



The following excerpt are pages from the North American Masonry Anchor Strength Design Guide 2024.

Please refer to the publication in its entirety for complete details on this product including data development, product specifications, general suitability, installation, and spacing and edge distance guidelines.

US&CA: [Hilti North American Product Technical Guides](#)

To consult directly with a team member regarding our anchor fastening products, contact Hilti's team of technical support specialists between the hours of 7:00am – 5:00pm CST.


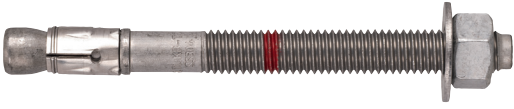
US: 877-749-6337 or [HNATechnicalServices@hilti.com](mailto:HNATechnicalServices@hilti.com)

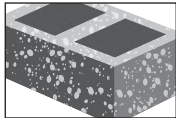
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## 7.4 KWIK BOLT TZ2 EXPANSION ANCHOR

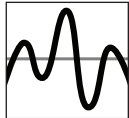
### PRODUCT DESCRIPTION

#### KWIK BOLT TZ2 Expansion anchor

Anchor System	Features and Benefits
 <p>Carbon steel KB-TZ2</p>  <p>Stainless Steel 304/316 KB-TZ2</p>	<ul style="list-style-type: none"> <li>• IFU provides multiple installation methods including no hole cleaning with hammer drill, Hilti Dust Removal System (DRS) for virtually dustless installation (OSHA 1926.1153 Table 1 compliant) and core drilling installation</li> <li>• Product and length identification marks help facilitate quality control after installation.</li> <li>• Maximized thread lengths and multiple embedment depths to accommodate various base plate thicknesses.</li> <li>• Mechanical expansion allows immediate load application.</li> <li>• Raised impact section (dog point) helps protect threads from damage during installation.</li> <li>• Bolt meets ductility requirements of ACI 318 Section 2.3.</li> <li>• Functional coatings and profile on expansion wedges provide increased reliability.</li> </ul>



Grout-filled concrete masonry



Seismic Design categories A-F



Profis Engineering design software



Hollow drill bit

Approvals/Listings	
<b>ICC-ES (International Code Council)</b> • 2021 International Building Code / International Residential Code (IBC/IRC)	ESR-4561 in grout-filled CMU per ICC-ES AC01
<b>City of Los Angeles</b>	2023 LABC Supplement (within ESR-4561)
<b>Florida Building Code</b>	2023 FBC Supplement with HVHZ (within ESR-4561)



## MATERIAL SPECIFICATIONS

### Carbon steel with electroplated zinc-nickel plating

- Carbon steel anchor components plated in accordance with ASTM F1941 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 carbon or stainless steel.
- Nuts and bolts are finished with a proprietary coating. Only Hilti KB-TZ2 nuts can be used with KB-TZ2 bolts.
- Carbon steel bolts are manufactured from carbon steel.

### Stainless steel

- 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 stainless steel.
- Nuts and bolts are finished with a proprietary coating. Only Hilti KB-TZ2 nuts can be used with KB-TZ2 bolts.
- Stainless steel 304 bolts are manufactured from AISI Type 304 stainless steel.
- Stainless steel 316 bolts are manufactured from AISI Type 316 stainless steel.

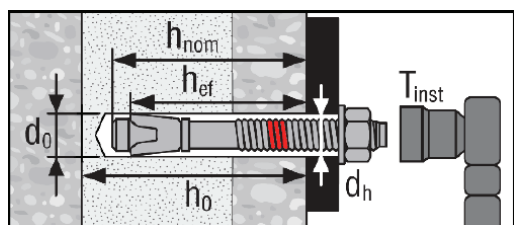
## INSTALLATION PARAMETERS

**Table 1 — KB-TZ2 Installation Information — Fully Grouted CMU Construction — Face of Wall and Top of Wall**

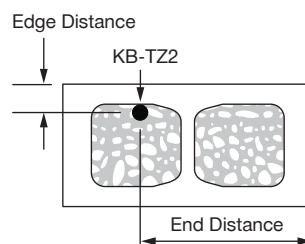
Design Information	Symbol	Units	Nominal anchor diameter (in)								
			1/4	3/8		1/2		5/8		3/4	
Nominal bit diameter	$d_o$	in.	1/4	3/8		1/2		5/8		3/4	
Effective minimum embedment	$h_{ef}$	in. (mm)	1 1/2 (38)	1 1/2 (38)	2 1/2 (64)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 (102)	3 1/4 (83)	4 3/4 (121)
Nominal embedment	$h_{nom}$	in. (mm)	1 3/4 (44)	1 7/8 (48)	3 (76)	2 1/2 (64)	3 3/4 (95)	3 1/4 (83)	4 1/2 (114)	4 (102)	5 1/2 (140)
Minimum hole depth	$h_o$	in. (mm)	2 (51)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 1/4 (108)	3 3/4 (95)	4 3/4 (121)	4 1/4 (108)	5 3/4 (146)
Installation Torque - Carbon Steel	$T_{inst}$	ft-lb (Nm)	4 (5.4)	15 (20.3)		25 (33.9)		30 (40.7)		50 (67.8)	
Installation Torque - Stainless Steel	$T_{inst}$	ft-lb (Nm)	6 (8.1)	15 (20.3)		15 (20.3)		35 (47.5)		50 (67.8)	
Min. Dia. of Hole in Fastened Part	$d_h$	in. (mm)	5/16 (7.9)	7/16 (11.1)		9/16 (14.3)		11/16 (17.5)		13/16 (20.6)	
Minimum Masonry Thickness	$h_{min}$	in. (mm)	7 5/8 (194)								
Minimum Distance to Hollow Head Joint <sup>1</sup>	$c_{min,HJ}$	in. (mm)	2 1/2 (64)	2 1/2 (64)		2 1/2 (64)		2 1/2 (64)		2 1/2 (64)	3 (76)
Face of Wall	Minimum Edge Distance	$c_{min}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)
	Minimum Anchor Spacing	$s_{min}$	in. (mm)	4 (102)	5 (127)	4 (102)	5 (127)	5 (127)	7 (178)	6 (152)	6 (152)
Top of Wall	Minimum Edge Distance <sup>2</sup>	$c_{min,top}$	in. (mm)	-	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)	2 3/4 (70)	2 3/4 (70)	-
	Minimum Anchor Spacing	$s_{min,top}$	in. (mm)	-	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	-

1 The minimum distance to hollow head joint is measured from the center of an anchor to the centerline of a hollow head joint (vertical mortar joint).  
 2 The minimum end distance from the center of an anchor to the end of the top of the CMU wall is 4 inches. Edge and end distances are illustrated in Figure 2.

**Figure 1 — Hilti KB-TZ2 Installation Parameters**



**Figure 2 — Edge and End Distances for Top of Wall Installation**



**Table 2 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the face of uncracked fully grouted CMU walls** <sup>1,2,3,4</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of concrete breakout / pullout) - $\Phi N_n$				Shear (lesser of pryout or crushing) - $\Phi V_n$			
		$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)	$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)
1/4	1-1/2 (38)	250 (1.1)	250 (1.1)	250 (1.1)	250 (1.1)	845 (3.8)	980 (4.4)	1,095 (4.9)	1,195 (5.3)
	3/8	610 (2.7)	610 (2.7)	610 (2.7)	610 (2.7)	845 (3.8)	980 (4.4)	1,095 (4.9)	1,195 (5.3)
3/8	1-1/2 (38)	610 (2.7)	610 (2.7)	610 (2.7)	610 (2.7)	845 (3.8)	980 (4.4)	1,095 (4.9)	1,195 (5.3)
	2-1/2 (64)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	2,590 (11.5)	2,780 (12.4)	2,940 (13.1)	3,075 (13.7)
1/2	2 (51)	780 (3.5)	780 (3.5)	780 (3.5)	780 (3.5)	1,305 (5.8)	1,505 (6.7)	1,685 (7.5)	1,845 (8.2)
	3-1/4 (83)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	3,055 (13.6)	3,280 (14.6)	3,470 (15.4)	3,630 (16.1)
5/8	2-3/4 (70)	1,430 (6.4)	1,430 (6.4)	1,430 (6.4)	1,430 (6.4)	3,465 (15.4)	3,725 (16.6)	3,935 (17.5)	4,120 (18.3)
	4 (102)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	3,465 (15.4)	3,725 (16.6)	3,935 (17.5)	4,120 (18.3)
3/4	3-1/4 (83)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	3,805 (16.9)	4,090 (18.2)	4,325 (19.2)	4,530 (20.2)
	4-3/4 (121)	3,165 (14.1)	3,165 (14.1)	3,165 (14.1)	3,165 (14.1)	3,805 (16.9)	4,090 (18.2)	4,325 (19.2)	4,530 (20.2)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.

**Table 3 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the face of cracked fully grouted CMU walls** <sup>1,2,3,4</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of concrete breakout / pullout) - $\Phi N_n$				Shear (lesser of pryout or crushing) - $\Phi V_n$			
		$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)	$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)
1/4	1-1/2 (38)	170 (0.8)	170 (0.8)	170 (0.8)	170 (0.8)	600 (2.7)	690 (3.1)	770 (3.4)	845 (3.8)
	3/8	440 (2.0)	440 (2.0)	440 (2.0)	440 (2.0)	600 (2.7)	690 (3.1)	770 (3.4)	845 (3.8)
3/8	1-1/2 (38)	440 (2.0)	440 (2.0)	440 (2.0)	440 (2.0)	600 (2.7)	690 (3.1)	770 (3.4)	845 (3.8)
	2-1/2 (64)	810 (3.6)	810 (3.6)	810 (3.6)	810 (3.6)	2,570 (11.4)	2,780 (12.4)	2,940 (13.1)	3,075 (13.7)
1/2	2 (51)	725 (3.2)	740 (3.3)	740 (3.3)	740 (3.3)	920 (4.1)	1,065 (4.7)	1,190 (5.3)	1,300 (5.8)
	3-1/4 (83)	985 (4.4)	985 (4.4)	985 (4.4)	985 (4.4)	3,055 (13.6)	3,280 (14.6)	3,470 (15.4)	3,630 (16.1)
5/8	2-3/4 (70)	860 (3.8)	860 (3.8)	860 (3.8)	860 (3.8)	2,965 (13.2)	3,425 (15.2)	3,830 (17.0)	4,120 (18.3)
	4 (102)	950 (4.2)	950 (4.2)	950 (4.2)	950 (4.2)	3,465 (15.4)	3,725 (16.6)	3,935 (17.5)	4,120 (18.3)
3/4	3-1/4 (83)	1,565 (7.0)	1,565 (7.0)	1,565 (7.0)	1,565 (7.0)	3,805 (16.9)	4,090 (18.2)	4,325 (19.2)	4,530 (20.2)
	4-3/4 (121)	2,565 (11.4)	2,565 (11.4)	2,565 (11.4)	2,565 (11.4)	3,805 (16.9)	4,090 (18.2)	4,325 (19.2)	4,530 (20.2)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:  
 1/4-in, 3/8-in, and 3/4-in diameters = 0.75  
 1/2-in diameter = 0.68  
 5/8-in diameter = 0.66

**Table 4 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the face of uncracked fully grouted CMU walls and installed at minimum distance from centerline of hollow head joint** <sup>1,2,3,4</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or pullout) - $\Phi N_n$				Shear (lesser of breakout, pryout, or crushing) - $\Phi V_n$			
		$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)	$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)
1/4	1-1/2 (38)	250 (1.1)	250 (1.1)	250 (1.1)	250 (1.1)	845 (3.8)	980 (4.4)	1,095 (4.9)	1,195 (5.3)
	3/8	1-1/2 (38)	610 (2.7)	610 (2.7)	610 (2.7)	610 (2.7)	845 (3.8)	980 (4.4)	1,095 (4.9)
		2-1/2 (64)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,670 (7.4)	1,930 (8.6)	2,160 (9.6)
1/2	2 (51)	780 (3.5)	780 (3.5)	780 (3.5)	780 (3.5)	1,075 (4.8)	1,240 (5.5)	1,390 (6.2)	1,520 (6.8)
	3-1/4 (83)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,920 (8.5)	2,220 (9.9)	2,480 (11.0)	2,715 (12.1)
5/8	2-3/4 (70)	1,320 (5.9)	1,430 (6.4)	1,430 (6.4)	1,430 (6.4)	1,985 (8.8)	2,295 (10.2)	2,565 (11.4)	2,810 (12.5)
	4 (102)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	2,140 (9.5)	2,475 (11.0)	2,765 (12.3)	3,030 (13.5)
3/4	3-1/4 (83)	1,555 (6.9)	1,800 (8.0)	1,925 (8.6)	1,925 (8.6)	2,170 (9.7)	2,505 (11.1)	2,800 (12.5)	3,070 (13.7)
	4-3/4 (121)	2,530 (11.3)	2,920 (13.0)	3,165 (14.1)	3,165 (14.1)	3,140 (14.0)	3,625 (16.1)	4,055 (18.0)	4,440 (19.8)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor located 2.5-in (3-in for 3/4-in diameter with 4-3/4 effective embedment) from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.

**Table 5 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the face of cracked fully grouted CMU walls and installed at minimum distance from centerline of hollow head joint** <sup>1,2,3,4</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or pullout) - $\Phi N_n$				Shear (lesser of breakout, pryout, or crushing) - $\Phi V_n$			
		$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)	$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)
1/4	1-1/2 (38)	170 (0.8)	170 (0.8)	170 (0.8)	170 (0.8)	600 (2.7)	690 (3.1)	770 (3.4)	845 (3.8)
3/8	1-1/2 (38)	440 (2.0)	440 (2.0)	440 (2.0)	440 (2.0)	600 (2.7)	690 (3.1)	770 (3.4)	845 (3.8)
	2-1/2 (64)	810 (3.6)	810 (3.6)	810 (3.6)	810 (3.6)	1,195 (5.3)	1,380 (6.1)	1,540 (6.9)	1,690 (7.5)
1/2	2 (51)	595 (2.6)	690 (3.1)	740 (3.3)	740 (3.3)	760 (3.4)	875 (3.9)	980 (4.4)	1,075 (4.8)
	3-1/4 (83)	930 (4.1)	985 (4.4)	985 (4.4)	985 (4.4)	1,370 (6.1)	1,585 (7.1)	1,770 (7.9)	1,940 (8.6)
5/8	2-3/4 (70)	860 (3.8)	860 (3.8)	860 (3.8)	860 (3.8)	1,420 (6.3)	1,640 (7.3)	1,830 (8.1)	2,005 (8.9)
	4 (102)	950 (4.2)	950 (4.2)	950 (4.2)	950 (4.2)	1,530 (6.8)	1,765 (7.9)	1,975 (8.8)	2,165 (9.6)
3/4	3-1/4 (83)	1,100 (4.9)	1,270 (5.6)	1,420 (6.3)	1,555 (6.9)	1,550 (6.9)	1,790 (8.0)	2,000 (8.9)	2,190 (9.7)
	4-3/4 (121)	1,785 (7.9)	2,060 (9.2)	2,305 (10.3)	2,525 (11.2)	2,245 (10.0)	2,590 (11.5)	2,895 (12.9)	3,170 (14.1)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor located 2.5-in (3-in for 3/4-in diameter with 4-3/4 effective embedment) from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:  
 1/4-in, 3/8-in, and 3/4-in diameters = 0.75  
 1/2-in diameter = 0.68  
 5/8-in diameter = 0.66

**Table 6 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course** <sup>1,2,3,4,5</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or pullout) - $\Phi N_n$				Shear (lesser of breakout, pryout, or crushing) - $\Phi V_n$			
		$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)	$f'_m = 1500$ psi (10.3 MPa) lb (kN)	$f'_m = 2000$ psi (13.8 MPa) lb (kN)	$f'_m = 2500$ psi (17.2 MPa) lb (kN)	$f'_m = 3000$ psi (20.7 MPa) lb (kN)
3/8	1-1/2 (38)	610 (2.7)	610 (2.7)	610 (2.7)	610 (2.7)	700 (3.1)	810 (3.6)	905 (4.0)	995 (4.4)
	2-1/2 (64)	1,040 (4.6)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,100 (4.9)	1,270 (5.6)	1,420 (6.3)	1,555 (6.9)
1/2	2 (51)	590 (2.6)	590 (2.6)	590 (2.6)	590 (2.6)	905 (4.0)	1,045 (4.6)	1,165 (5.2)	1,275 (5.7)
	3-1/4 (83)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,265 (5.6)	1,460 (6.5)	1,635 (7.3)	1,790 (8.0)
5/8	2-3/4 (70)	1,430 (6.4)	1,430 (6.4)	1,430 (6.4)	1,430 (6.4)	2,575 (11.5)	2,975 (13.2)	3,325 (14.8)	3,645 (16.2)
	4 (102)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	1,585 (7.1)	2,775 (12.3)	3,205 (14.3)	3,585 (15.9)	3,925 (17.5)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 5/8-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
- 5 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:  
3/8-in and 1/2-in. diameter = 0.50  
5/8-in diameter = 0.46

**Table 7 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength with masonry failure modes in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course** <sup>1,2,3,4,5</sup>

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or pullout) - $\Phi N_n$				Shear (lesser of breakout, pryout, or crushing) - $\Phi V_n$			
		$f'_c = 1500$ psi (10.3 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 2500$ psi (17.2 MPa) lb (kN)	$f'_c = 3000$ psi (20.7 MPa) lb (kN)	$f'_c = 1500$ psi (10.3 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 2500$ psi (17.2 MPa) lb (kN)	$f'_c = 3000$ psi (20.7 MPa) lb (kN)
3/8	1-1/2 (38)	440 (2.0)	440 (2.0)	440 (2.0)	440 (2.0)	495 (2.2)	575 (2.6)	640 (2.8)	700 (3.1)
	2-1/2 (64)	735 (3.3)	810 (3.6)	810 (3.6)	810 (3.6)	785 (3.5)	910 (4.0)	1,015 (4.5)	1,110 (4.9)
1/2	2 (51)	500 (2.2)	560 (2.5)	560 (2.5)	560 (2.5)	635 (2.8)	735 (3.3)	825 (3.7)	900 (4.0)
	3-1/4 (83)	820 (3.6)	950 (4.2)	985 (4.4)	985 (4.4)	905 (4.0)	1,045 (4.6)	1,165 (5.2)	1,280 (5.7)
5/8	298 (70)	860 (3.8)	860 (3.8)	860 (3.8)	860 (3.8)	1,840 (8.2)	2,125 (9.5)	2,375 (10.6)	2,605 (11.6)
	4 (102)	950 (4.2)	950 (4.2)	950 (4.2)	950 (4.2)	1,985 (8.8)	2,290 (10.2)	2,560 (11.4)	2,805 (12.5)

- 1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
- 2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 5/8-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC01.
- 3 Compare masonry tabular values to the steel values in Table 8. The lesser of the values is to be used for the design.
- 4 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:  
3/8-in diameter = 0.75  
1/2-in diameter = 0.68  
5/8-in diameter = 0.66
- 5 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:  
3/8-in and 1/2-in. diameter = 0.50  
5/8-in diameter = 0.46

**Table 8 — Hilti Carbon Steel and Stainless Steel KB-TZ2 design strength based on steel failure per ACI 318 Ch. 17**

Nominal anchor diameter in.	Carbon Steel <sup>1</sup>			Stainless Steel <sup>1</sup>		
	Tensile <sup>2</sup> $\phi N_{sa}$ lb (kN)	Shear <sup>3</sup> $\phi V_{sa}$ lb (kN)	Seismic Shear <sup>4</sup> $\phi V_{sa,eq}$ lb (kN)	Tensile <sup>2</sup> $\phi N_{sa}$ lb (kN)	Shear <sup>3</sup> $\phi V_{sa}$ lb (kN)	Seismic Shear <sup>4</sup> $\phi V_{sa,eq}$ lb (kN)
1/4	2,190 (9.7)	685 (3.0)	685 (3.0)	2,190 (9.7)	515 (2.3)	515 (2.3)
3/8	4,870 (21.7)	1,040 (4.6)	545 (2.4)	4,635 (20.6)	1,065 (4.7)	555 (2.5)
1/2	8,430 (37.5)	2,135 (9.5)	1,535 (6.8)	8,905 (39.6)	1,740 (7.7)	1,250 (5.6)
5/8	13,150 (58.5)	3,225 (14.3)	1,480 (6.6)	14,125 (62.8)	3,330 (14.8)	1,530 (6.8)
3/4	19,000 (84.5)	5,130 (22.8)	2,205 (9.8)	18,035 (80.2)	4,180 (18.6)	1,795 (8.0)

1 Hilti KB-TZ2 carbon steel and stainless steel anchors are to be considered ductile steel elements.

2 Tensile =  $\phi A_{se,N} f_{uta}$  as noted in ACI 318-19 17.6.1.2.

3 Shear values determined by static shear tests with  $\phi V_{sa} \leq \phi 0.60 A_{se,V} f_{uta}$  as noted in ACI 318-19 17.7.1.2b.

4 Seismic shear values determined by seismic shear tests with  $\phi V_{sa,eq} \leq \phi V_{sa} \leq \phi 0.60 A_{se,V} f_{uta}$  as noted in ACI 318-19 17.7.1.2b.

## INSTALLATION INSTRUCTIONS

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at [www.hilti.com](http://www.hilti.com). Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the IFU.

## ORDERING INSTRUCTIONS

**Table 9 — Hilti KB-TZ2 carbon steel product portfolio**

Description	Length (in)	Length ident. letter	Thread length (in)	Nominal embed. 1 (in)	Min. fixture thickness 1 (in)	Max. fixture thickness 1 (in)	Nominal embed. 2 (in)	Min. fixture thickness 2 (in)	Max. fixture thickness 2 (in)	Nominal embed. 3 (in)	Min. fixture thickness 3 (in)	Max. fixture thickness 3 (in)	Nominal embed. 4 (in)	Min. fixture thickness 4 (in)	Max. fixture thickness 4 (in)	Package quantity
KB-TZ2 1/4 x 2-1/8	2-1/8	B	7/8	1-3/4	0	1/8	-	-	-	-	-	-	-	-	-	100
KB-TZ2 1/4 x 2-1/2	2-1/2	C	1-1/4	1-3/4	0	1/2	-	-	-	-	-	-	-	-	-	100
KB-TZ2 1/4 x 3-1/4	3-1/4	D	2	1-3/4	0	1-1/4	-	-	-	-	-	-	-	-	-	100
KB-TZ2 1/4 x 4-1/2	4-1/2	G	3	1-3/4	1/8	2-1/2	-	-	-	-	-	-	-	-	-	100
KB-TZ2 3/8 x 2-1/2	2-1/2	C	1	1-7/8	0	1/4	-	-	-	-	-	-	-	-	-	50
KB-TZ2 3/8 x 3	3	D	1 1/2	1-7/8	0	3/4	2-1/2	0	1/4	-	-	-	-	-	-	50
KB-TZ2 3/8 x 3-1/2	3-1/2	Ω	2	1-7/8	0	1-1/4	2-1/2	0	3/4	3	0	1/4	-	-	-	50
KB-TZ2 3/8 x 3-3/4	3-3/4	E	2-1/4	1-7/8	0	1-1/2	2-1/2	0	1	3	0	1/2	-	-	-	50
KB-TZ2 3/8 x 5	5	H	3-1/2	1-7/8	0	2-3/4	2-1/2	0	2-1/4	3	0	1-3/4	-	-	-	50
KB-TZ2 3/8 x 7	7	L	4-7/8	1-7/8	1/2	4-3/4	2-1/2	0	4-1/4	3	0	3-3/4	-	-	-	50
KB-TZ2 1/2 x 3	3	D	1-1/8	2	1/4	1/2	2-1/2	0	0	-	-	-	-	-	-	20
KB-TZ2 1/2 x 3-3/4	3-3/4	E	1-5/8	2	1/2	1-1/4	2-1/2	0	3/4	3	0	1/4	-	-	-	20
KB-TZ2 1/2 x 4-1/2	4-1/2	G	2-3/8	2	1/2	2	2-1/2	0	1-1/2	3	0	1	3-3/4	0	1/4	20
KB-TZ2 1/2 x 5-1/2	5-1/2	I	3-3/8	2	1/2	3	2-1/2	0	2-1/2	3	0	2	3-3/4	0	1-1/4	20
KB-TZ2 1/2 x 7	7	L	4-3/4	2	5/8	4-1/2	2-1/2	1/8	4	3	0	3-1/2	3-3/4	0	2-3/4	20
KB-TZ2 1/2 x 8-1/2	8-1/2	O	4-7/8	2	2	6	2-1/2	1-1/2	5-1/2	3	1	5	3-3/4	1/4	4-1/4	20
KB-TZ2 1/2 x 10	10	R	4-7/8	2	3-1/2	7-1/2	2-1/2	3	7	3	2-1/2	6-1/2	3-3/4	1-3/4	5-3/4	20
KB-TZ2 5/8 x 4-1/4	4-1/4	F	2-1/4	3-1/4	0	3/8	-	-	-	-	-	-	-	-	-	15
KB-TZ2 5/8 x 4-3/4	4-3/4	G	2-3/4	3-1/4	0	7/8	3-3/4	0	3/8	-	-	-	-	-	-	15
KB-TZ2 5/8 x 5-1/2	5-1/2	I	3-1/2	3-1/4	0	1-5/8	3-3/4	0	1-1/8	4-1/2	0	3/8	-	-	-	15
KB-TZ2 5/8 x 6	6	J	4	3-1/4	0	2-1/8	3-3/4	0	1-5/8	4-1/2	0	7/8	-	-	-	15
KB-TZ2 5/8 x 7	7	L	4-7/8	3-1/4	0	3-1/8	3-3/4	0	2-5/8	4-1/2	0	1-7/8	-	-	-	15
KB-TZ2 5/8 x 8-1/2	8-1/2	O	6-1/2	3-1/4	0	4-5/8	3-3/4	0	4-1/8	4-1/2	0	3-3/8	-	-	-	15
KB-TZ2 5/8 x 10	10	R	7-1/8	3-1/4	1/8	6-1/8	3-3/4	0	5-5/8	4-1/2	0	4-7/8	-	-	-	15
KB-TZ2 3/4 x 4-3/4	4-3/4	G	2-1/2	4	0	1/8	-	-	-	-	-	-	-	-	-	10
KB-TZ2 3/4 x 5-1/2	5-1/2	I	3-1/4	4	0	7/8	4-1/2	0	3/8	-	-	-	-	-	-	10
KB-TZ2 3/4 x 6-1/4	6-1/4	J	3-1/4	4	0	1-5/8	4-1/2	0	1-1/8	5-1/2	0	1/8	-	-	-	10
KB-TZ2 3/4 x 7	7	L	4	4	0	2-3/8	4-1/2	0	1-7/8	5-1/2	0	7/8	-	-	-	10
KB-TZ2 3/4 x 8	8	N	5	4	0	3-3/8	4-1/2	0	2-7/8	5-1/2	0	1-7/8	-	-	-	10
KB-TZ2 3/4 x 9	9	P	6	4	0	4-3/8	4-1/2	0	3-7/8	5-1/2	0	2-7/8	-	-	-	10
KB-TZ2 3/4 x 10	10	R	7	4	0	5-3/8	4-1/2	0	4-7/8	5-1/2	0	3-7/8	-	-	-	10
KB-TZ2 1x6-1/2	6-1/2	K	2 1/2	4 5/8	0	1-1/8	6-3/8	-	-	-	-	-	-	-	-	10
KB-TZ2 1x8	8	N	3 7/8	4 5/8	0	2-5/8	6-3/8	0	7/8	-	-	-	-	-	-	10
KB-TZ2 1x9	9	P	3 7/8	4 5/8	7/8	3-5/8	6-3/8	0	1-7/8	-	-	-	-	-	-	10
KB-TZ2 1x10-1/2	10-1/2	R	6	4 5/8	3/8	5-1/8	6-3/8	0	3-3/8	-	-	-	-	-	-	10
KB-TZ2 1x12	12	T	6	4 5/8	1-7/8	6-5/8	6-3/8	1/8	4-7/8	-	-	-	-	-	-	10



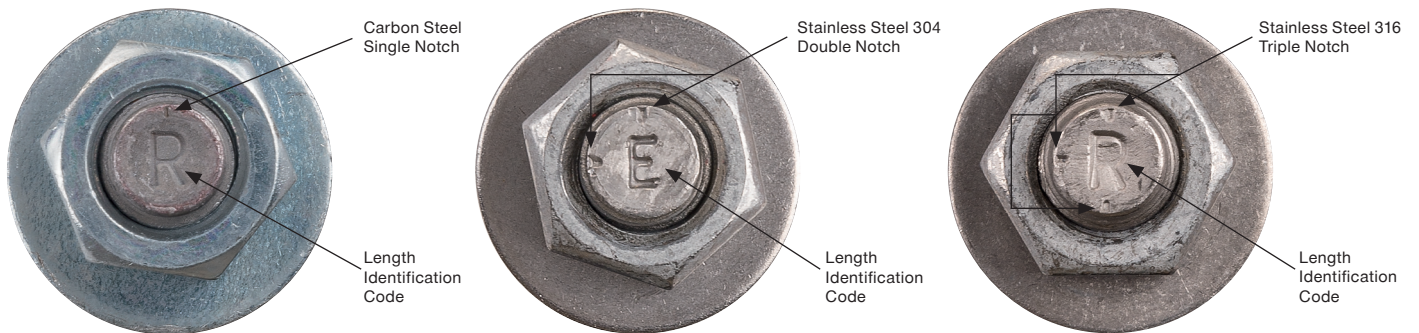
Table 10 – Hilti KB-TZ2 SS304 product portfolio

Description	Length (in)	Length ident. letter	Thread length (in)	Nominal embed. 1 (in)	Min. fixture thickness 1 (in)	Max. fixture thickness 1 (in)	Nominal embed. 2 (in)	Min. fixture thickness 2 (in)	Max. fixture thickness 2 (in)	Nominal embed. 3 (in)	Min. fixture thickness 3 (in)	Max. fixture thickness 3 (in)	Package quantity
KB-TZ2 1/4x2-1/8 SS304	2-1/8	B	7/8	1-3/4	0	1/8	-	-	-	-	-	-	100
KB-TZ2 1/4x2-1/2 SS304	2-1/2	C	1 1/4	1-3/4	0	1/2	-	-	-	-	-	-	100
KB-TZ2 1/4x3-1/4 SS304	3-1/4	D	2	1-3/4	0	1-1/4	-	-	-	-	-	-	100
KB-TZ2 1/4x4-1/2 SS304	4-1/2	G	3	1-3/4	1/8	2-1/2	-	-	-	-	-	-	100
KB-TZ2 3/8x2-1/2 SS304	2-1/2	C	1	1-7/8	0	1/4	-	-	-	-	-	-	50
KB-TZ2 3/8x3 SS304	3	D	1 1/2	1-7/8	0	3/4	2-1/2	0	1/4	-	-	-	50
KB-TZ2 3/8x3-1/2 SS304	3-1/2	Q	2	1-7/8	0	1-1/4	2-1/2	0	3/4	3	0	1/4	50
KB-TZ2 3/8x3-3/4 SS304	3-3/4	E	2 1/4	1-7/8	0	1-1/2	2-1/2	0	1	3	0	1/2	50
KB-TZ2 3/8x5 SS304	5	H	3 1/2	1-7/8	0	2-3/4	2-1/2	0	2-1/4	3	0	1-3/4	50
KB-TZ2 3/8x7 SS304	7	L	4 7/8	1-7/8	1/2	4-3/4	2-1/2	0	4-1/4	3	0	3-3/4	50
KB-TZ2 1/2x3-3/4 SS304	3-3/4	E	1 5/8	2-1/2	0	3/4	3	0	1/4	-	-	-	20
KB-TZ2 1/2x4-1/2 SS304	4-1/2	G	2 3/8	2-1/2	0	1-1/2	3	0	1	3-3/4	0	1/4	20
KB-TZ2 1/2x5-1/2 SS304	5-1/2	I	3 3/8	2-1/2	0	2-1/2	3	0	2	3-3/4	0	1-1/4	20
KB-TZ2 1/2x7 SS304	7	L	4 3/4	2-1/2	1/8	4	3	0	3-1/2	3-3/4	0	2-3/4	20
KB-TZ2 5/8x4-1/4 SS304	4-1/4	F	2 1/4	3-1/4	0	3/8	-	-	-	-	-	-	15
KB-TZ2 5/8x4-3/4 SS304	4-3/4	G	2 3/4	3-1/4	0	7/8	3-3/4	0	3/8	-	-	-	15
KB-TZ2 5/8x6 SS304	6	J	4	3-1/4	0	2-1/8	3-3/4	0	1-5/8	4-1/2	0	7/8	15
KB-TZ2 5/8x7 SS304	7	L	4 7/8	3-1/4	0	3-1/8	3-3/4	0	2-5/8	4-1/2	0	1-7/8	15
KB-TZ2 5/8x8-1/2 SS304	8-1/2	O	6 1/2	3-1/4	0	4-5/8	3-3/4	0	4-1/8	4-1/2	0	3-3/8	15
KB-TZ2 5/8x10 SS304	10	R	7 1/8	3-1/4	1/8	6-1/8	3-3/4	0	5-5/8	4-1/2	0	4-7/8	15
KB-TZ2 3/4x4-3/4 SS304	4-3/4	G	1 3/4	4	0	1/8	-	-	-	-	-	-	10
KB-TZ2 3/4x5-1/2 SS304	5-1/2	I	2 1/2	4	0	7/8	4-1/2	0	3/8	-	-	-	10
KB-TZ2 3/4x6-1/4 SS304	6-1/4	J	3 1/4	4	0	1-5/8	4-1/2	0	1-1/8	5-1/2	0	1/8	10
KB-TZ2 3/4x7 SS304	7	L	4	4	0	2-3/8	4-1/2	0	1-7/8	5-1/2	0	7/8	10
KB-TZ2 3/4x8 SS304	8	N	5	4	0	3-3/8	4-1/2	0	2-7/8	5-1/2	0	1-7/8	10
KB-TZ2 3/4x9 SS304	9	P	6	4	0	4-3/8	4-1/2	0	3-7/8	5-1/2	0	2-7/8	10
KB-TZ2 3/4x10 SS304	10	R	7	4	0	5-3/8	4-1/2	0	4-7/8	5-1/2	0	3-7/8	10
KB-TZ2 3/4x12 SS304	12	T	7	4	1-5/8	7-3/8	4-1/2	1-1/8	6-7/8	5-1/2	1/8	5-7/8	10
KB-TZ2 1x6-1/2 SS304	6-1/2	K	2 1/2	4-5/8	0	7/8	6-3/8	-	-	-	-	-	10
KB-TZ2 1x8 SS304	8	N	3 7/8	4-5/8	0	2-3/8	6-3/8	0	7/8	-	-	-	10
KB-TZ2 1x9 SS304	9	P	3 7/8	4-5/8	1	3-3/8	6-3/8	0	1-7/8	-	-	-	10
KB-TZ2 1x10-1/2 SS304	10-1/2	R	6	4 5/8	1/2	4-7/8	6-3/8	0	3-3/8	-	-	-	10
KB-TZ2 1x12 SS304	12	T	6	4 5/8	2	6-3/8	6-3/8	1/4	4-7/8	-	-	-	10

**Table 11 – Hilti KB-TZ2 SS316 product portfolio**

Description	Length (in)	Length ident. letter	Thread length (in)	Nominal embed. 1 (in)	Min. fixture thickness 1 (in)	Max. fixture thickness 1 (in)	Nominal embed. 2 (in)	Min. fixture thickness 2 (in)	Max. fixture thickness 2 (in)	Nominal embed. 3 (in)	Min. fixture thickness 3 (in)	Max. fixture thickness 3 (in)	Package quantity
KB-TZ2 1/4x2-1/2 SS316	2-1/2	C	1-1/4	1-3/4	0	1/2	-	-	-	-	-	-	100
KB-TZ2 1/4x3-1/4 SS316	3-1/4	D	2	1-3/4	0	1-1/4	-	-	-	-	-	-	100
KB-TZ2 1/4x4-1/2 SS316	4-1/2	G	3	1-3/4	1/8	2-1/2	-	-	-	-	-	-	100
KB-TZ2 3/8x2-1/2 SS316	2-1/2	C	1	1-7/8	0	1/4	-	-	-	-	-	-	50
KB-TZ2 3/8x3 SS316	3	D	1-1/2	1-7/8	0	3/4	2-1/2	0	1/4	-	-	-	50
KB-TZ2 3/8x3-1/2 SS316	3-1/2	Q	2	1-7/8	0	1-1/4	2-1/2	0	3/4	3	0	1/4	50
KB-TZ2 3/8x3-3/4 SS316	3-3/4	E	2-1/4	1-7/8	0	1-1/2	2-1/2	0	1	3	0	1/2	50
KB-TZ2 3/8x5 SS316	5	H	3-1/2	1-7/8	0	2-3/4	2-1/2	0	2-1/4	3	0	1-3/4	50
KB-TZ2 3/8x7 SS316	7	L	4-7/8	1-7/8	1/2	4-3/4	2-1/2	0	4-1/4	3	0	3-3/4	50
KB-TZ2 1/2x3-3/4 SS316	3-3/4	E	1-5/8	2-1/2	0	3/4	3	0	1/4	-	-	-	20
KB-TZ2 1/2x4-1/2 SS316	4-1/2	G	2-3/8	2-1/2	0	1-1/2	3	0	1	3-3/4	0	1/4	20
KB-TZ2 1/2x5-1/2 SS316	5-1/2	I	3-3/8	2-1/2	0	2-1/2	3	0	2	3-3/4	0	1-1/4	20
KB-TZ2 1/2x7 SS316	7	L	4-3/4	2-1/2	1/8	4	3	0	3-1/2	3-3/4	0	2-3/4	20
KB-TZ2 1/2x8-1/2 SS316	8-1/2	O	4-7/8	2-1/2	1-1/2	5-1/2	3	1	5	3-3/4	1/4	4-1/4	20
KB-TZ2 1/2x10 SS316	10	R	4-7/8	2-1/2	3	7	3	2-1/2	6-1/2	3-3/4	1-3/4	5-3/4	20
KB-TZ2 5/8x4-1/4 SS316	4-1/4	F	2-1/4	3-1/4	0	3/8	-	-	-	-	-	-	15
KB-TZ2 5/8x4-3/4 SS316	4-3/4	G	2-3/4	3-1/4	0	7/8	3-3/4	0	3/8	-	-	-	15
KB-TZ2 5/8x6 SS316	6	J	4	3-1/4	0	2-1/8	3-3/4	0	1-5/8	4-1/2	0	7/8	15
KB-TZ2 5/8x7 SS316	7	L	4-7/8	3-1/4	0	3-1/8	3-3/4	0	2-5/8	4-1/2	0	1-7/8	15
KB-TZ2 5/8x8-1/2 SS316	8-1/2	O	6-1/2	3-1/4	0	4-5/8	3-3/4	0	4-1/8	4-1/2	0	3-3/8	15
KB-TZ2 5/8x10 SS316	10	R	7-1/8	3-1/4	1/8	6-1/8	3-3/4	0	5-5/8	4-1/2	0	4-7/8	15
KB-TZ2 3/4x4-3/4 SS316	4-3/4	G	1-3/4	4	0	1/8	-	-	-	-	-	-	10
KB-TZ2 3/4x5-1/2 SS316	5-1/2	I	2-1/2	4	0	7/8	4-1/2	0	3/8	-	-	-	10
KB-TZ2 3/4x6-1/4 SS316	6-1/4	J	3-1/4	4	0	1-5/8	4-1/2	0	1-1/8	5-1/2	0	1/8	10
KB-TZ2 3/4x7 SS316	7	L	4	4	0	2-3/8	4-1/2	0	1-7/8	5-1/2	0	7/8	10
KB-TZ2 3/4x8 SS316	8	N	5	4	0	3-3/8	4-1/2	0	2-7/8	5-1/2	0	1-7/8	10
KB-TZ2 3/4x9 SS316	9	P	6	4	0	4-3/8	4-1/2	0	3-7/8	5-1/2	0	2-7/8	10
KB-TZ2 3/4x10 SS316	10	R	7	4	0	5-3/8	4-1/2	0	4-7/8	5-1/2	0	3-7/8	10
KB-TZ2 3/4x12 SS316	12	T	7	4	1-5/8	7-3/8	4-1/2	1-1/8	6-7/8	5-1/2	1/8	5-7/8	10

**Figure 3 – Anchor head with length identification code and KB-TZ2 head notch embossment**





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