minimum effective embedment depth	h_{ef}	in	1-5/8		2		3-1/4		2-3/4	4-1/4	3-3/4	
Minimum concrete member thickness	h_{min}	in	4	5	4	6	6	8	6	6-1/4	7	8
Critical edge distance	c_{ac}	in	5	3	6	6	7-1/2	6	7-1/2	6-1/2	12	10
Data for Steel Strengths – Tension and Shear												
Minimum specified yield strength	f_y	psi	60,000		55,000				55,000		55,000	
Minimum specified ultimate strength	f_{uta}	psi	75,000		75,000				75,000		75,000	
Effective tensile stress area (neck)	A_{se}	in^2	0.056		0.119				0.183		0.266	
Effective tensile stress area (thread)	A_{se}	in^2	0.075		0.142				0.217		0.332	
Steel strength in tension	N_{sa}	lbf	4,200		8,925				13,725		19,950	
Steel strength in shear, uncracked or cracked concrete[6]	V_{sa}	lbf	1,830		5,175				8,955		14,970	
Steel strength in shear – seismic loads	V_{eq}	lbf	1,545		5,175				8,955		11,775	
Strength reduction factor *f* for tension, steel failure modes[2]			0.75		0.75				0.75		0.75	
Strength reduction factor *f* for shear, steel failure modes[2]			0.60		0.65				0.65		0.65	
Data for Concrete Breakout Concrete Pryout Strengths in Tension and Shear												
Effectiveness factor – uncracked concrete	k_{uncr}	—	24		24				24		24	
Effectiveness factor – cracked concrete	k_{cr}	—	17		17				17		17	
Modification factor for cracked and uncracked concrete[3]	$\Psi_{c,N}$	—	1.0		1.0				1.0		1.0	
Coefficient for pryout strength	k_{cp}	—	1.0		1.0		2.0		2.0		2.0	
Load-bearing length of anchor	l_e	in	1.625		2.0		3.25		2.75	4.25	3.75	
Strength reduction factor ϕ for tension, concrete failure modes, Condition B[2]			0.65		0.65				0.65		0.65	
Strength reduction factor ϕ for shear, concrete failure modes, Condition B[2]			0.70		0.70				0.70		0.70	
Data for Pullout Strengths												
Pullout strength, uncracked concrete	$N_{p,uncr}$	lbf	See Footnote[5]		See Footnote[5]		6,540		5,430	8,900	See Footnote[5]	
Pullout strength, cracked concrete	$N_{p,cr}$	lbf	See Footnote[5]		See Footnote[5]				See Footnote[5]		See Footnote[5]	
Pullout strength for seismic loads	N_{eq}	lbf	See Footnote[5]		See Footnote[5]				See Footnote[5]	6,715	See Footnote[5]	
Strength reduction factor *f* for tension, pullout failure modes, Condition B[2]			See Footnote[5]		0.65				0.65		See Footnote[5]	
Additional Anchor Data												
Axial stiffness in service load range in uncracked concrete	b_{uncr}	lbf/in	100,000		250,000				250,000		250,000	
Axial stiffness in service load range in cracked concrete	b_{cr}	lbf/in	40,000		20,000				20,000		20,000	

For SI: 1 inch = 25.4 mm, 1 in2 = 645.16mm2, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa, 1 lbf • 102/in - 17,500 N/m.

[1] The 1/2", 5/8" and 3/4" diameter Trubolt+ Wedge Anchors are ductile steel elements as defined by ACI 318 D.1. The 3/8" diameter Trubolt+ is considered ductile under tension loading and brittle under shear loading.

[2] All values of ϕ apply to the load combinations of IBC Section 1605.2, ACI 318 Section 9.2 or UBC Section 1612.2. If the load combinations of Appendix C or UBC Section 1909.2 are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.5. For installations where reinforcement that complies with ACI 318 Appendix D requirements for Condition A is present, the appropriate ϕ factor must be determined in accordance with ACI 318 D.4.4.

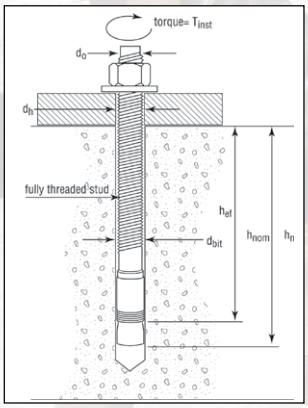
[3] For all design cases $\Psi_{c,N} = 1.0$. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.

[4] The actual diameter for the 3/8" diameter anchor is 0.361" for the 5/8" diameter anchor is 0.615" and the 3/4" diameter anchor is 0.7482".

[5] Anchor pullout strength does not control anchor design. Determine steel and concrete capacity only.

[6] Steel strength in shear values are based on test results per ACI 355.2, Section 9.4 and must be used for design.

TRUBOLT+ WEDGE ANCHOR (INSTALLED)



TRUBOLT+ WEDGE INSTALLATION INFORMATION

Parameter	Notation	Units	Nominal Achor Diameter (inch)									
			3/8		1/2				5/8		3/4	
Anchor outer diameter	d_o	inches	0.361		0.5				0.615		0.7482	
Nominal carbide bit diameter	d_{bit}	inches	3/8		1/2				5/8		3/4	
Effective embedment depth	h_{ef}	inches	1-5/8		2		3-1/4		2-3/4	4-1/4	3-3/4	
Minimum anchor embedment depth	h_{nom}	inches	2		2-1/2		3-3/4		3-1/4	4-3/4	4-3/8	
Minimum hole depth[1]	h_o	inches	2-1/4		2-3/4		4		3-1/2	5	4-5/8	
Minimum concrete member thickness[1]	h_{min}	inches	4	5	4	6	6	8	6	6-1/4	7	8
Critical edge distance[1]	c_{ac}	In.	5	3	6	6	7-1/2	6	7-1/2	6-1/2	12	10
Minimum anchor spacing[1]	s_{min}	In.	3-1/2	2-1/2	6	5-3/4	4	5-3/4	8	6	6	6
Minimum edge distance[1]	c_{min}	In.	3		6				7-1/2	5	7-1/2	7-1/2
Minimum overall anchor length	l	inches	2-1/2		3-3/4		4-1/2		4-1/4	6	5-1/2	
Installation torque	T_{inst}	ft-lb	30		45				90		110	
Minimum diameter of hole in fastened part	d_h	inches	1/2		5/8				3/4		7/8	

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m.

Trubolt+ Seismic Wedge Anchors

TRUBOLT+ WEDGE ANCHOR ALLOWABLE STRESS DESIGN (ASD) VALUES FOR ILLUSTRATIVE PURPOSES

Anchor Notation	Anchor Embedment Depth	Effective Embedment Depth	Allowable Tension Load
	(inches), h_{nom}	(inches), h_{ef}	(lbs)
3/8	2	1-5/8	1,090
1/2	2-1/2	2	1,490
	3-3/4	3-1/4	2,870
5/8	3-1/4	2-3/4	2,385
	4-3/4	4-1/4	3,910
3/4	4-3/8	3-3/4	3,825

For SI: 1 inch = 25.4 mm, 1 ft-lb = 4.45N.
Design Assumptions:
1 Single anchor with static shear load only.
2 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
3 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
4 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
5 Values do not include edge distance or spacing reductions.

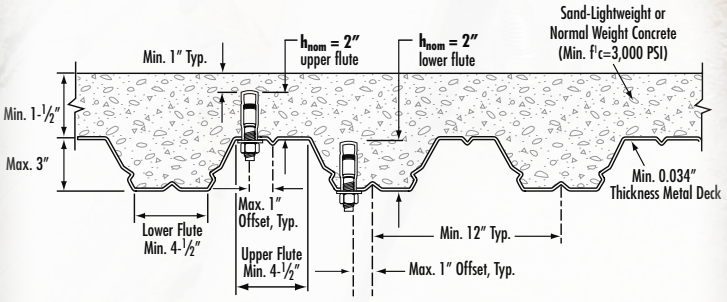
ITW RED HEAD TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION FOR INSTALLATION IN THE SOFFIT OF CONCRETE FILL ON METAL DECK FLOOR AND ROOF ASSEMBLIES

TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION

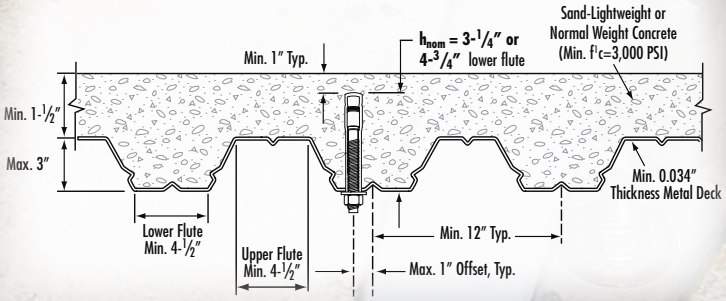
Characteristic	Symbol	Units	Nominal Anchor Diameter				
			3/8"	1/2"		5/8"	
			Upper /Lower	Upper /Lower	Lower Only	Lower Only	Lower Only
			h_{ef} = 1-5/8"	h_{ef} = 2"	h_{ef} = 3-1/4"	h_{ef} = 2-3/4"	h_{ef} = 4-1/4"
Pullout strength, uncracked concrete over metal deck	$N_{p, deck, uncr}$	lbf	2,170	2,515	5,285	3,365	6,005
Pullout strength, cracked concrete over metal deck	$N_{p, deck, cr}$	lbf	1,650	1,780	4,025	2,405	5,025
Reduction factor for pullout strength in tension, Condition B	ϕ	––	0.65				
Shear strength, uncracked concrete over metal deck	$V_{p, deck, uncr}$	lbf	1,640	2,200	3,790	2,890	6,560
Reduction factor for steel strength in shear	ϕ	––	0.60	0.65			
Anchor embedment depth	h_{nom}	in	2.0	2.5	3.75	3.25	4.75

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N

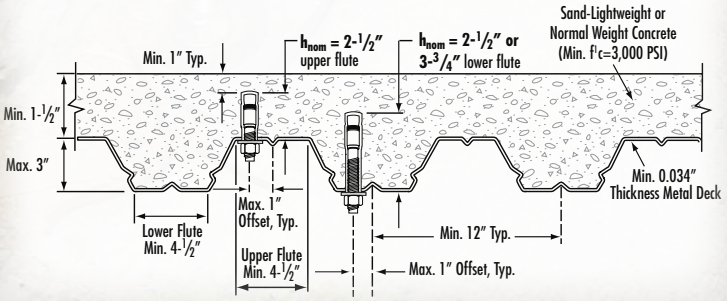
Nominal Anchor Diameter = 3/8″



Nominal Anchor Diameter = 5/8″



Nominal Anchor Diameter = 1/2″



2009 IBC Compliant

TRUBOLT+ SELECTION GUIDE

TRUBOLT+ PART NO.	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY PER BOX	QTY PER MASTER CARTON
CWS-3830	1-5/8 (41.3)	3/8" - 16	3 (76.2)	5/8 (15.9)	50	400
CWS-3836	2-3/8 (60.3)		3-3/4 (95.3)	1-3/8 (34.9)	50	300
CWS-3850	3-5/8 (92.1)		5 (127.0)	2-5/8 (66.7)	50	300
CWS-1236	2-1/8 (54.0)	1/2" - 13	3-3/4 (95.3)	3/4 (19.1)	25	150
CWS-1244	2-7/8 (73.0)		4-1/2 (114.3)	1-1/2 (38.1)	25	150
CWS-1254	3-7/8 (98.4)		5-1/2 (139.7)	2-1/2 (63.5)	25	150
CWS-1270	5-3/8 (136.5)		7 (177.8)	4 (101.6)	25	150
CWS-5850	3-3/16 (81.0)	5/8" - 11	5 (127.0)	1-1/8 (28.6)	10	100
CWS-5860	4-3/16 (106.4)		6 (152.4)	2-1/8 (54.0)	10	50
CWS-5870	5-3/16 (131.8)		7 (177.8)	3-1/8 (79.4)	10	30
CWS-5884	5-3/4 (146.0)		8-1/2 (215.9)	4-5/8 (117.5)	10	30
CWS-3454	3-5/8 (92.1)	3/4" - 10	5-1/2 (139.7)	1-1/2 (38.1)	10	30
CWS-3462	4-3/8 (111.1)		6-1/4 (158.8)	2-1/4 (57.2)	10	30
CWS-3470	5-1/8 (130.2)		7 (177.8)	3 (76.2)	10	30
CWS-3484	5-3/4 (146.0)		8-1/2 (215.9)	4-1/2 (114.3)	10	30
CWS-34100	5-3/4 (146.0)		10 (254.0)	6 (152.4)	10	30

TRUBOLT SELECTION GUIDE

CARBON STEEL WITH ZINC PLATING PART NO.	CARBON STEEL WITH HOT-DIPPED GALVANIZING PART NO.	TYPE 304 STAINLESS STEEL PART NO.	TYPE 316 STAINLESS STEEL PART NO.	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY PER BOX	QTY PER MASTER CARTON
WS-1416		WW-1416		3/4 (19.1)	1/4" - 20	1-3/4 (44.5)	3/8 (9.5)	100	1000
WS-1422		WW-1422	SWW-1422	1-1/4 (31.8)		2-1/4 (57.2)	7/8 (22.2)	100	1000
WS-1432		WW-1432	SWW-1432	2-1/4 (57.2)		3-1/4 (82.6)	1-7/8 (47.6)	100	800
WS-3822		WW-3822	SWW-3822	1-1/8 (28.6)	3/8" - 16	2-1/4 (57.2)	3/8 (9.5)	50	500
WS-3826		WW-3826	SWW-3826	1-5/8 (41.3)		2-3/4 (69.9)	7/8 (22.2)	50	400
WS-3830		WW-3830	SWW-3830	1-3/4 (44.5)		3 (76.2)	1-1/8 (28.6)	50	400
WS-3836		WW-3836	SWW-3836	2-1/2 (63.5)		3-3/4 (95.3)	1-7/8 (47.6)	50	300
WS-3850		WW-3850	SWW-3850	3-3/4 (95.2)		5 (127.0)	3-1/8 (79.4)	50	250
WS-3870				3-7/8 (98.4)		7 (177.8)	5-1/8 (130.2)	50	250
WS-1226	WS-1226G	WW-1226	SWW-1226	1-1/4 (31.8)	1/2" - 13	2-3/4 (69.9)	1/8 (3.2)	25	200
WS-1236		WW-1236	SWW-1236	2-1/4 (57.2)		3-3/4 (95.3)	1 (25.4)	25	150
WS-1242	WS-1242G	WW-1242	SWW-1242	2-3/4 (69.9)		4-1/4 (108.0)	1-1/2 (38.1)	25	150
WS-1244				3 (76.2)		4-1/2 (114.3)	1-3/4 (44.5)	25	150
WS-1254	WS-1254G	WW-1254	SWW-1254	4 (101.6)		5-1/2 (139.7)	2-3/4 (69.9)	25	150
WS-1270	WS-1270G	WW-1270		5-1/2 (139.7)		7 (177.8)	4-1/4 (108.0)	25	150
WS-5834	WS-5834G	WW-5834		1-3/4 (44.5)	5/8" - 11	3-1/2 (88.9)	1/8 (3.2)	10	100
WS-5842		WW-5842	SWW-5842	2-1/2 (63.5)		4-1/4 (108.0)	7/8 (22.2)	10	100
WS-5850		WW-5850	SWW-5850	3-1/4 (82.6)		5 (127.0)	1-5/8 (41.3)	10	100
WS-5860	WS-5860G	WW-5860		4-1/4 (107.9)		6 (152.4)	2-5/8 (66.7)	10	50
WS-5870		WW-5870	SWW-5870	5-1/4 (133.4)		7 (177.8)	3-5/8 (92.1)	10	30
WS-5884		WW-5884		5-3/4 (146.0)		8-1/2 (215.9)	5-1/8 (130.2)	10	30
WS-58100				5-3/4 (146.0)		10 (254.0)	6-5/8 (168.3)	10	30
WS-3442		WW-3442		2-3/8 (60.3)	3/4" - 10	4-1/4 (108.0)	1/4 (31.8)	10	60
WS-3446	WS-3446G	WW-3446	SWW-3446	2-7/8 (73.0)		4-3/4 (120.7)	3/4 (19.1)	10	60
WS-3454	WS-3454G	WW-3454	SWW-3454	3-5/8 (92.1)		5-1/2 (139.7)	1-1/2 (38.1)	10	50
WS-3462				4-3/8 (111.1)		6-1/4 (158.8)	2-1/4 (57.2)	10	30
WS-3470		WW-3470		5-1/8 (130.2)		7 (177.8)	3 (76.2)	10	30
WS-3484	WS-3484G	WW-3484		5-3/4 (146.0)		8-1/2 (215.9)	4-1/2 (114.3)	10	30
WS-34100		WW-34100		5-3/4 (146.0)		10 (254.0)	6 (152.4)	10	30
WS-34120				1-3/4 (44.5)		12 (304.8)	8 (203.2)	10	30
WS-7860				2-1/2 (63.5)	7/8" - 9	6 (152.4)	1-3/8 (34.9)	5	25
WS-7880				2-1/2 (63.5)		8 (203.2)	3-3/8 (85.7)	5	15
WS-78100				2-1/2 (63.5)		10 (254.0)	5-3/8 (136.5)	5	15
WS-10060		WW-10060		2-1/2 (63.5)	1" - 8	6 (152.4)	1/2 (12.7)	5	25
WS-10090		WW-10090		2-1/2 (63.5)		9 (228.6)	3-1/2 (88.9)	5	15
WS-100120				2-1/2 (63.5)		12 (304.8)	6-1/2 (165.1)	5	15
Tie Wire									
TW-1400				N/A	1/4"	2-1/8 (54.0)	9/32 -hole (7.1)	100	1000
TW-1400 K				N/A		2-1/8 (54.0)	9/32 -hole (7.1)	BULK	BULK

MADE IN USA

Because applications vary, ITW Red Head cannot guarantee the performance of this product. Each customer assumes all responsibility and risk for the use of this product. The safe handling and the suitability of this product for use is the sole responsibility of the customer. Specific job site conditions should be considered when selecting the proper product. Should you have any questions, please call the Technical Assistance Department at 800-899-7890.

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