



DURABILITY WITH DISTINCTION

**INSTALLATION  
INSTRUCTIONS  
FOR**

**5' PERF BENCH  
SURFACE MOUNTED**

**TOLAR MANUFACTURING COMPANY INC.**

TRANSIT SHELTERS | STREET FURNITURE | DISPLAYS & DIRECTORIES | TRANSIT SOLAR LIGHTING  
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# IF BENCH REQUIRES SUP-R-STUD ANCHORS

## Mechanical Anchoring Systems

### Sup-R-Stud®



Sup-R-Stud®

#### Available Materials

- Carbon steel, zinc plated
- Carbon steel, mechanically galvanized
- Grade 5, yellow di-chromated
- 303/304 stainless steel
- 316 stainless steel

#### Features/Advantages

- Required hole diameter equals anchor diameter
- Excellent for setting immediately
- Can be loaded immediately
- Can be set in a bottomless hole
- Simple installation
- Nut and washer supplied in package
- ROHS compliant except for Grade 5

#### Concerns

- Do not use in brick or block
- Not advised for use where vibratory loads are high
- Oversize holes are detrimental and will reduce load performance

#### Approvals/Listings

- G.S.A. Spec FF-S-325C, Group II, Type 4, Class 1
- UL listed 3/8" - 1" (except 7/8" )
- FM 3/8", 1/2", 3/4"
- Contact customer service for approvals / listings for state D.O.T.'s



Made in USA



**NOTE:** The load values below are for all lengths of a given diameter capable of reaching the specified embedment.

Diameter- Threads	Embedment	Ultimate Tensile & Shear Loads in Lbs.		
		2000 P.S.I. Tension	4000 P.S.I. Tension	Shear
1/4" - 20	1 1/8"	1,173	1,015	1,472
	2 1/4"	2,573	2,711	
3/8" - 16	1 5/8"	2,289	2,367	3,151
	3 3/8"	3,556	5,203	
1/2" - 13	2 1/4"	4,120	5,068	6,828
	4 1/2"	4,608	5,772	
5/8" - 11	2 3/4"	5,486	5,556	9,659
	5 5/8"	6,957	9,294	
3/4" - 10	3 3/8"	9,267	11,975	15,126
	6 3/4"	13,278	16,201	
7/8" - 9	4"	9,746	13,902	21,574
	8"	14,378	20,288	
1" - 8	4 1/2"	10,226	15,829	28,023
	9"	15,479	24,375	
1 1/4" - 7	6 1/2"	14,720	23,090	33,000

#### Anchor Spacing / Edge Distance

Anchor Diameter	Min. Anchor Spacing *	Min. Edge Distance *
1/4"	2 1/2"	1 1/4"
3/8"	3 3/4"	1 7/8"
1/2"	5"	2 1/2"
5/8"	6 1/4"	3 1/8"
3/4"	7 1/2"	3 3/8"
7/8"	8 3/4"	4 3/8"
1"	10"	5"
1 1/4"	12 1/2"	6 1/4"

\* To obtain 100% load as published

#### Installation

- 1 Drill hole 1/2" to 1" deeper than anchor embedment.
- 2 Clean hole of debris.
- 3 With nut threaded past the end of stud, hammer into position.
- 4 Tighten finger tight plus an additional 3-5 turns with wrench.
- 5 If anchor spins in hole, force anchor up using screwdriver until clip binds into concrete.



# IF BENCH REQUIRES HILTI TZ ANCHORS



## 4.3.5 Kwik Bolt 3 Expansion Anchor

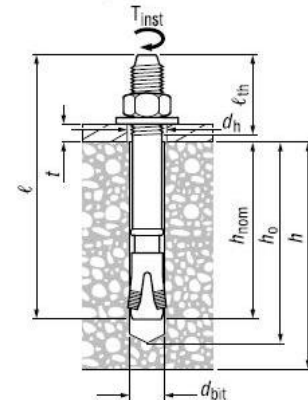
### 4.3.5.3 Technical Data

Table 1 - Kwik Bolt 3 Specifications<sup>1</sup>

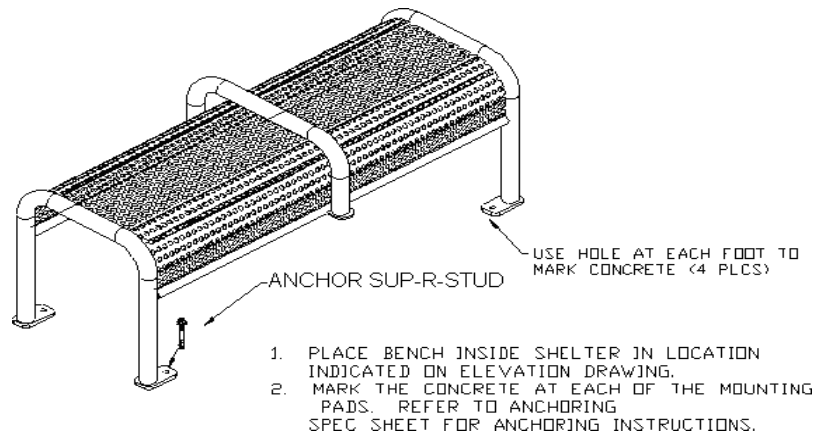
Details		Bolt Size		1/4			3/8			1/2		
		in.	(mm)	(6.4)			(9.5)			(12.7)		
$d_{bit}$ nominal bit diameter <sup>2</sup>		in.		1/4			3/8			1/2		
$h_{min}/h_{nom}/h_{deep}$ depth of embedment		in.		1-1/8	2	3	1-5/8	2-1/2	3-1/2	2-1/4	3-1/2	4-3/4
		(mm)		(29)	(51)	(76)	(41)	(64)	(89)	(57)	(89)	(121)
$h_o$ minimum/standard/deep hole depth		in.		1-3/8	2-1/4	3-1/4	2	2-7/8	3-7/8	2-3/4	4	5-1/4
		(mm)		(35)	(57)	(83)	(51)	(73)	(89)	(70)	(102)	(133)
$d_h$ wedge clearance hole in fixture		in.		5/16			7/16			9/16		
		(mm)		(8)			(11)			(14)		
$T_{inst}$ Recommended Installation Torque	Normal weight & Light weight Concrete	Carbon Steel HDG	ft-lb	4			20			40		
			(Nm)	(5)			(27)			(54)		
	Stainless Steel	ft-lb	6			20			40			
		(Nm)	(8)			(27)			(54)			
	Grout Filled Block	Carbon Steel	ft-lb	4			15			25		
			(Nm)	(5)			(20)			(34)		
$h$ min. base material thickness		in.		3 inch (76 mm) or 1.3 times embedment, whichever number is greater								
Bolt Fracture Load	Carbon Steel		2900 lb <sup>4,6</sup>			7200 lb <sup>4,6</sup>			12400 lb <sup>4</sup>			
	HDG		no offering			no offering			12400 lb <sup>4</sup>			
	Stainless steel		2900 lb <sup>4,7</sup>			7200 lb <sup>4,7</sup>			12400 lb <sup>4</sup>			

Details		Bolt Size		5/8			3/4			1		
		in.	(mm)	(15.9)			(19.1)			(25.4)		
$d_{bit}$ nominal bit diameter <sup>2</sup>		in.		5/8			3/4			1		
$h_{min}/h_{nom}/h_{deep}$ minimum/standard/deep depth of embedment		in.		2-3/4	4	5-1/2	3-1/4	4-3/4	6-1/2 <sup>3</sup>	4-1/2	6	9
		(mm)		(70)	(102)	(140)	(83)	(121)	(166)	(114)	(152)	(220)
$h_o$ minimum/standard/deep hole depth		in.		3-3/8	4-5/8	6-1/8	4	5-1/2	6-4/5	5-1/2	7	10
		(mm)		(86)	(117)	(156)	(102)	(140)	(173)	(140)	(178)	(254)
$d_h$ wedge clearance hole in fixture		in.		11/16			13/16			1-1/8		
		(mm)		(17)			(21)			(29)		
$T_{inst}$ Recommended Installation Torque	Normal weight & Light weight Concrete	Carbon Steel HDG	ft-lb	85			150			250		
			(Nm)	(115)			(203)			(339)		
	Stainless Steel	ft-lb	85			150			235			
		(Nm)	(115)			(203)			(319)			
	Grout Filled Block	Carbon Steel	ft-lb	65			120			-		
			(Nm)	(88)			(1663)					
$h$ min. base material thickness		in.		3 inch (76 mm) or 1.3 times embedment, whichever number is greater								
Bolt Fracture Load	Carbon Steel		19600 lb <sup>4</sup>			28700 lb <sup>4,8</sup>			$f_{ut} \geq 88$ ksi, $f_y \geq 75$ ksi <sup>5</sup>			
	HDG		19600 lb <sup>4</sup>			28700 lb <sup>4</sup>			no offering			
	Stainless steel		21900 lb <sup>4</sup>			$f_{ut} \geq 76$ ksi, $f_y \geq 64$ ksi <sup>5</sup>			$f_{ut} \geq 76$ ksi, $f_y \geq 64$ ksi <sup>5</sup>			

- See Kwik Bolt 3 Product Line Table in Section 4.5.3.3 for a full list and anchor length and thread length configurations.
- Loads for Kwik Bolt 3 are applicable for both carbide drill bits (see Section 8.4.1) and matched tolerance Hilti DD-C diamond core bits in sizes ranging from 1/2 inch to 1 inch.
- The deep embedment depth for stainless steel Kwik Bolt 3 anchors is 6 inch (203 mm).
- Bolt fracture loads are determined by testing in a jig as part of product quality control. These values are not intended for design purposes.
- Bolt strength specified by minimum tensile and yield strength. Bolt fracture load not applicable.
- Bolt fracture load not applicable to carbon steel Countersunk Kwik Bolt 3. The tensile and yield strengths are,  $f_{ut} \geq 105$  ksi and  $f_y \geq 90$  ksi.
- Bolt fracture load not applicable to stainless steel Countersunk Kwik Bolt 3. The tensile and yield strengths are,  $f_{ut} \geq 90$  ksi and  $f_y \geq 76$  ksi.
- For 3/4 x 12,  $f_{ut} \geq 86$  ksi and  $f_y \geq 75$  ksi. Bolt fracture load not applicable.



# GENERAL BENCH INSTALLATION



**1.** PLACE THE BENCH INSIDE THE SHELTER AT THE LOCATION INDICATED ON THE ELEVATION DRAWING.

**2.** MARK THE CONCRETE AT EACH OF THE MOUNTING PADS. REFER TO THE ANCHORING SPEC. SHEET FOR ANCHORING INSTRUCTIONS.