

Hollow-Set™ Dropin™ *Internally Threaded Expansion Anchor*

PRODUCT DESCRIPTION

The Hollow-Set Dropin anchor is designed for anchoring in hollow base materials such as hollow concrete block, brick with weep holes, and precast hollow core plank. It can also be used in solid base materials.

Precast plank or concrete masonry blocks often have a maximum outer wall thickness of 1 1/2". During the drilling process, spalling on the back side of the wall often decreases the wall thickness, leaving only 1" or less for anchoring. The Hollow-Set Dropin is designed to perform in this environment, although most conventional style anchors will not function properly. The Hollow-Set Dropin is also appropriate for overhead applications.

GENERAL APPLICATIONS AND USES

- Anchoring to Concrete Block
- Anchoring to Precast Hollow Core Plank
- Suspending Conduit
- Fire Sprinkler
- Cable Trays and Strut
- Suspended Lighting
- Pipe Supports
- Removable Anchorage

FEATURES AND BENEFITS

- Internally threaded anchor for easy removability and service work
- Unique expansion design allows for anchoring in thin-walled base materials such as hollow concrete block and precast hollow core plank
- Smooth wall dropin can be installed flush mounted or below the base material surface
- Versatile setting options allows for torque-controlled or forced-controlled expansion
- Tested in accordance with ASTM E488 and AC01 criteria
- Qualified for seismic and wind loads

APPROVALS AND LISTINGS

International Code Council, Evaluation Service (ICC-ES) ESR-1532
(formerly listed in ICBO ES ER-5225)
City of Los Angeles (COLA) LARR-24960
Factory Mutual Research Corporation (FM Approvals) – Serial No. 15219/1952
Underwriters Laboratories (UL Listed) – File EX 1289 (N)
Federal GSA Specification – Meets the proof load requirements of FF-S-325C, Group II, Type 3, Class I (superseded)

GUIDE SPECIFICATIONS

CSI Divisions: 03151-Concrete Anchoring, 04081-Masonry Anchorage and 05090-Metal Fastenings. Dropin Anchors shall be Hollow-Set Dropin anchors as supplied by Powers Fasteners, Inc., Brewster, NY.

SECTION CONTENTS	Page No.
General Information.....	104
Installation Specifications.....	105
Material Specifications.....	105
Performance Data.....	106
Design Criteria.....	108
Ordering Information.....	110



Hollow-Set Dropin

ANCHOR MATERIALS

Zamac Alloy Anchor Body
Carbon Steel Cone
Type 304 Stainless Steel Cone

ROD/ANCHOR SIZE RANGE (TYP.)

1/4" to 5/8" diameter

SUITABLE BASE MATERIALS

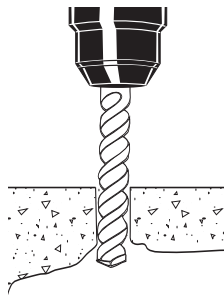
Normal-Weight Concrete
Precast Hollow Core Plank
Hollow Concrete Masonry
Brick Masonry

INSTALLATION SPECIFICATIONS

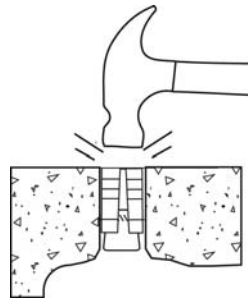
Dimension	Rod/Anchor Diameter, <i>d</i>				
	1/4"	5/16"	3/8"	1/2"	5/8"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	3/8	5/8	5/8	3/4	1
Maximum Tightening Torque, <i>T_{max}</i> (ft.-lbs)	5	7	10	20	40
Thread Size (UNC)	1/4-20	5/16-18	3/8-16	1/2-13	5/8-11
Overall Anchor Length (in.)	7/8	1 5/16	1 5/16	1 3/4	2
Sleeve Length (in.)	5/8	15/16	15/16	1 1/4	1 1/2
Thread Length In Cone (in.)	3/8	5/8	5/8	3/4	1

Installation Guidelines for Hollow Base Materials

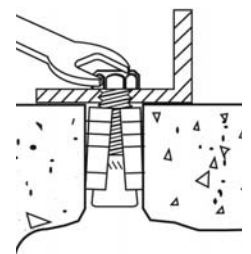
Drill a hole into the base material to the required depth. Drilling in rotary/hammer mode is acceptable. In hollow base materials, drill through into the cell or void. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.



Blow the hole clean of dust and other materials. Do not expand the anchor prior to installation. Insert cone end and tap flush to surface.

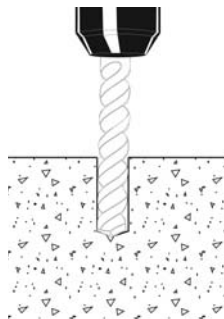


Position fixture, insert bolt and tighten. The bolt should engage a minimum of 2/3 of the anchor threads. The anchor can also be expanded using the Hollow-Set tool for hollow base materials. (If Hollow-Set Tool is used, thread anchor onto tool prior to tapping into anchor hole. When flush with surface, turn tool clockwise to tighten. Release tool from set anchor by turning counterclockwise. Fixture can then be attached).



Installation Guidelines for Solid Base Materials

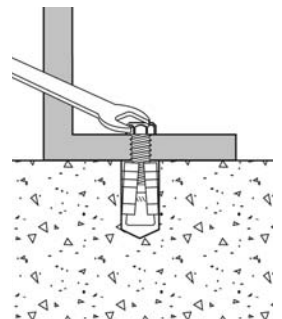
Drill a hole into the base material to the required depth. In hollow base materials, drill through into the cell or void. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.



Blow the hole clean of dust and other materials. Insert the anchor into the hole. Use the setting tool for solid base materials and insert in the anchor.



Set the anchor by driving the zamac sleeve over the cone using several sharp hammer blows. Be sure the anchor is at the required embedment depth, so that anchor threads do not protrude above the surface of the base material. Position the fixture, insert bolt or threaded rod and tighten.



MATERIAL SPECIFICATIONS

Anchor Component	Carbon Steel	Stainless Steel
Anchor Body	Zamac Alloy	Zamac Alloy
Cone	AISI 12L14	Type 304 Stainless Steel
Plating (Cone)	ASTM B633, SC1, Type III (Fe/Zn 5)	N/A

PERFORMANCE DATA

Ultimate Load Capacities for Hollow-Set Dropin in Normal-Weight Concrete^{1,2,3}

Rod/ Anchor Diameter <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Drill Bit Diameter <i>d_{bit}</i> in.	Minimum Concrete Compressive Strength (<i>f'_c</i>)					
			2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	3/4 (19.1)	3/8	760 (3.4)	1,200 (5.4)	1,140 (5.1)	1,200 (5.4)	1,440 (6.5)	1,200 (5.4)
	7/8 (22.2)		880 (4.0)	1,440 (6.5)	1,145 (5.2)	1,440 (6.5)	2,045 (9.2)	1,440 (6.5)
5/16 (7.9)	1 (25.4)	5/8	1,120 (5.0)	1,980 (8.9)	1,680 (7.6)	1,980 (8.9)	2,200 (9.9)	1,980 (8.9)
	1 1/2 (38.1)		2,205 (9.9)	2,740 (12.3)	2,775 (12.5)	2,740 (12.3)	4,825 (21.7)	2,740 (12.3)
3/8 (9.5)	1 (25.4)	5/8	1,370 (6.2)	2,550 (11.5)	2,070 (9.3)	2,550 (11.5)	2,290 (10.3)	2,550 (11.5)
	1 1/2 (38.1)		2,445 (11.0)	3,145 (14.2)	3,510 (15.8)	3,145 (14.2)	5,085 (22.9)	3,145 (14.2)
1/2 (12.7)	1 1/2 (38.1)	3/4	2,140 (9.6)	4,020 (18.1)	4,025 (18.1)	4,020 (18.1)	7,285 (32.8)	4,020 (18.1)
	2 (50.8)		2,780 (12.5)	4,020 (18.1)	4,375 (19.7)	4,020 (18.1)	9,455 (42.5)	4,020 (18.1)
5/8 (15.9)	2 1/4 (57.2)	1	5,725 (25.8)	6,400 (28.8)	9,410 (42.3)	6,400 (28.8)	12,745 (57.4)	6,400 (28.8)

1. Tabulated load values are applicable to anchors with carbon and stainless steel cones.

2. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load.

3. Linear interpolation may be used to determine ultimate loads for intermediate embedments and compressive strengths.

Allowable Load Capacities for Hollow-Set Dropin in Normal-Weight Concrete^{1,2,3,4,5}

Rod/ Anchor Diameter <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Drill Bit Diameter <i>d_{bit}</i> in.	Minimum Concrete Compressive Strength (<i>f'_c</i>)					
			2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	3/4 (19.1)	3/8	190 (0.9)	300 (1.4)	285 (1.3)	300 (1.4)	360 (1.6)	300 (1.4)
	7/8 (22.2)		220 (1.0)	360 (1.6)	285 (1.3)	360 (1.6)	510 (2.3)	360 (1.6)
5/16 (7.9)	1 (25.4)	5/8	280 (1.3)	495 (2.2)	420 (1.9)	495 (2.2)	550 (2.5)	495 (2.2)
	1 1/2 (38.1)		550 (2.5)	685 (3.1)	695 (3.1)	685 (3.1)	1,205 (5.4)	685 (3.1)
3/8 (9.5)	1 (25.4)	5/8	345 (1.6)	640 (2.9)	520 (2.3)	640 (2.9)	575 (2.6)	640 (2.9)
	1 1/2 (38.1)		610 (2.7)	785 (3.5)	880 (4.0)	785 (3.5)	1,270 (5.7)	785 (3.5)
1/2 (12.7)	1 1/2 (38.1)	3/4	535 (2.4)	1,005 (4.5)	1,005 (4.5)	1,005 (4.5)	1,820 (8.2)	1,005 (4.5)
	2 (50.8)		695 (3.1)	1,005 (4.5)	1,095 (4.9)	1,005 (4.5)	2,365 (10.6)	1,005 (4.5)
5/8 (15.9)	2 1/4 (57.2)	1	1,430 (6.4)	1,600 (7.2)	2,355 (10.6)	1,600 (7.2)	3,185 (14.3)	1,600 (7.2)

1. Tabulated load values are applicable to anchors with carbon and stainless steel cones.

2. Allowable load capacities listed are calculated using an applied safety factor of 4.0.

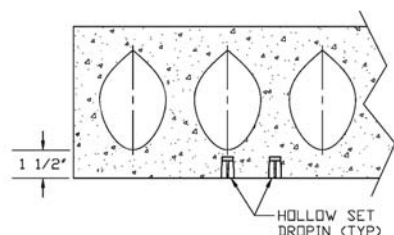
3. Linear interpolation may be used to determine ultimate loads for intermediate embedments and compressive strengths.

4. Allowable loads for anchors to resist short-term loads such as earthquake or wind may be increased by 33-1/3 percent for the duration of the load, where permitted by code.

5. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in the Design Criteria section.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Hollow Core Plank^{1,2}



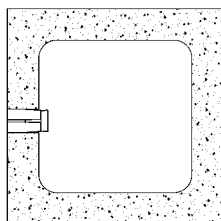
Rod/ Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Drill Bit Diameter d_{bit} in.	Minimum Concrete Compressive Strength $f'_c \geq 5,000$ psi (34.5 MPa)			
			Ultimate Load		Allowable Load	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	7/8 (22.2)	3/8	1,190 (5.4)	1,440 (6.5)	300 (1.4)	360 (1.6)
5/16 (7.9)	1* (25.4)	5/8	2,280 (10.3)	2,740 (12.3)	570 (2.6)	685 (3.1)
3/8 (9.5)	1* (25.4)	5/8	2,525 (11.4)	2,740 (12.3)	630 (2.8)	685 (3.1)
	1 1/2 (38.1)	5/8	3,620 (16.3)	3,145 (14.2)	905 (4.1)	785 (3.5)
1/2 (12.7)	1 1/4* (31.8)	3/4	5,420 (24.4)	5,580 (25.1)	1,355 (6.1)	1,395 (6.3)
5/8 (15.9)	1 1/2* (38.1)	1	9,660 (43.5)	8,320 (37.4)	2,415 (10.9)	2,080 (9.4)

1. Tabulated load values are applicable to anchors with carbon and stainless steel cones.

2. Allowable loads are calculated using an applied safety factor of 4.0.

* Anchors were installed with sleeve flush to surface of the plank.

Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Hollow Concrete Masonry^{1,2}



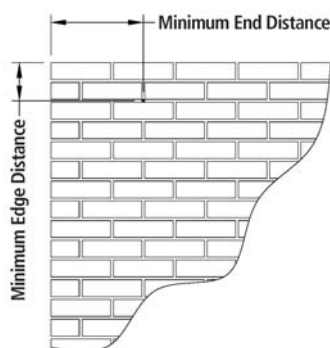
Rod/ Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Drill Bit Diameter d_{bit} in.	$f'_m \geq 1,500$ psi (10.4 MPa)			
			Ultimate Load		Allowable Load	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	7/8 (22.2)	3/8	530 (2.4)	1,575 (7.1)	105 (0.5)	315 (1.4)
5/16 (7.9)	1* (25.4)	5/8	1,035 (4.7)	1,815 (8.2)	205 (0.9)	365 (1.6)
3/8 (9.5)	1* (25.4)	5/8	1,225 (5.5)	2,485 (11.2)	245 (1.1)	495 (2.2)
1/2 (12.7)	1 1/4* (31.8)	3/4	1,790 (8.1)	3,655 (16.4)	360 (1.6)	730 (3.3)
5/8 (15.9)	1 1/2* (38.1)	1	1,790 (8.1)	3,740 (16.8)	360 (1.6)	750 (3.4)

1. Tabulated load values are for anchors installed in minimum 6-inch wide, Grade N, Type II, medium and normal-weight concrete masonry units. Mortar must be minimum Type N. Masonry prism compressive strength must be 1,500 psi minimum at the time of installation.

2. Tabulated load values are applicable to anchors with carbon and stainless steel cones. Allowable loads are calculated using an applied safety factor of 5.0.

* Anchors were installed with sleeve flush to face shell surface.

PERFORMANCE DATA

**Ultimate and Allowable Load Capacities for Hollow-Set Dropin
in Brick with Weepholes and Clay Brick Masonry^{1,2,3,4}**


Rod/ Anchor Diameter <i>d</i> in. (mm)	Minimum Embed. Depth <i>h_v</i> in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Structural Brick Masonry <i>f'_m</i> ≥ 1,500 psi (10.4 MPa)			
				Ultimate Load		Allowable Load	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	7/8 (22.2)	6 (152.4)	8 (203.2)	880 (4.0)	1,640 (7.4)	175 (0.8)	330 (1.5)
5/16 (9.5)	1 1/4 (31.8)	8 (203.2)		1,460 (6.6)	2,230 (10.0)	290 (1.3)	445 (2.0)
3/8 (12.7)	1 1/4 (31.8)	8 (203.2)		1,860 (8.4)	2,980 (13.4)	370 (1.7)	595 (2.7)
1/2 (15.9)	1 1/2 (38.1)	10 (254.0)		3,240 (14.6)	4,230 (19.0)	650 (2.9)	845 (3.8)
5/8 (19.1)	2 1/4 (57.2)	12 (304.8)		4,680 (21.1)	6,420 (28.9)	935 (4.2)	1,605 (7.2)

1. Tabulated load values are for anchors with carbon or stainless steel cones installed in Grade SW multiple wythe, brick masonry conforming to ASTM C62.
2. Tabulated load values are applicable to anchors with carbon and stainless steel cones. Allowable loads are calculated using an applied safety factor of 5.0.
3. Anchors were installed with sleeve flush to face shell surface.
4. The tabulated values are for anchors installed at a minimum of 16 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 8 anchor diameters on center provided the capacities are reduced by 50 percent. Linear interpolation may be used for intermediate spacing.

DESIGN CRITERIA

Combined Loading

For anchors loaded in both shear and tension, the combination of loads should be proportioned as follows:

$$\left(\frac{N_u}{N_n} \right) + \left(\frac{V_u}{V_n} \right) \leq 1$$

Where: N_u = Applied Service Tension Load
 N_n = Allowable Tension Load
 V_u = Applied Service Shear Load
 V_n = Allowable Shear Load

Load Adjustment Factors for Spacing and Edge Distances¹

Anchor Installed in Normal-Weight Concrete					
Anchor Dimension	Load Type	Critical Distance (Full Anchor Capacity)	Critical Load Factor	Minimum Distance (Reduced Capacity)	Minimum Load Factor
Spacing (<i>s</i>)	Tension and Shear	$s_{cr} = 3.0h_v$	$F_N = F_V = 1.0$	$s_{min} = 1.5h_v$	$F_N = F_V = 0.50$
Edge Distance (<i>c</i>)	Tension	$c_{cr} = 14d$	$F_N = 1.0$	$c_{cr} = 8d$	$F_N = 0.80$
	Shear	$c_{cr} = 14d$	$F_V = 1.0$	$c_{cr} = 8d$	$F_V = 0.50$

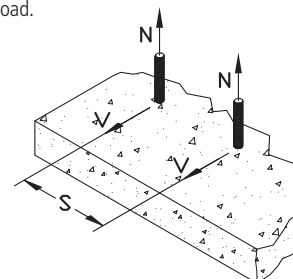
1. Load values, found in the Performance Tables, are multiplied by the reduction factors when spacing edge distances are less than critical distances. Linear interpolation is allowed for spacing and edge distances that fall between critical and minimum distances. When a group of anchors is affected by both reduced spacing and edge distance, the spacing and edge distance reduction factors must be combined (multiplied).

DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight Concrete

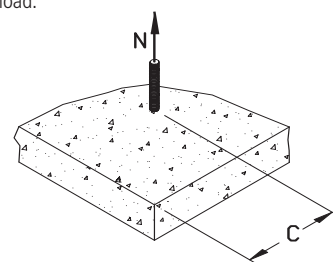
Spacing, Tension (F_N) & Shear (F_V)					
Dia. (in.)	1/4	5/16	3/8	1/2	5/8
h_V (in.)	7/8	1 1/2	1 1/2	2	2 1/4
S_{cr} (in.)	2 5/8	4 1/2	4 1/2	6	6 3/4
S_{min} (in.)	1 3/8	2 1/4	2 1/4	3	3 3/8
Spacing, s (inches)	1 3/8	0.50			
	2 1/4	0.86	0.50	0.50	
	2 5/8	1.00	0.58	0.58	
	3		0.67	0.67	0.50
	3 3/8		0.75	0.75	0.56
	4		0.89	0.89	0.67
	4 1/2		1.00	1.00	0.75
	5			0.83	0.74
	6			1.00	0.89
	6 3/4				1.00

Notes: For anchors loaded in tension and shear, the critical spacing (S_{cr}) is equal to 3 embedment depths ($3h_V$) at which the anchor achieves 100% of load. Minimum spacing (S_{min}) is equal to 1.5 embedment depths ($1.5h_V$) at which the anchor achieves 50% of load.



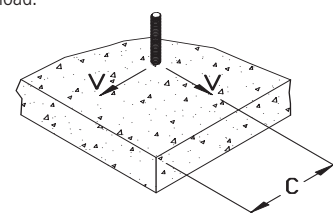
Edge Distance, Tension (F_N)					
Dia. (in.)	1/4	5/16	3/8	1/2	5/8
C_{cr} (in.)	3 1/2	4 3/8	5 1/4	7	8 3/4
C_{min} (in.)	2	2 1/2	3	4	5
Edge Distance, c (inches)	2	0.80			
	2 1/2	0.87	0.80		
	3	0.93	0.85	0.80	
	3 1/2	1.00	0.91	0.84	
	4		0.96	0.89	0.80
	4 3/8		1.00	0.92	0.83
	5			0.98	0.87
	5 1/4		1.00	0.88	0.81
	6			0.93	0.85
	7			1.00	0.91
	8				0.96
	8 3/4				1.00

Notes: For anchors loaded in tension, the critical edge distance (C_{cr}) is equal to 14 anchor diameters ($14d$) at which the anchor achieves 100% of load. Minimum edge distance (C_{min}) is equal to 8 anchor diameters ($8d$) at which the anchor achieves 80% of load.



Edge Distance, Shear (F_V)					
Dia. (in.)	1/4	5/16	3/8	1/2	5/8
C_{cr} (in.)	3 1/2	4 3/8	5 1/4	7	8 3/4
C_{min} (in.)	2	2 1/2	3	4	5
Edge Distance, c (inches)	2	0.50			
	2 1/2	0.67	0.50		
	3	0.83	0.63	0.50	
	3 1/2	1.00	0.77	0.61	
	4		0.90	0.72	0.50
	4 3/8		1.00	0.81	0.56
	5			0.94	0.67
	5 1/4		1.00	0.71	0.53
	6			0.83	0.63
	7			1.00	0.77
	8				0.90
	8 3/4				1.00

Notes: For anchors loaded in shear, the critical edge distance (C_{cr}) is equal to 14 anchor diameters ($14d$) at which the anchor achieves 100% of load. Minimum edge distance (C_{min}) is equal to 8 anchor diameters ($8d$) at which the anchor achieves 50% of load.



ORDERING INFORMATION

Hollow-Set Dropin with Carbon Steel Cone

Catalog Number	Rod/Anchor Diameter	Drill Diameter	Overall Length	Sleeve Length	Std. Box	Std. Ctn.	Wt./ 100
9320	1/4"	3/8"	7/8"	5/8"	100	1,000	1 3/4
9330	5/16"	5/8"	1-5/16"	15/16"	50	500	5 1/2
9340	3/8"	5/8"	1-5/16"	15/16"	50	500	5 1/2
9350	1/2"	3/4"	1-3/4"	1 1/4"	50	250	9 1/2
9360	5/8"	1"	2"	1 1/2"	25	125	21



Hollow-Set Dropin with Stainless Steel Cone

Catalog Number	Rod/Anchor Diameter	Drill Diameter	Overall Length	Sleeve Length	Std. Box	Std. Ctn.	Wt./ 100
9420	1/4"	3/8"	7/8"	5/8"	100	1,000	1-3/4
9440	3/8"	5/8"	1-5/16"	15/16"	100	500	5-1/2

Setting Tool for Solid Base Materials

Catalog Number	Size	Standard Box	Standard Carton
9322	1/4"	1	1
9342	5/16" and 3/8"	1	1
9352	1/2"	1	1
9362	5/8"	1	1



Setting Tool for Hollow Base Materials

Catalog Number	Size	Standard Box	Standard Carton
9323	1/4"	1	1
9333	5/6"	1	1
9343	3/8"	1	1
9353	1/2"	1	1
9363	5/8"	1	1

