

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 26 - Hilti KWIK Bolt 3 carbon steel design strength in the soffit of uncracked lightweight concrete over metal deck^{1,2,3,4,5,6}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Loads according to figure 5			
			Tension - ϕN_n		Shear - ϕV_n	
			$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	1,140 (5.1)	1,315 (5.8)	1,255 (5.6)	1,255 (5.6)
3/8	2 (51)	2-3/8 (60)	1,460 (6.5)	1,685 (7.5)	1,845 (8.2)	1,845 (8.2)
1/2	2 (51)	2-1/4 (57)	1,775 (7.9)	2,050 (9.1)	2,050 (9.1)	2,050 (9.1)
	3-1/4 (83)	3-1/2 (89)				
5/8	3-1/8 (79)	3-1/2 (89)	3,095 (13.8)	3,575 (15.9)	4,280 (19.0)	4,280 (19.0)
	4 (102)	4-3/8 (111)				

Table 27 - Hilti KWIK Bolt 3 stainless steel design strength in the soffit of uncracked lightweight concrete over metal deck^{1,2,3,4,5,7}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Loads according to figure 5			
			Tension - ϕN_n		Shear - ϕV_n	
			$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	1,175 (5.2)	1,355 (6.0)	1,315 (5.8)	1,315 (5.8)
3/8	2 (51)	2-3/8 (60)	1,675 (7.5)	1,935 (8.6)	1,675 (7.5)	1,675 (7.5)
1/2	2 (51)	2-1/4 (57)	1,265 (5.6)	1,460 (6.5)	1,135 (5.0)	1,135 (5.0)
	3-1/4 (83)	3-1/2 (89)				
5/8	3-1/8 (79)	3-1/2 (89)	2,880 (12.8)	3,325 (14.8)	3,700 (16.5)	3,700 (16.5)
	4 (102)	4-3/8 (111)				

- 1 See section 3.1.7.3 to convert design strength value to ASD value.
- 2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
- 3 Tabular value is for one anchor per flute. Minimum spacing along the length of the flute is $3 \times h_{ef}$ (effective embedment).
- 4 Tabular values are lightweight concrete and no additional reduction factor is needed.
- 5 No additional reduction factors for spacing or edge distance need to be applied.
- 6 Comparison to steel values in table 4 is not required. Values in tables 26 control.
- 7 Comparison to steel values in table 12 is not required. Values in tables 27 control.

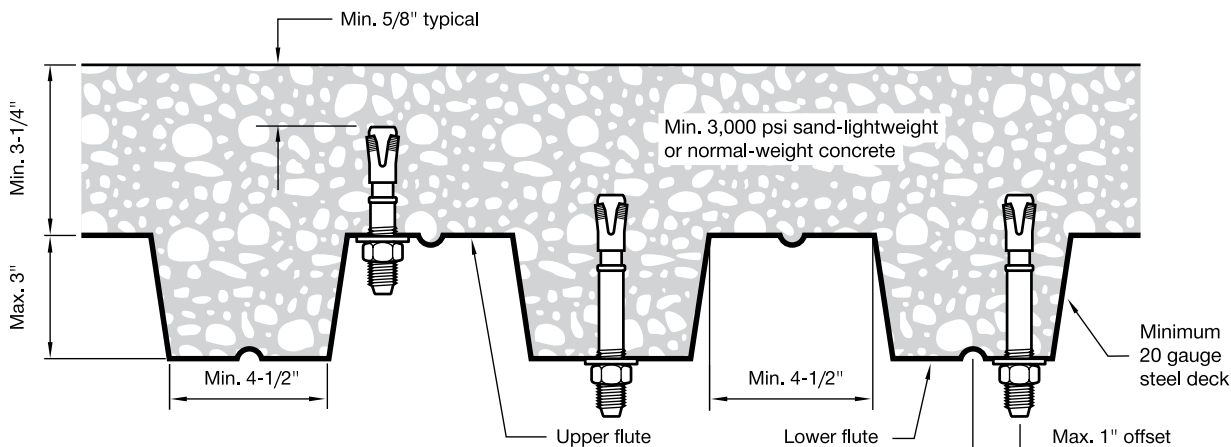


Figure 5 - Installation in concrete over metal deck

Trubolt+ & OVERHEAD Trubolt+

Strength Design Performance values in accordance to 2006 and 2009 IBC

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

Anchor Notation	Anchor Embedment Depth (inches), h_{nom}	Effective Embedment Depth (inches), h_{ef}	Allowable Tension Load (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.

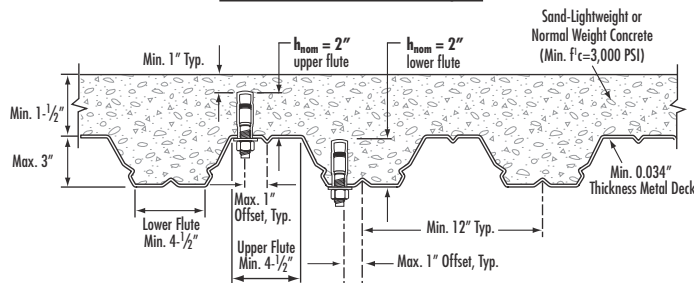
ITW RED HEAD TRUBOLT+ and OVERHEAD TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION FOR INSTALLATION IN THE SOFFIT OF CONCRETE FILL ON METAL DECK FLOOR AND ROOF ASSEMBLIES

TRUBOLT+ AND OVERHEAD TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION

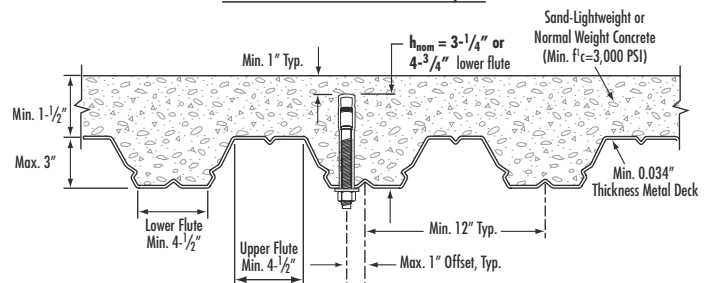
Characteristic	Symbol	Units	Nominal Anchor Diameter				
			3/8"	1/2"		5/8"	
			Upper /Lower	Upper /Lower	Lower Only	Lower Only	Lower Only
			$h_{ef} = 1-5/8"$	$h_{ef} = 2"$	$h_{ef} = 3-1/4"$	$h_{ef} = 2-3/4"$	$h_{ef} = 4-1/4"$
Pullout strength, uncracked concrete over metal deck	$N_{p, deck, uncr}$	lbf	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"

