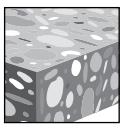
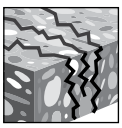
3.3.5 KWIK BOLT TZ EXPANSION ANCHOR

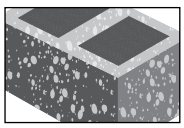
PRODUCT DESCRIPTION

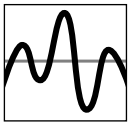
KWIK Bolt TZ carbon steel and stainless steel anchors

Anchor System	Features and Benefits
 Carbon Steel KB-TZ  Stainless Steel KB-TZ  Hilti SIW-6AT-A22 impact wrench and the SI-AT-A22 Adaptive Torque Module	• Used with Hilti Dust Removal System (DRS) for dustless drilling and installation (compliant with Table 1 of OSHA 1926.1153 regulations for silica dust exposure). • Accurate SafeSet™ installation when using the Hilti SIW-6AT-A22 impact wrench and the SI-AT-A22 Adaptive Torque Module • Product and length identification marks facilitate quality control after installation. • Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses. • Type 316 stainless steel wedges provide superior performance in cracked concrete. • Ridges on expansion wedges provide increased reliability. • Mechanical expansion allows immediate load application. • Raised impact section (dog point) prevents thread damage during installation. • Bolt meets ductility requirements of ACI 318-14 Section 2.3. • ACI 349-01 Nuclear Design Guide is available. Call Hilti Technical Support.


Uncracked concrete

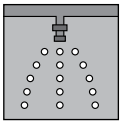

Cracked concrete


Grout-filled concrete masonry


Seismic Design Categories A-F

Hollow Drill Bit with Adaptive Torque Tool (AT)

Profis Anchor design software


Fire sprinkler listings

Approvals/Listings	
ICC-ES (International Code Council) - 2018 International Building Code / International Residential Code (IBC/IRC) - 2015 National Building Code of Canada (NBC-C)	ESR-1917 in concrete per ACI 318-14 Ch. 17 / ACI 355.2/ ICC-ES AC193 ESR-3785 in grout-filled CMU per ICC-ES AC01 ELC-1917 in concrete per CSA A23.3-14 / ACI 355.2
City of Los Angeles	2017 LABC Supplement (within ESR-1917) RR 26057 grout-filled CMU
Florida Building Code	2010 FBC with HVHZ
FM (Factory Mutual)	Pipe hanger components for automatic sprinkler systems 3/8 through 3/4
UL and cUL (Underwriters Laboratory)	Pipe hanger equipment for fire protection services for 3/8 through 3/4

MATERIAL SPECIFICATIONS

Carbon steel with electroplated zinc

Carbon steel KB-TZ anchors have the following minimum bolt fracture loads.[1]

Anchor diameter (in.)	Shear (lb)	Tension (lb)
3/8	NA	6,744
1/2	7,419	11,240
5/8	11,465	17,535
3/4	17,535	25,853

Carbon steel anchor components plated in accordance with ASTM B633 to a minimum thickness of 5 µm.

Nuts conform to the requirements of ASTM A563, Grade A, Hex.

Washers meet the requirements of ASTM F844.

Expansion sleeves (wedges) are manufactured from type 316 stainless steel

Stainless steel

Stainless steel KB-TZ anchors are made of type 304 or 316 material and have the following minimum bolt fracture loads.[1]

Anchor diameter (in.)	Shear (lb)	Tension (lb)
3/8	5,058	6,519
1/2	8,543	12,364
5/8	13,938	19,109
3/4	22,481	24,729

All nuts and washers for type 304 anchors are made from type 304 stainless.

All nuts and washers for type 316 anchors are made from type 316 stainless.

Nuts meet the dimensional requirements of ASTM F594.

Washers meet the dimensional requirements of ANSI B18.22.1, Type A, plain.

Expansion sleeve (wedges) are made from type 316 stainless steel.

1 Bolt fracture loads are determined by testing in a universal tensile machine for quality control at the manufacturing facility. These loads are not intended for design purposes. See tables 4 and 16 for the steel design strengths of carbon steel and stainless steel, respectively.

INSTALLATION PARAMETERS

Figure 1 - Hilti KWIK Bolt TZ specifications

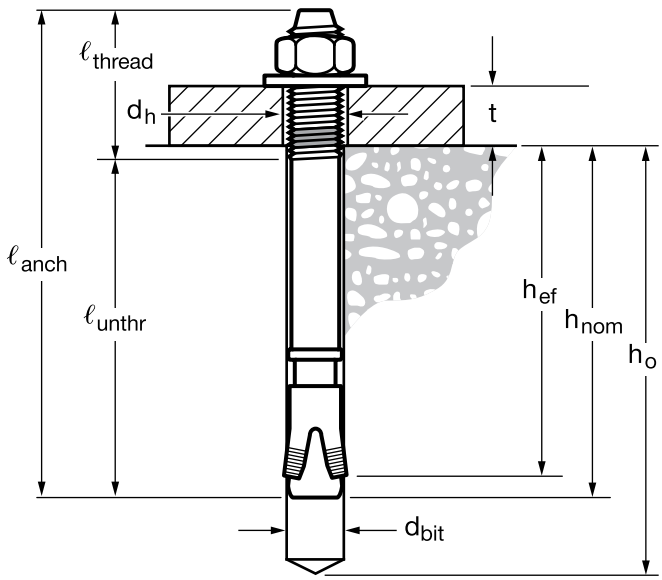


Table 1 - Hilti KWIK Bolt TZ carbon steel specifications

Setting information	Symbol	Units	Nominal anchor diameter d_o											
			3/8			1/2			5/8			3/4		
Nominal bit diameter	d_{bit}	in.	3/8			1/2			5/8			3/4		
Minimum nominal embedment	h_{nom}	in.	1-13/16	2-5/16	3-1/16	2-3/8	3-5/8		3-9/16	4-7/16		3-13/16	4-5/16	5-5/16
		(mm)	(46)	(59)	(78)	(60)	(91)		(91)	(113)		(97)	(110)	(135)
Effective minimum embedment	h_{ef}	in.	1-1/2	2	2-3/4	2	3-1/4		3-1/8	4		3-1/4	3-3/4	4-3/4
		(mm)	(38)	(51)	(70)	(51)	(83)		(79)	(102)		(83)	(95)	(121)
Min. hole depth	h_o	in.	2	2-5/8	3-3/8	2-5/8	4		3-3/4	4-3/4		4	4-5/8	5-3/4
		(mm)	(51)	(67)	(83)	(67)	(102)		(95)	(121)		(102)	(117)	(146)
Min. thickness of fixture[1]	t_{min}	in.	0	0	0	3/4	1/4		3/8	3/4		0	0	7/8
		(mm)	(0)	(0)	(0)	(19)	(6)		(9)	(19)		(0)	(0)	(23)
Max. thickness of fixture	t_{max}	in.	2-13/16	2-5/16	1-9/16	4	2-3/4		5-5/8	4-3/4		5-9/16	4-15/16	3-15/16
		(mm)	(71)	(59)	(40)	(101)	(70)		(143)	(121)		(141)	(125)	(100)
Installation torque (concrete)	T_{inst}	ft-lb	25			40			60			110		
		(Nm)	(34)			(54)			(81)			(149)		
Installation torque (masonry)	T_{inst}	ft-lb	n/a	15	n/a	25			35			n/a	70	
		(Nm)		(20)		(34)			(47)				(95)	
Fixture hole diameter	d_h	in.	7/16			9/16			11/16			13/16		
		(mm)	(11.1)			(14.3)			(17.5)			(20.6)		
Available anchor lengths	ℓ_{anch}	in.	3	3-3/4	5	3-3/4	4-1/2	5-1/2	7	4-3/4	6	8-1/2	10	5-1/2	7	8	10
		(mm)	(76)	(95)	(127)	(95)	(114)	(140)	(178)	(121)	(152)	(216)	(254)	(140)	(178)	(203)	(254)
Threaded length including dog point	ℓ_{thread}	in.	1-1/2	2-1/4	3-1/2	1-5/8	2-3/8	3-3/8	4-7/8	1-1/2	2-3/4	5-1/4	6-3/4	2-1/2	4	5	7
		(mm)	(38)	(57)	(89)	(41)	(60)	(86)	(124)	(38)	(70)	(133)	(171)	(63)	(103)	(128)	(179)
Unthreaded length	ℓ_{unthr}	in.	1-1/2			2-1/8			3-1/4			3		
		(mm)	(39)			(54)			(83)			(77)		

1 Minimum thickness of fixture is a concern only when the anchor is installed at the minimum nominal embedment. When KWIK Bolt TZ anchors are installed at this embedment, the anchor threading ends near the surface of the concrete. If the fixture is sufficiently thin, it could be possible to run the nut to the bottom of the threading during application of the installation torque. If fixtures are thin, it is recommended that embedment be increased accordingly.

Table 2 - Hilti KWIK Bolt TZ stainless steel specifications[1]

Setting information	Symbol	Units	Nominal anchor diameter (in.)													
			3/8			1/2			5/8				3/4			
Nominal bit diameter	d_{bit}	in.	3/8			1/2			5/8				3/4			
Nominal min. embedment	h_{nom}	in.	2-5/16			2-3/8	3-5/8		3-9/16	4-7/16			4-5/16	5-5/16		
		(mm)	(59)			(60)	(91)		(91)	(113)			(110)	(142)		
Effective min. embedment	h_{ef}	in.	2			2	3-1/4		3-1/8	4			3-3/4	4-3/4		
		(mm)	(51)			(51)	(83)		(79)	(102)			(95)	(121)		
Min. hole depth	h_o	in.	2-5/8			2-5/8	4		3-3/4	4-3/4			4-5/8	5-3/4		
		(mm)	(67)			(67)	(102)		(95)	(121)			(117)	(146)		
Min. thickness of fixture[1]	t_{min}	in.	1/4			3/4	1/4		3/8	3/4			1/8	1-5/8		
		(mm)	(6)			(19)	(6)		(9)	(19)			(3)	(41)		
Max. thickness of fixture	t_{max}	in.	2-1/4			4	2-3/4		5-5/8	4-3/4			4-5/8	3-5/8		
		(mm)	(57)			(101)	(70)		(143)	(121)			(117)	(92)		
Installation torque (concrete)	T_{inst}	ft-lb	25			40			60				110			
		(Nm)	(34)			(54)			(81)				(149)			
Installation torque (masonry)	T_{inst}	ft-lb	15			25			35				70			
		(Nm)	(20)			(34)			(47)				(95)			
Fixture hole diameter	d_h	in.	7/16			9/16			11/16				13/16			
		(mm)	(11.1)			(14.3)			(17.5)				(20.6)			
Available anchor lengths	l_{anch}	in.	3	3-3/4	5	3-3/4	4-1/2	5-1/2	7	4-3/4	6	8.5	10	5-1/2	8	10
		(mm)	(76)	(95)	(127)	(95)	(114)	(140)	(178)	(121)	(152)	(216)	(254)	(140)	(203)	(254)
Threaded length including dog point	l_{thread}	in.	7/8	1-5/8	2-7/8	1-5/8	2-3/8	3-3/8	4-7/8	1-1/2	2-3/4	5-1/4	6-3/4	1-1/2	4	6
		(mm)	(22)	(41)	(73)	(41)	(60)	(86)	(124)	(38)	(70)	(133)	(171)	(38)	(102)	(152)
Unthreaded length	l_{unthr}	in.	2-1/8			2-1/8			3-1/4				4			
		(mm)	(54)			(54)			(83)				(102)			

1 Refer to figure 1 of this section for diagram of installation parameters

2 Minimum thickness of fixture is a concern only when the anchor is installed at the minimum nominal embedment. When KWIK Bolt TZ anchors are installed at this embedment, the anchor threading ends near the surface of the concrete. If the fixture is sufficiently thin, it could be possible to run the nut to the bottom of the threading during application of the installation torque. If fixtures are thin, it is recommended that embedment be increased accordingly.