

ROD HANGERS

ZINC PLATED FOR CONCRETE

CERTIFICATION

TECHNICAL DATA



ICC-ESR 5217
ICC-ESR Evaluated



FM APPROVED
on select sizes



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Rod Hangers feature an internal thread to facilitate bolt and rod connections. It is a one piece, steel anchor designed for rod hanging applications such as mechanical/fire sprinkler systems, ductwork/HVAC, electrical and pipe hanging. Evaluated for use in cracked concrete and seismic applications. The rod hanger can be installed into substrates such as concrete, brick, hollow brick, precast plank concrete, block, wood, metal deck and steel purlins.

ICC Evaluation is for cracked and uncracked concrete substrates.



FM Approval on 1AFR38 3/8" Rod Hanger Only



KEY BENEFITS

- ICC-ESR 5217
- FM Approved - 3/8" Rod Hanger Only
- Dual hardened tip for easier threading into concrete and higher productivity.
- No close-tolerance drill bits required.
- Requires less drilling in overhead applications.
- Time saving and easy to use.

APPLICATIONS

- Single or multiple pipes
- Overhead applications
- Duct and piping installations
- Close to edge/close to anchor applications

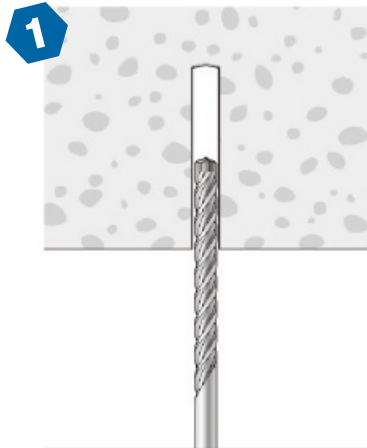
INSTALLATION PARAMETERS

TABLE 1: AFR ROD HANGER WITH HEX COUPLER HEAD INSTALLATION PARAMETERS¹

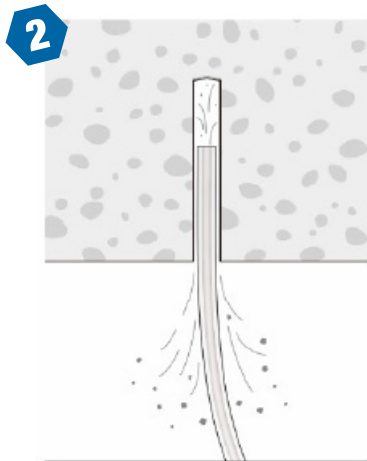
CHARACTERISTICS	SYMBOL	UNIT	NOMINAL ANCHOR DIAMETER			
			1/4"		3/8"	
Drill Bit Diameter	d_o	in (mm)	1/4 (6.4)		3/8 (9.5)	
Nominal Embedment Depth	h_{nom}	in (mm)	1-5/8 (41)	2-1/2 (64)	1-5/8 (41)	2-1/2 (64)
Effective Embedment Depth	h_{ef}	in (mm)	1.24 (31.6)	2.01 (51.1)	1.21 (30.8)	1.98 (50.3)
Minimum Hole Depth	h_{hole}	in (mm)	2 (51)	2-7/8 (73)	2 (51)	2-7/8 (73)
Fixture Hole Diameter	d_r	in (mm)	3/8 (9.5)		1/2 (12.7)	
Maximum Installation Torque ²	$T_{inst,max}$	ft.lb (Nm)	21 (29)		N/A	
Maximum Impact Wrench Torque Rating	$T_{impact,max}$	ft.lb (Nm)	135 (185)		135 (185)	
Minimum Concrete Thickness	h_{min}	in (mm)	4 (102)	4-3/8 (110)	4 (102)	4-3/8 (110)
Critical Edge Distance	c_{ac}	in (mm)	1.5 h_{ef}			
Minimum Edge Distance (c_{min})	c_{min}	in (mm)	1-3/4 (44)			
Minimum Spacing (s_{min})	s_{min}	in (mm)	3 (76)			
Internal Thread Size	—	in (mm)	1/4-20 or 3/8-16 (UNC Coarse)		3/8-16 or 1/2-13 (UNC Coarse)	

1. The tabulated data is to be used in conjunction with the design criteria given in ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appedix D, as applicable.
 2. N/A - Manual torque wrench installation not evaluated.

INSTALLATION INSTRUCTIONS



1. Drill a hole into the base material to the required depth using a drill bit that meets the requirements of ANSI B212.15.



2. Remove dust and debris from the hole using a hand pump or compressed air.



3. Select a powered impact wrench of a torque wrench, attach an appropriate sized hex socket to the wrench and mount the screw anchor head into the socket.



4. Install the anchor with an impact wrench through the surface. The correct force should be considered during the installation to make sure the socket doesn't do damage to the member surface or self-inflict any damage to its connecting threads.



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PERFORMANCE DATA

TABLE 2: AFR ROD HANGER WITH HEX COUPLER HEAD DESIGN INFORMATION^{1,2}

CHARACTERISTICS	SYMBOL	UNIT	NOMINAL ANCHOR DIAMETER			
			1/4"		3/8"	
Drill Bit Diameter	d_o	in (mm)	1/4 (6.4)		3/8 (9.5)	
Nominal Embedment Depth	h_{nom}	in (mm)	1-5/8 (41)	2-1/2 (64)	1-5/8 (41)	2-1/2 (64)
Effective Embedment Depth	h_{ef}	in (mm)	1.24 (31.6)	2.01 (51.1)	1.21 (30.8)	1.98 (50.3)
Anchor Category	1, 2 or 3	–	3	2	1	1
STEEL STRENGTH IN TENSION & SHEAR						
Minimum Specified Ultimate Strength	f_{uta}	psi (N/mm ²)	101,525 (700)		101,525 (700)	
Minimum Specified Yield Strength	f_y	psi (N/mm ²)	81,220 (560)		81,220 (560)	
Effective Stress Area (Screw Anchor Body)	A_{se}	in ² (mm ²)	0.0453 (29.2)		0.1020 (65.8)	
Steel Strength in Tension	N_{sa}	lb (kN)	4,585 (20.4)		10,355 (46.1)	
Strength Reduction Factor for Steel Failure in Tension	Φ_{sa}	–	0.65			
Steel Strength in Shear	V_{sa}	lb (kN)	1,350 (6.0)		3,150 (14.0)	
Steel Strength in Shear, Seismic	$V_{sa,eq}$	lb (kN)	1,125 (5.0)		1,800 (8.0)	
Strength Reduction Factor for Steel Failure in Shear	Φ_{sa}	–	0.60			
PULLOUT STRENGTH IN TENSION³						
Pullout Strength in Uncracked Concrete	$N_{p,uncr}$	lb (kN)	N/A	4,025 (17.9)	2,990 (13.3)	N/A
Pullout Strength in Cracked Concrete	$N_{p,cr}$	lb (kN)	605 (2.7)	1,080 (4.8)	1,755 (7.8)	2,630 (11.7)
Pullout Strength in Cracked Concrete, Seismic	$N_{p,eq}$	lb (kN)	605 (2.7)	1,080 (4.8)	1,755 (7.8)	2,630 (11.7)
Normalization Exponent, Uncracked Concrete	n	–	0.50		0.50	
Normalization Exponent, Cracked Concrete	n	–	0.40		0.50	
Strength Reduction Factor for Pullout Strength in Tension	Φ_p	–	0.45	0.55	0.65	0.65
CONCRETE BREAKOUT STRENGTH IN TENSION						
Effective Embedment	h_{er}	in (mm)	1.24 (31.6)	2.01 (51.1)	1.21 (30.8)	1.98 (50.3)
Effectiveness Factor for Uncracked Concrete	k_{uncr}	in-lb (SI)	24 (10.0)	24 (10.0)	24 (10.0)	24 (10.0)
Effectiveness Factor for Cracked Concrete	k_{cr}	in-lb (SI)	17 (7.1)	17 (7.1)	17 (7.1)	17 (7.1)
Strength Reduction Factor for Concrete Breakout Strength in Tension	Φ_{cb}	–	0.45	0.55	0.65	0.65

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TABLE 2: AFR ROD HANGER WITH HEX COUPLER HEAD DESIGN INFORMATION^{1,2}

CHARACTERISTICS	SYMBOL	UNIT	NOMINAL ANCHOR DIAMETER			
			1/4"		3/8"	
CONCRETE BREAKOUT STRENGTH IN TENSION						
Axial Stiffness in Service Load Range in Uncracked Concrete	β_{uncr}	lb/inch x 10^5 (N/mm)	2.719 (48)	1.928 (34)	6.240 (109)	4.502 (79)
COV for β_{uncr}	v	%	38			
Axial Stiffness in Service Load Range in Cracked Concrete	β_{cr}	lb/inch x 10^5 (N/mm)	1.451 (25)	1.100 (19)	3.318 (58)	2.563 (45)
COV for β_{cr}	v	%	48			
CONCRETE BREAKOUT STRENGTH IN SHEAR						
Nominal Diameter	d_o^2	in (mm)	0.250 (6.4)		0.375 (9.5)	
Load Bearing Length of Anchor	l_e	in (mm)	1.24 (31.6)	2.01 (51.1)	1.21 (30.8)	1.98 (50.3)
Reduction Factor of Concrete Break-out Strength in Shear	ϕ_{cb}	—	0.70			
CONCRETE PRYOUT STRENGTH IN SHEAR						
Coefficient for Pryout Strength	k_{cp}	—	1.0	1.0	1.0	1.0
Reduction Factor for Pryout Strength in Shear	ϕ_{cp}	—	0.70			

- The tabulated data is to be used in conjunction with the design criteria given in ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appedix D, as applicable.
- The strength reduction factor applies when the load combination from the IBC or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appedix C are used, the appropriate value of f must be determined in accordance with ACI 318-11 D.4.5.

TABLE 3: EXAMPLE AFR ROD HANGER ALLOWABLE STRESS DESIGN VALUES FOR ILLUSTRATIVE PURPOSES^{1,2,3,4,5,6,7,8,9,10}

NOMINAL ANCHOR DIAMETER d_o (inch)	NOMINAL EMBEDMENT DEPTH h_{nom} (inch)	ALLOWABLE TENSION LOAD $T_{allowable, ASD}$ (lb)
1/4	1-5/8	504
1/4	2-1/2	1,271
3/8	1-5/8	613
3/8	2-1/2	1,313

- Single anchor
- Single tension loading only
- Concrete determined to remain uncracked for the life of the anchorage.
- Load combinations taken from ACI 318 (-19 or -14) Section 5.3 or ACI 318-11 Section 9.2, as applicable with no seismic loading.
- 30% Dead Load (D) and 70% Live Load (L), controlling load combination 1.2 D + 1.6L.
- Calculation of the weighted average of $a = 1.2 \times 0.3 + 1.6 \times 0.7 = 1.48$
- Nominal weight concrete, $f'_c = 2,500$ psi.
- $C_{a1} = C_{a2} \geq C_{ac}$
- Concrete thickness $h \geq h_{min}$
- Values are for Condition B (supplementary reinforcement in accordance with ACI 318 (-19 or -14) 17.3.3 or ACI 318-11 D.4.3 is not provided)



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ORDERING INFORMATION

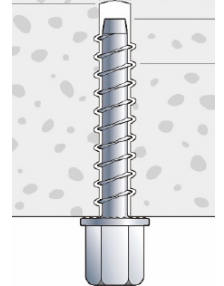


TABLE 4: 1AFR ROD HANGER ORDERING INFORMATION

PART NUMBER	SCREW SIZE	DRILL SIZE	ROD SIZE	SOCKET SIZE	QTY/BOX
1AFR14	1/4 x 1-5/8"	1/4"	1/4"	1/2"	50
1AFR38	1/4 x 1-5/8"	1/4"	3/8"	1/2"	50
1AFR385	1/4 x 2-1/2"	1/4"	3/8"	1/2"	50
1AFR12	3/8 x 2-1/2"	3/8"	1/4"	3/4"	25

TABLE 5: ACCESSORIES ORDERING INFORMATION

PART NUMBER	DESCRIPTION	IMAGE
5DSPE-14-6	1/4" x 6-3/4" Enduro SDS-Plus 4 Cutter Bit	
5DSPE-38-6	3/8" x 6-3/4" Enduro SDS-Plus 4 Cutter Bit	
5MNS121304	1/2 x 1-3/4 Magnetic Nut Setter	
5DWMT73934	1/2 Impact Deep Well Socket 1/2-Square Drive	
5DWMT73939B	3/4 Impact Deep Well Socket - 1/2 Square Drive	
51837573	1/2-Square Impact Socket Extension/Adapter 1/4 Hex Shank	