Titen HD[®] Rod Hanger Design Information — Concrete

Titen HD Threaded Rod Hanger Product Data								_		
	Size	Model	Accepts Bod Dia	Drill Bit	Wrench	Min. Embed	Hole Depth Overdrill (in.)	Quantity		
	(in.)	No.	(in.)	(in.)	(in.)	(in.)		Box	Carton	
Cracked	¼ x 1%	THDB25158RH	1⁄4	1⁄4	3⁄8	1 %	1⁄8	100	500	1
APPRIVED Cracked	3∕8 x 15⁄8	THDB37158RH	3⁄8	1⁄4	1⁄2	1%	1⁄8	50	200	1
APPRIONED Cracked	½ x 2¾	THD50234RH	1⁄2	3⁄8	11/16	21⁄2	1⁄4	50	100	

Titen HD Threaded Rod Hanger Installation Information and Additional Data¹

			Model Number				
Characteristic	Symbol	Units	THDB25158RH THDB37158RH	THD50234RH			
Installation Information							
Rod Hanger Diameter	d _o	in.	1⁄4 or 3⁄8	1⁄2			
Drill Bit Diameter	d _{bit}	in.	1⁄4	3⁄8			
Maximum Installation Torque ²	T _{inst,max}	ftlb.	24	50			
Maximum Impact Wrench Torque Rating ³	T _{impact, max}	ftlb.	125	150			
Minimum Hole Depth	h _{hole}	in.	1 3⁄4	3			
Embedment Depth	h _{nom}	in.	1 %	2¾			
Effective Embedment Depth	h _{ef}	in.	1.19	1.77			
Critical Edge Distance	C _{ac}	in.	3	211/16			
Minimum Edge Distance	C _{min}	in.	1 1⁄2	1¾			
Minimum Spacing	S _{min}	in.	1 1/2	3			
Minimum Concrete Thickness	h _{min}	in.	31⁄4	41⁄4			
	Anch	nor Data					
Yield Strength	f _{ya}	psi	100,000	97,000			
Tensile Strength	f _{uta}	psi	125,000	110,000			
Minimum Tensile and Shear Stress Area	A _{se}	in. ²	0.042	0.099			
Axial Stiffness in Service Load Range — Uncracked Concrete	β _{uncr}	lb./in.	202,000	715,000			
Axial Stiffness in Service Load Range — Cracked Concrete	β_{cr}	lb./in.	173,000	345,000			

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 or ACI 318-11.

2. $T_{inst,max}$ is the maximum permitted installation torque for installations using a torque wrench.

3. Timpact,max is the maximum permitted torque rating for impact wrenches.

Titen HD[®] Rod Hanger Design Information — Concrete

Titen HD Threaded Rod Hanger Tension Strength Design Data for Installations in Concrete¹

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			Model Number				
Characteristic	Symbol	Units	THDB25158RH THDB37158RH	THD50234RH			
Anchor Category	1, 2 or 3	_	1				
Embedment Depth	h _{nom}	in.	1%	21⁄2			
Steel Strength in Tension (ACI 318-14 17.4.1 or ACI 318-11 Section D.5.1)							
Tension Resistance of Steel	N _{sa}	lb.	5,195	10,890			
Strength Reduction Factor — Steel Failure ²	$\phi_{_{SA}}$	_	0.65				
Concrete Breakout Strength in Tension (ACI 318-14 17.4.2 or ACI 318-11 Section D.5.2)							
Effective Embedment Depth	h _{ef}	in.	1.19	1.77			
Critical Edge Distance	C _{ac}	in.	3	211/16			
Effectiveness Factor — Uncracked Concrete	k _{uncr}	-	30	24			
Effectiveness Factor — Cracked Concrete	k _{cr}	—	1	7			
Modification Factor	Ψ _{c,N}	_	1.0				
Strength Reduction Factor — Concrete Breakout Failure ³	ϕ_{cb}	_	0.65				
Pullout Strength in Tension (ACI 318-14 17.4.3 or ACI 318-11 Section D.5.3)							
Pullout Resistance — Uncracked Concrete ($f'_c = 2,500$ psi)	N _{p,uncr}	lb.	N/A ⁴	2,0255			
Pullout Resistance — Cracked Concrete ($f'_c = 2,500$ psi)	N _{p,cr}	lb.	N/A ⁴	1,235 ⁵			
Strength Reduction Factor — Pullout Failure ⁶	ϕ_p	_	0.65				
Tension Strength for Seismic Applications (ACI 318-14 17.2.3.3 or ACI 318-11 Section D.3.3.3)							
Nominal Pullout Strength for Seismic Loads ($f_c^{i} = 2,500$ psi)	N _{p,eq}	lb.	N/A ⁴	1,235 ⁵			
Strength Reduction Factor — Pullout Failure ⁶	ϕ_{eq}	_	0.65				
1. The information presented in this table is to be used in conjunction with 4. As described in this report, N/A denotes that pullout resistance does							

the design criteria of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.

2. The tabulated value of ϕ_{sa} applies when the load combinations of Section 1605.2 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4(b), as applicable.

3. The tabulated values of ϕ_{cb} applies when both the load combinations of Section 1605.2 of the IBC, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used and the requirements of ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided in concrete. For installations were complying reinforcement can be verified, the $\phi_{\rm cb}$ factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, may be used for Condition A. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4(c) for Condition B.

not govern and does not need to be considered.

5. The characteristic pullout resistance for greater compressive strengths may be increased by multiplying the tabular value by (f'_c/2,500)^{0.5}

6. The tabulated values of ϕ_{p} or ϕ_{eq} applies when both the load combinations of ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used and the requirements of ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided in concrete. For installations were complying reinforcement can be verified, the ϕ_p or ϕ_{eq} factors described in ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, may be used for Condition A. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4(c) for Condition B.

Titen HD[®] Rod Hanger Design Information Concrete

Titen HD Threaded Rod Hanger Tension Strength Design Data for Installations in the Lower and Upper Flute of Normal-Weight or Sand-Lightweight Concrete Through Metal Deck^{1,2,5,6}

		Units	Model No.					
			Lowe	Upper Flute				
Characteristic	Symbol		Figure 2	Figure 1	Figure 2			
			THDB25158RH THDB37158RH	THD50234RH	THDB25158RH THDB37158RH			
Minimum Hole Depth	h _{hole}	in.	13⁄4	3	1¾			
Embedment Depth	h _{nom}	in.	1%	21⁄2	1%			
Effective Embedment Depth	h _{ef}	in.	1.19	1.77	1.19			
Pullout Resistance – Cracked Concrete ^{2,3,4}	N _{p,deck,cr}	lbf.	420	870	655			
Pullout Resistance – Uncracked Concrete ^{2,3,4}	N _{p,deck,uncr}	lbf.	995	1,430	1,555			

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.

2. Concrete compressive strength shall be 3,000 psi minimum. The characteristic pullout resistance for greater compressive strengths shall be increased by multiplying the tabular value by (f'c, specified/3,000 psi)0.5.

3. For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, as shown in Figure 1 or Figure 2, calculation of the concrete breakout strength may be omitted.

4. In accordance with ACI 318-14 Section 17.4.3.2 or ACI 318-11 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight-concrete-over-metal-deck floor and roof assemblies Np. deck.cr shall be substituted for $N_{p,qr}$. Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete N_{p,deck,uncr} shall be substituted for N_{p,uncr}.

5. Minimum distance to edge of panel is 2hef.

6. The minimum anchor spacing along the flute must be the greater of $3h_{ef}$ or 1.5 times the flute width.



Figure 1. THD50234RH Installation in Concrete over Metal Deck



Figure 2. THDB25158RH and THDB37158RH Installation in Concrete over Metal Deck

IBC