GENERAL INFORMATION

STEEL DROPIN™

Internally Threaded Expansion Anchor

PRODUCT DESCRIPTION

The Steel Dropin is an all-steel, machine bolt anchor available in carbon steel and two types of stainless steel. It can be used in solid concrete, hard stone, and solid block base materials. A coil thread version for forming applications is also available.

GENERAL APPLICATIONS AND USES

- Suspending Conduit
- Fire Sprinkler
- Cable Trays and Strut
- Concrete Formwork
- Pipe Supports
- Suspended Lighting

FEATURES AND BENEFITS

+ Internally threaded anchor for easy bolt removability and service work
+ Flanged (lipped) version installs flush for easy inspection and standard embedment
+ Smooth wall dropin can be installed flush mounted or below the base material surface
+ Optionally available with a knurled body
+ Coil thread version accepts coil rod and typically used for concrete formwork applications

TESTING, APPROVALS AND LISTINGS

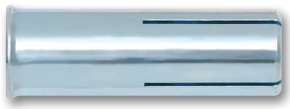
- Tested in accordance with ASTM 488 and AC01 criteria
- Underwriters Laboratory (UL Listed) – File No. EX1289 (N) (see ordering information)
- FM Approvals (Factory Mutual) – File No. 3059197

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors and 05 05 19 - Post-Installed Concrete Anchors. Dropin anchors shall be Steel Dropin as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

SECTION CONTENTS

SMOOTH WALL DROPIN



FLANGE (LIPPED) DROPIN

THREAD VERSION

- UNC Coarse Thread
- Coil Thread

ANCHOR MATERIALS

- Zinc Plated Carbon Steel
- 303 Stainless Steel (Domestic)
- 304 Stainless Steel
- 316 Stainless Steel

ROD/ANCHOR SIZE RANGE (TYP.)

- 1/4" to 3/4" diameter UNC Coarse Thread
- 1/2" and 3/4" diameter Coil Thread

SUITABLE BASE MATERIALS

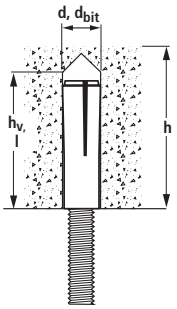
- Normal-weight Concrete
- Lightweight Concrete

MATERIAL SPECIFICATIONS

Anchor Component	Carbon Steel	Type 303 Stainless Steel	Type 316 Stainless Steel
Anchor Body	AISI 1008	Type 303/304 Stainless Steel	Type 316 Stainless Steel
Plug	AISI 1018	Type 303/304 Stainless Steel	Type 316 Stainless Steel
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn 5)	N/A	
Stainless steel anchor components are passivated.			

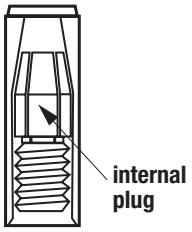
INSTALLATION SPECIFICATIONS

Anchor (Rod) Size	Rod/Anchor Diameter, d						
	1/4"	3/8"	1/2"	1/2" Coil Thread	5/8"	3/4"	3/4" Coil Thread
ANSI Drill Bit Size, d_{bit} (in.)	3/8	1/2	5/8	5/8	7/8	1	1
Maximum Tightening Torque, T_{max} (ft.-lbs.)	5	10	20	20	40	80	80
Thread Size (UNC)	1/4-20	3/8-16	1/2-13	1/2-6	5/8-11	3/4-10	3/4-41/2
Thread Depth (in.)	7/16	5/8	13/16	13/16	1-3/16	1-3/8	1-3/8
Flange Size (in.)	7/16	9/16	45/64	–	–	–	–
Anchor Length l, h_v (in.)	1	1-9/16	2	2	2-1/2	3-3/16	3-3/16



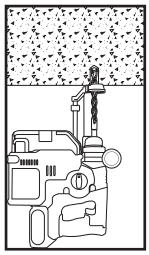
Nomenclature

d = Diameter of anchor
d_{bit} = Diameter of drill bit
h = Base material thickness. The minimum value of h should be 1.5h_v or 3" min. (whichever is greater)
h_v = Minimum embedment depth
l = Overall length of anchor
T_{max} = Maximum tightening torque

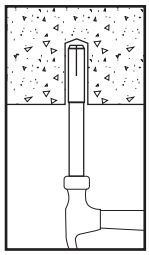


Installation Procedure

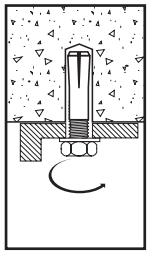
Using the proper drill bit size, drill a hole into the base material to the depth of embedment required. The tolerances of the drill bit used must meet the requirements of ANSI Standard B212.15. Do not over drill the hole unless the application calls for a subset anchor.



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. Insert the anchor into the hole and tap flush with surface. Using a DEWALT setting tool specifically, set the anchor by driving the tool with a sufficient number of hammer blows until the shoulder of the tool is seated against the anchor. Anchor will not hold allowable loads required if shoulder of DEWALT setting tool does not seat against anchor.



If using a fixture, position it, insert bolt and tighten. Most overhead applications utilize threaded rod. Minimum thread engagement should be at least one anchor diameter.



PERFORMANCE DATA

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

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth in. (mm)	Tension						Shear	
		2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)		f'c ≥ 2000 psi (20.7 MPa)	
		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)	1 (25.4)	1,140 (5.1)	285 (1.3)	1,985 (8.9)	495 (2.2)	2,080 (9.4)	520 (2.3)	2,120 (9.5)	530 (2.4)
3/8 (9.5)	1-9/16 (39.7)	2,180 (9.8)	545 (2.5)	4,180 (18.8)	1,045 (4.7)	4,950 (22.3)	1,240 (5.6)	4,585 (20.6)	1,145 (5.2)
1/2 (12.7)	2 (50.8)	4,105 (18.5)	1,025 (4.6)	5,760 (25.9)	1,440 (6.5)	6,585 (29.6)	1,645 (7.4)	6,400 (28.8)	1,600 (7.2)
5/8 (15.9)	2-1/2 (63.5)	4,665 (21.0)	1,165 (5.2)	7,440 (33.5)	1,860 (8.4)	10,920 (49.1)	2,730 (12.3)	12,380 (55.7)	3,095 (13.9)
3/4 (19.1)	3-3/16 (81.0)	8,580 (38.6)	2,145 (9.7)	9,405 (41.8)	2,350 (10.5)	11,300 (50.3)	2,825 (12.6)	15,680 (70.6)	3,920 (17.6)

1. Tabulated load values are applicable to carbon and stainless steel anchors.
2. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
3. Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load.

Ultimate and Allowable Load Capacities for Steel Dropin in Lightweight Concrete[1,2,3,4]

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth in. (mm)	Tension						Shear	
		2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)		f'c ≥ 2000 psi (20.7 MPa)	
		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)	1 (25.4)	1,060 (4.8)	265 (1.2)	1,360 (6.1)	340 (1.5)	1,660 (7.5)	415 (1.9)	1,920 (8.6)	480 (2.2)
3/8 (9.5)	1-9/16 (39.7)	3,040 (13.7)	760 (3.4)	3,780 (17.0)	945 (4.3)	4,520 (20.3)	1,130 (5.1)	4,120 (18.5)	1,030 (4.6)
1/2 (12.7)	2 (50.8)	4,240 (19.1)	1,060 (4.8)	4,840 (21.8)	1,210 (5.4)	5,460 (24.6)	1,365 (6.1)	5,680 (25.6)	1,420 (6.4)
5/8 (15.9)	2-1/2 (63.5)	6,860 (30.9)	1,715 (7.7)	7,840 (35.3)	1,960 (8.8)	8,840 (39.8)	2,210 (9.9)	9,640 (43.4)	2,410 (10.8)
3/4 (19.1)	3-3/16 (81.0)	10,280 (45.7)	2,570 (11.4)	11,700 (52.7)	2,925 (13.0)	13,120 (59.0)	3,280 (14.6)	15,680 (70.6)	3,920 (17.9)

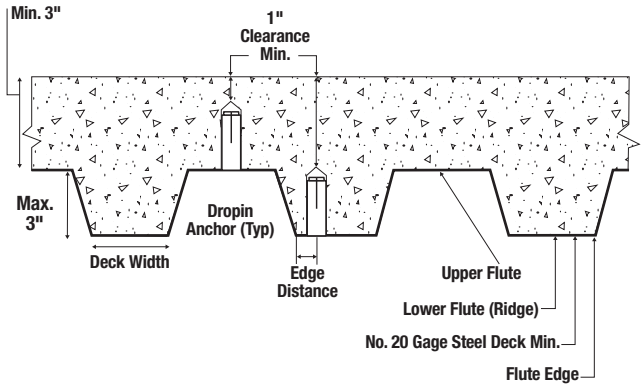
1. Tabulated load values are applicable to carbon and stainless steel anchors.
2. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
3. Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load.
4. Allowable load capacities are multiplied by reduction factors found in the Design Criteria section when anchor spacing or edge distances are less than critical distances.

Allowable Load Capacities for Steel Dropin in Lightweight Concrete over Steel Deck[1,2,3,4]

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Lightweight Concrete over Steel Deck, f'c ≥ 3,000 (20.7 MPa)							
		Minimum 1-1/2" Wide Deck				Minimum 4-1/2" Wide Deck			
		Ultimate Load		Allowable Load		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 (25.4)	400 (1.8)	2,040 (9.2)	100 (0.4)	510 (2.3)	760 (3.4)	2,040 (9.2)	190 (0.8)	510 (2.3)
3/8 (9.5)	1-9/16 (39.7)	600 (2.7)	2,760 (12.3)	150 (0.7)	690 (3.1)	960 (4.3)	2,760 (12.3)	240 (1.1)	690 (3.1)
1/2 (12.7)	2 (50.8)	-	-	-	-	2,740 (12.3)	5,560 (25.0)	685 (3.1)	1,390 (6.3)

1. Tabulated load values are for carbon steel and stainless steel anchors installed in sand-lightweight concrete over steel deck. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Allowable load capacities listed are calculated using and applied safety factor of 4.0.
3. Tabulated load values are for anchors installed in the center of the flute. Spacing distances shall be in accordance with the spacing table for lightweight concrete listed in the Design Criteria.
4. Flute edge distance equals one-half the minimum deck width.
5. Anchors are permitted to be installed in the lower or upper flute of the metal deck provided the proper installation procedures are maintained.

SAND-LIGHTWEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE OVER STEEL DECK (MINIMUM 3,000 PSI)



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	$c_{cr} = 14d$	$F_{NC} = 1.0$	$c_{min} = 7d$	$F_{NC} = 0.90$
	Shear	$c_{cr} = 14d$	$F_{VC} = 1.0$	$c_{min} = 7d$	$F_{VC} = 0.50$

Anchor Installed in Lightweight 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	$c_{cr} = 14d$	$F_{NC} = 1.0$	$c_{min} = 7d$	$F_{NC} = 0.80$
	Shear	$c_{cr} = 14d$	$F_{VC} = 1.0$	$c_{min} = 7d$	$F_{VC} = 0.50$

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.

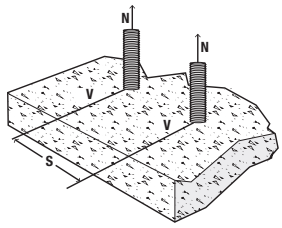
LOAD ADJUSTMENT FACTORS FOR NORMAL-WEIGHT AND LIGHTWEIGHT CONCRETE

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

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
h_v (in.)		1	1-1/2	2	2-1/2	3
s_{cr} (in.)		3	4-1/2	6	7-1/2	9
s_{min} (in.)		1-1/2	2-1/4	3	3-3/4	4-1/2
Spacing Distance (inches)	1-1/2	0.50	-	-	-	-
	2-1/4	0.75	0.50	-	-	-
	3	1.00	0.67	0.50	-	-
	3-3/4	1.00	0.83	0.63	0.50	-
	4	1.00	0.89	0.67	0.53	-
	4-1/2	1.00	1.00	0.75	0.60	0.50
	5	1.00	1.00	0.83	0.67	0.56
	6	1.00	1.00	1.00	0.80	0.67
	7-1/2	1.00	1.00	1.00	1.00	0.83
	9	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}) (Normal-Weight concrete only)

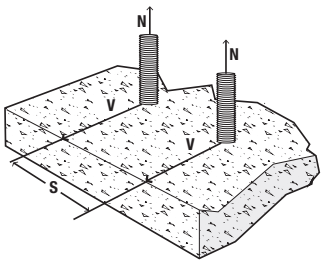
Dia. (in.)		1/4	3/8	1/2	5/8	3/4
c_{cr} (in.)		3-1/2	5-1/4	7	8-3/4	10-1/2
c_{min} (in.)		1-3/4	2-5/8	3-1/2	4-3/8	5-1/4
Edge Distance, c (inches)	1-3/4	0.90	-	-	-	-
	2	0.91	-	-	-	-
	2-5/8	0.95	0.90	-	-	-
	3	0.97	0.91	-	-	-
	3-1/2	1.00	0.93	0.90	-	-
	4-3/8	1.00	0.97	0.93	0.90	-
	5-1/4	1.00	1.00	0.95	0.92	0.90
	6	1.00	1.00	0.97	0.94	0.91
	7	1.00	1.00	1.00	0.96	0.93
	8	1.00	1.00	1.00	0.98	0.95
	8-3/4	1.00	1.00	1.00	1.00	0.97
	10-1/2	1.00	1.00	1.00	1.00	1.00

Notes: For anchors loaded in tension, the critical edge (c_{cr}) is equal to 14 anchors diameters (14d) at which the anchor achieves 100% of load.

Minimum edge distance (c_{min}) is equal to 7 anchor diameters (7d) at which the anchor achieves 90% of load for normal-weight concrete and 80% of load for light-weight concrete.

Edge Distance, Tension (F_{NC}) (Lightweight concrete only)

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
c_{cr} (in.)		3-1/2	5-1/4	7	8-3/4	10-1/2
c_{min} (in.)		1-3/4	2-5/8	3-1/2	4-3/8	5-1/4
Edge Distance, c (inches)	1-3/4	0.80	-	-	-	-
	2	0.83	-	-	-	-
	2-5/8	0.90	0.80	-	-	-
	3	0.94	0.83	-	-	-
	3-1/2	1.00	0.87	0.80	-	-
	4-3/8	1.00	0.93	0.85	0.80	-
	5-1/4	1.00	1.00	0.90	0.84	0.80
	6	1.00	1.00	0.94	0.87	0.83
	7	1.00	1.00	1.00	0.92	0.87
	8	1.00	1.00	1.00	0.97	0.90
	8-3/4	1.00	1.00	1.00	1.00	0.93
	10-1/2	1.00	1.00	1.00	1.00	1.00

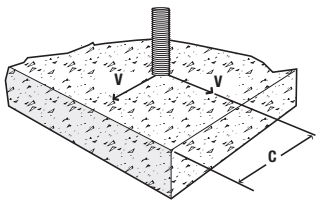


Edge Distance, Shear (F_{VC})

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
c_{cr} (in.)		3-1/2	5-1/4	7	8-3/4	10-1/2
c_{min} (in.)		1-3/4	2-5/8	3-1/2	4-3/8	5-1/4
Edge Distance, c (inches)	1-3/4	0.50	-	-	-	-
	2	0.57	-	-	-	-
	2-5/8	0.75	0.50	-	-	-
	3	0.86	0.57	-	-	-
	3-1/2	1.00	0.67	0.50	-	-
	4-3/8	1.00	0.83	0.63	0.50	-
	5	1.00	0.95	0.71	0.57	-
	5-1/4	1.00	1.00	0.75	0.60	0.50
	6	1.00	1.00	0.86	0.69	0.57
	7	1.00	1.00	1.00	0.80	0.67
	8	1.00	1.00	1.00	0.91	0.76
	8-3/4	1.00	1.00	1.00	1.00	0.83
	10	1.00	1.00	1.00	1.00	0.95
	10-1/2	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 7 anchor diameters (7d) at which the anchor achieves 50% of load.



ORDERING INFORMATION

Carbon Steel Smooth Wall Dropin

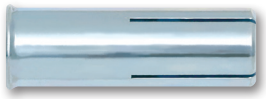
Cat. No.	Domestic Cat. No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6304	6304USA	1/4"	1"	7/16"	100	1000	2
6306	6306USA	3/8"	1-9/16"	5/8"	50	500	6
6308	6308USA	1/2"	2"	13/16"	50	250	12
6320	6320USA	5/8"	2-1/2"	1-3/16"	25	125	32
6312	6312USA	3/4"	3-13/16"	1-3/8"	10	50	48

Carbon Steel Knurled Wall Dropin

Cat. No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6340	1/4"	1"	7/16"	100	1,000	2
6342	3/8"	1-9/16"	5/8"	50	500	6
6344	1/2"	2"	13/16"	50	250	12

Carbon Steel Flanged Dropin (Lipped)

Cat. No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6324	1/4"	1"	7/16"	100	1,000	2
6326	3/8"	1-9/16"	5/8"	50	500	6
6328	1/2"	2"	13/16"	50	300	12

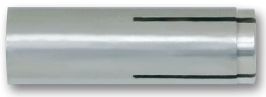


Type 300 Series Stainless Steel Dropin

Cat. No. (Type 304)	Domestic Cat. No. (Type 303)	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6204	6204USA	1/4"	1"	7/16"	100	1000	2
6206	6206USA	3/8"	1-9/16"	5/8"	50	500	6
6208	6208USA	1/2"	2"	13/16"	50	250	12
6210	6210USA	5/8"	2-1/2"	1-3/16"	25	125	32
6212	6212USA	3/4"	3-13/16"	1-3/8"	10	50	48

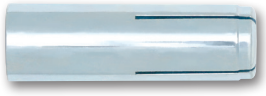
Type 316 Stainless Steel Dropin

Cat. No.	Domestic Cat. No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6224	6224USA	1/4"	1"	7/16"	100	1000	2
6226	6226USA	3/8"	1-9/16"	5/8"	50	500	6
6228	6228USA	1/2"	2"	13/16"	50	250	12
6230	6230USA	5/8"	2-1/2"	1-3/16"	25	125	32
6232	6232USA	3/4"	3-13/16"	1-3/8"	10	50	48



Carbon Steel Coil Thread Dropin

Cat. No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100
6330	1/2"	2"	13/16"	50	300	12
6332	3/4"	3-3/16"	1-3/8"	10	50	48



Setting Tools for Steel Dropin

Cat. No.	6305	6307	6309	6311	6313
Rod/Anchor Size	1/4"	3/8"	1/2"	5/8"	3/4"
Pin Length	39/64"	61/64"	1-3/16"	1-5/16"	1-61/64"

Accu-Bit™ Drill Stop for Steel Dropin

Cat. No.	Rod/Anchor Size	Drill Depth	Std. Box
DWA5493	1/2" Accu-Bit for 3/8" Steel Dropin	1-13/16"	1
DWA5495	5/8" Accu-Bit for 1/2" Steel Dropin	2-3/8"	1