GENERAL INFORMATION

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 and precast hollow core plank. It can also be used in solid base materials. 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, where most conventional style anchors will not function properly.

GENERAL APPLICATIONS AND USES

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

FEATURE AND BENEFITS

+ Internally threaded anchor for easy bolt removability and service work
+ Unique expansion design allows for anchoring in thin-walled base materials
+ Versatile setting options allows for hollow or solid base materials
+ Tested in accordance with ASTM E488 and AC01 criteria

APPROVALS AND LISTINGS

- Underwriters Laboratories (UL) File EX 1289 (Hanger, Pipe): See listing for sizes.

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 - Masonry Anchors and 05 05 19 - Post-Installed Concrete Anchors. Dropin anchors shall be Hollow-Set Dropin as supplied by DEWALT, Towson, MD.

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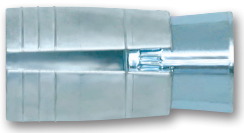


HOLLOW-SET DROPIN

ANCHOR MATERIALS

- Zamac Alloy Anchor Body with:
  - Carbon Steel Cone or
  - Type 304 Stainless Steel Cone

ROD/ANCHOR SIZE RANGE (TYP.)

- 1/4" through 5/8" diameters

SUITABLE BASE MATERIALS

- Normal-Weight Concrete
- Precast Hollow Core Plank
- Hollow or Grout Filled Concrete Masonry (CMU)
- Brick Masonry

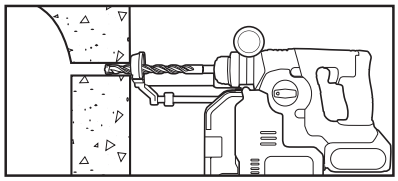
MATERIAL SPECIFICATIONS

Anchor Component	Carbon Steel	Stainless Steel
Anchor Body	Zamac Alloy	Zamac Alloy
Cone	AISI C 1008	Type 304 Stainless Steel
Plating (Cone)	ASTM B633, SC1, Type III (Fe/Zn 5)	N/A

INSTALLATION SPECIFICATIONS

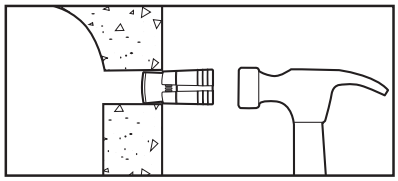
Dimension	Rod/Anchor Diameter, d				
	1/4"	5/16"	3/8"	1/2"	5/8"
ANSI Drill Bit Size, d_{bit} (in.)	3/8	5/8	5/8	3/4	1
Maximum Tightening Torque, T_{max} (ft.-lbs)	3-4	5-7	8-10	15-20	30-40
Thread Size (UNC)	1/4-20	5/16-18	3/8-16	1/2-13	5/8-11
Overall Anchor Length (in.)	7/8	1-5/16	1-5/16	1-3/4	2
Sleeve 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 Instructions for Hollow Base Materials

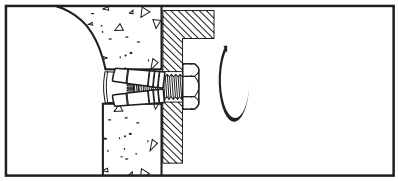


In hollow base materials, drill through into the cell or void. The tolerances of the drill bit used must meet the requirements of ANSI Standard B212.15.

Remove dust and debris from the hole during drilling (e.g. dust extractor, hollow bit) or following drilling (e.g. suction, forced air) to extract loose particles created by drilling.

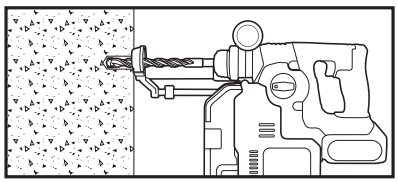


Do not expand the anchor prior to installation. Insert cone end and tap flush to surface.



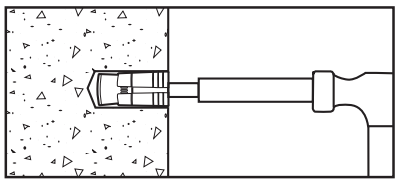
Position fixture, insert bolt and tighten. The bolt should engage a minimum of 2/3 of the anchor threads. The anchor can also be expanded using a Hollow-Set Tool. (If Hollow-Set Tool is used, thread anchor onto tool prior to tapping into anchor hole. When flush with surface, turn tool clockwise to tighten.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

Installation Instructions for Solid Base Materials



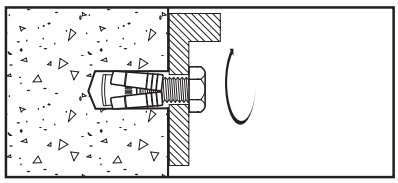
Drill a hole into the base material to the required embedment depth. The tolerances of the drill bit used must meet the requirements of ANSI Standard B212.15.

Remove dust and debris from the hole during drilling (e.g. dust extractor, hollow bit) or following drilling (e.g. suction, forced air) to ex tract loose particles created by drilling.



Insert the anchor into the hole. Position the setting tool in the anchor.

Using the Solid Tool, 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.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Normal-Weight Concrete[1,2,3,4]

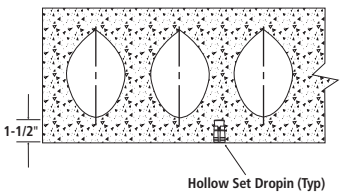
Rod/ Anchor Diameter d in. (mm)	Minimum Embed Depth h_v in. (mm)	Drill Bit Diameter ANSI in.	Minimum Concrete Compressive Strength, f 'c											
			2,000 psi				4,000 psi				6,000 psi			
			Tension		Shear		Tension		Shear		Tension		Shear	
			Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
1/4 (6.4)	3/4 (19)	3/8	760 (3.4)	150 (0.7)	1,200 (5.3)	240 (1.1)	1,140 (5.1)	230 (1.0)	1,200 (5.3)	240 (1.1)	1,440 (6.4)	290 (1.3)	1,200 (5.3)	240 (1.1)
	7/8 (22)		880 (3.9)	175 (0.8)	1,440 (6.4)	290 (1.3)	1,145 (5.1)	230 (1.0)	1,440 (6.4)	290 (1.3)	2,045 (9.1)	410 (1.8)	1,440 (6.4)	290 (1.3)
5/16 (6.4)	1 (25)	5/8	1,120 (5.0)	225 (1.0)	1,980 (8.8)	395 (1.8)	1,680 (7.5)	335 (1.5)	1,980 (8.8)	395 (1.8)	2,200 (9.8)	440 (2.0)	1,980 (8.8)	395 (1.8)
	1-1/2 (38)		2,205 (9.8)	440 (2.0)	2,740 (12.2)	550 (2.4)	2,775 (12.3)	555 (2.5)	2,740 (12.2)	550 (2.4)	4,825 (21.5)	965 (4.3)	2,740 (12.2)	550 (2.4)
3/8 (9.5)	1 (25)	5/8	1,370 (6.1)	275 (1.2)	2,550 (11.3)	510 (2.3)	2,070 (9.2)	415 (1.8)	2,550 (11.3)	510 (2.3)	2,290 (10.2)	460 (2.0)	2,550 (11.3)	510 (2.3)
	1-1/2 (38)		2,445 (10.9)	490 (2.2)	3,145 (14.0)	630 (2.8)	2,800 (12.5)	560 (2.5)	3,145 (14.0)	630 (2.8)	5,085 (22.6)	1,015 (4.5)	3,145 (14.0)	630 (2.8)
1/2 (12.7)	1-1/2 (38)	3/4	2,140 (9.5)	430 (1.9)	4,020 (17.9)	805 (3.6)	4,025 (17.9)	805 (3.6)	4,020 (17.9)	805 (3.6)	7,285 (32.4)	1,455 (6.5)	4,020 (17.9)	805 (3.6)
	2 (51)		2,780 (12.4)	555 (2.5)	4,020 (17.9)	805 (3.6)	4,375 (19.5)	875 (3.9)	4,020 (17.9)	805 (3.6)	9,455 (42.1)	1,890 (8.4)	4,020 (17.9)	805 (3.6)
5/8 (15.9)	2-1/4 (57)	1	5,725 (25.5)	1,145 (5.1)	6,400 (28.5)	1,280 (5.7)	9,410 (41.9)	1,880 (8.4)	6,400 (28.5)	1,280 (5.7)	10,500 (46.7)	2,100 (9.3)	6,400 (28.5)	1,280 (5.7)

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. Consideration of safety factors of 20 or higher may be necessary depending on the application, such as life safety, overhead and in sustained tensile loading applications.
3. Linear interpolation may be used to determine allowable loads for anchors at intermediate embedment depths and compressive strengths.
4. The tabulated load values are applicable to single anchors installed at critical edge and spacing distances. Allowable load capacities are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances.

Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Hollow Core Plank[1,2,3]

Rod/ Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Drill Bit Diameter ANSI in.	Minimum Concrete Compressive Strength f'c ≥ 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	6,560 (29.2)	8,320 (37.4)	1,640 (7.3)	2,080 (9.4)

1. Tabulated load values are applicable to anchors with carbon and stainless steel cones and set with sleeve flush to surface of the plank and with setting tool for solid base materials.
2. Allowable load capacities listed are calculated using and applied safety factor of 4.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, overhead and in sustained tensile loading applications.
3. Minimum spacing distance must not be less than eight anchor diameters (8d).



Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Hollow Concrete Masonry[1,2,3,4,5,6,7]

Rod/Anchor Diameter d in.	Minimum Embedment Depth hv in.	Drill Bit Diameter ANSI in.	Min. Edge Distance in. (mm)	Min. End Distance in. (mm)	f'm = 1,500 psi			
					Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4	7/8* (22.2)	3/8	3-3/4 (95)	3-3/4 (95)	530 (2.4)	785 (3.5)	105 (0.5)	155 (0.7)
5/16	1* (25.4)	5/8	3-3/4 (95)	3-3/4 (95)	1,035 (4.6)	920 (4.1)	205 (0.9)	185 (0.8)
3/8	1* (25.4)	5/8	3-3/4 (95)	3-3/4 (95)	1,225 (5.4)	1,175 (5.2)	245 (1.1)	235 (1.0)
1/2	1-1/4* (31.8)	3/4	3-3/4 (95)	3-3/4 (95)	1,520 (6.8)	1,240 (5.5)	305 (1.4)	250 (1.1)
	1-1/4* (31.8)	3/4	11-1/4 (286)	11-1/4 (286)	1,520 (6.8)	1,825 (8.1)	305 (1.4)	365 (1.6)
5/8	1-1/2* (38.1)	1	11-1/4 (286)	11-1/4 (286)	1,790 (8.0)	1,870 (8.3)	360 (1.6)	375 (1.7)

1. Tabulated load values are applicable to anchors with carbon and stainless steel cones.
2. Tabulated load values for anchors are installed in minimum 6" wide, minimum Grade N, Type II, lightweight, medium-weight or normal-weight concrete masonry units conforming to ASTM C 90. Mortar must be minimum Type N. Masonry cells may be grouted. Masonry compressive strength must be at specified minimum at the time of installation.
3. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, and in sustained tensile loading applications.
4. Allowable shear load values may be increased by 100% (multiplied by 2.0) provided the applied shear loads are not loaded toward the wall edge and end.
5. The tabulated values are applicable for anchors installed into masonry wall faces or ends of block ends provided minimum edge and end distances are maintained.
6. The tabulated values are applicable to single anchors. Two anchors may be installed in the same cell provided the spacing distance between the anchors is a minimum of six diameters (6d) and the allowable loads are reduced by 50%.
7. Anchors were installed with sleeve flush to block surface and with setting tool for hollow base materials. Embedment is measured from the surface of the base material.

*Minimum face shell thickness must be minimum 1.25-inch-thick for 1/2-inch-diameter anchors and minimum 1.5-inch-thick for 5/8-inch diameter anchors.

Ultimate and Allowable Load Capacities for Hollow-Set Dropin in Solid Clay Brick Masonry[1,2,3,4]

Rod/ Anchor Diameter d in. (mm)	Minimum Embed. Depth h_v in. (mm)	Drill Bit Diameter ANSI in.	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	f'm ≥ 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	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)	5/8	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)	5/8	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)	3/4	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)	1	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.
2. Tabulated load values are for anchors installed in multiple wythe, minimum Grade SW, solid clay brick masonry walls conforming to ASTM C 62. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation (f'm ≥ 1,500 psi).
3. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, and in sustained tensile loading applications.
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 (ALLOWABLE STRESS DESIGN)

Combined Loading

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

$$\left(\frac{Nu}{Nn}\right) + \left(\frac{Vu}{Vn}\right) \leq 1$$

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 DISTANCES[1]

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 (s)	Tension and Shear	$s_{cr} = 3.0h_v$	$F_{NS} = F_{VS} = 1.0$	$s_{min} = 1.5h_v$	$F_{NS} = F_{VS} = 0.50$
Edge Distance (c)	Tension	$c_{cr} = 14d$	$F_{NC} = 1.0$	$c_{min} = 8d$	$F_{NC} = 0.80$
	Shear	$c_{cr} = 14d$	$F_{VC} = 1.0$	$c_{min} = 8d$	$F_{VC} = 0.50$

1. Allowable load values found in the performance data tables are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances. Linear interpolation is allowed for intermediate anchor spacing and edge distances between critical and minimum distances. When an anchor is affected by both reduced spacing and edge distance, the spacing and edge reduction factors must be combined (multiplied). Multiple reduction factors for anchor spacing and edge distance may be required depending on the anchor group configuration.

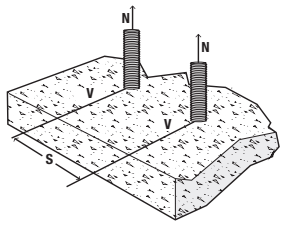
LOAD ADJUSTMENT FACTORS FOR NORMAL-WEIGHT CONCRETE

Spacing, Tension (F_{NS}) & Shear (F_{VS})

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	1.00	0.67	0.67	0.50	-
	3-3/8	1.00	0.75	0.75	0.56	0.50
	4	1.00	0.89	0.89	0.67	0.59
	4-1/2	1.00	1.00	1.00	0.75	0.67
	5	1.00	1.00	1.00	0.83	0.74
	6	1.00	1.00	1.00	1.00	0.89
	6-3/4	1.00	1.00	1.00	1.00	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.

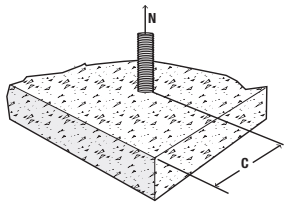


Edge Distance, Tension (F_{NC})

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	1.00	0.96	0.89	0.80	-
	4-3/8	1.00	1.00	0.92	0.83	-
	5	1.00	1.00	0.98	0.87	0.80
	5-1/4	1.00	1.00	1.00	0.88	0.81
	6	1.00	1.00	1.00	0.93	0.85
	7	1.00	1.00	1.00	1.00	0.91
	8	1.00	1.00	1.00	1.00	0.96
	8-3/4	1.00	1.00	1.00	1.00	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.

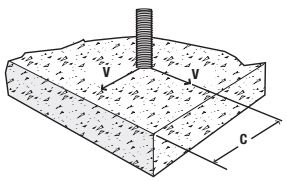


Edge Distance, Shear (F_{VC})

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	1.00	0.90	0.72	0.50	-
	4-3/8	1.00	1.00	0.81	0.56	-
	5	1.00	1.00	0.94	0.67	0.50
	5-1/4	1.00	1.00	1.00	0.71	0.53
	6	1.00	1.00	1.00	0.83	0.63
	7	1.00	1.00	1.00	1.00	0.77
	8	1.00	1.00	1.00	1.00	0.90
	8-3/4	1.00	1.00	1.00	1.00	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.

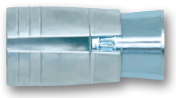
Minimum edge distance (c_{min}) is equal to 8 anchor diameters (8d) at which the anchor achieves 50% of load.



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	300	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	5/16"	1	1
9343	3/8"	1	1
9353	1/2"	1	1
9363	5/8"	1	1

* Hollow set tool for hollow block and clay brick masonry base materials.