

POWER-Drop™ Drop-In Anchors

wej-it

HIGH-PERFORMANCE ANCHORS

This is the anchor that was used for the top plate connection in the May 19, 2015 test. The product data indicates that it was an ultimate shear capacity of 26.4 kips. This is greater than the 1" dia. wedge anchor that was used at the Bent Plate Anchor Bracket, which has an advertised ultimate shear capacity of 21.1 kips. Therefore, this anchor may be used in either location. No other 1" nominal dia. drop-in anchors were found. Other manufacturers make 3/4" nominal dia. drop-in anchors, but they all have significantly less capacity.

The safety shoulder supports the clip when the anchor is under strain to eliminate bolt-end collapse and/or clip slippage under ultimate loading conditions. These seismic rated drop-in anchors may be used with machine screws, tamper-proof bolts, threaded rod and other male-threaded fasteners 3/8" – 1" in diameter.



Key Features & Benefits

- ▶ Internally threaded anchor
- ▶ **Wedge anchor performance** with the convenience of a drop-in
- ▶ Safety shoulder
 - Supports clip when anchor is under strain to eliminate bolt-end collapse and/or clip slippage under ultimate loading conditions
- ▶ Seismic rated
 - Allowable values may be increased 33.3% for short-term loading in resisting earthquake or wind loads
- ▶ Numerous head style options
 - May be used with machine screws, tamper-proof bolts, threaded rod and a variety of other male-threaded fasteners
- ▶ Available in a variety of sizes

Specifications, Listings and Approvals

Anchor Thread Diameters: 3/8" – 1"

Material: Carbon steel

Finish: Zinc Plating ASTM B633, Type III, SC1

Approvals:

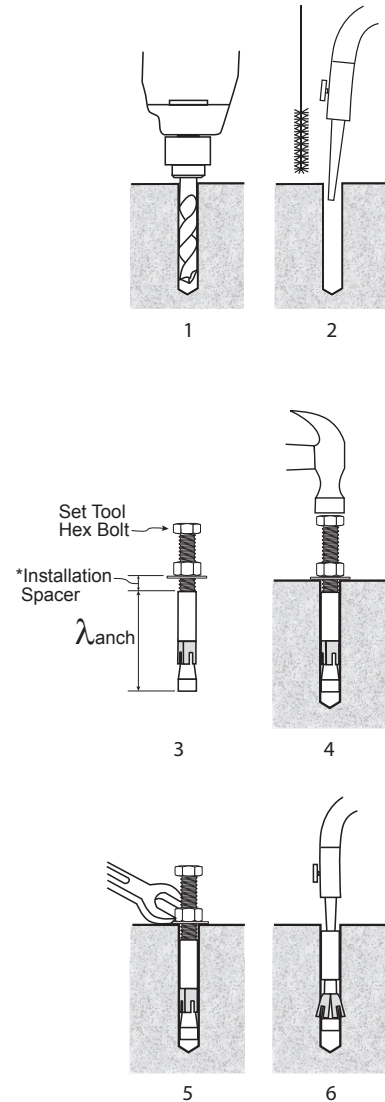
- 2000 International Building Code (IBC)
- 2000 International Residential Code (IRC)
- 1997 Uniform Building Code (UBC)
- Data Test in accordance with ICC-ES Criteria for Expansion Anchors in Concrete and Masonry Elements (ACOI) dated April 2002
- Formerly ICC-ES Legacy Report #5063

Installation Information

Instructions

1. Drill the hole perpendicular to the work surface. Do not ream the hole or allow the drill to wobble. Drill the hole to the proper minimum hole depth as shown in the Installation Data table below.
2. Thoroughly clean hole using compressed air and a nylon brush. An unclean hole may compromise anchor performance.
3. Set the anchor embedment depth: Fully thread the Setting Tool (sacrificial hex bolt) with assembled nut and washer into the anchor. Set the distance between the top of the anchor and the bottom of the nut to the correct ***Installation Spacer**.
4. After setting the *Installation Spacer, place the anchor into the hole and hammer downward on the setting tool until the nut and washer makes contact with the surface of the concrete.
5. To set the anchor tighten the nut while holding the bolt head (to assure the anchor does not spin in place). Review table below for recommended installation torque/ installation turns. **Do not** use an impact wrench for this step.
6. Once the anchor is set remove the cap screw and clear the anchor with compressed air to remove any concrete dust from the threads.

NOTE: Always wear safety glasses. Follow drill manufacturer's instructions. Use only solid carbide-tipped drill bits meeting ANSI B212.15 diameter standards.



Installation Data

Catalog Number	Drill Bit Dia. (in.)	Min. Hole Depth (in.)	Embed. Depth (in.)	*Installation Spacer	Installation Torque Approx. (ft.-lbs.)	Installation Turns
PD38	1/2	3	2-5/8	5/16	25	2-1/2
PD12	5/8	4	3-15/32	3/8	55	2-1/2
PD58	7/8	5	4-5/16	5/8	90	3
PD34	1	5-3/4	5-1/4	5/8	175	4
PD1	1-1/4	6-1/2	5-3/4	3/4	290	3

Anchor Data

Catalog Number	Thread Size (UNC)	Anchor Dimensions (in.)	Thread Depth (in.)
PD38	3/8-16	1/2 x 2-5/16	1-1/16
PD12	1/2-13	5/8 x 3-3/32	1-1/2
PD58	5/8-11	7/8 x 3-13/16	1-1/2
PD34	3/4-10	1 x 4-5/8	1-23/32
PD1	1-8	1-1/4 x 5	1-1/2

Performance Data

Ultimate and Allowable Loads (lbs.) – Normal-Weight Concrete

Catalog No.	Thread Size (UNC)	3,000 psi				4,000 psi			
		Allowable		Ultimate		Allowable		Ultimate	
		Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
PD38	3/8 - 16	720	1050	2880	4200	1603	1050	6410	4200
PD12	1/2 - 13	1010	1830	4040	7320	2588	1835	10350	7340
PD58	5/8 - 11	2220	2970	8880	11880	4125	2970	16500	11880
PD34	3/4 - 10	2330	3340	9320	13360	5353	3340	21410	13360
PD1	1 - 8	3660	6610	14640	26440	6188	6610	24750	26440

Load Adjustment Factors

Recommended Spacing and Edge Distance Requirements

Catalog No.	Thread Size (UNC)	Min. Edge Distance (in.)	Tension Load Factor for Min. Edge Distance	Shear Load Factor for Min. Edge	Min. Spacing Distance (in.)	Tension Load Factor for Min. Spacing	Shear Load Factor for Min. Spacing
PD38	3/8-16	2-5/8	0.7	0.5	2-5/8	0.5	0.4
PD12	1/2-13	3-1/2	0.7	0.5	3-1/2	0.5	0.4
PD58	5/8-11	4-3/8	0.7	0.5	4-3/8	0.5	0.4
PD34	3/4-10	5-1/4	0.7	0.5	5-1/4	0.5	0.4
PD1	1-8	5-3/4	0.7	0.5	5-3/4	0.35	0.4

POWER-Drop™ Drop-In Anchors



Order Information



POWER-Drop Anchors

Catalog Number	Thread Size (UNC)	Anchor Dimensions (in.)	Thread Depth (in.)	Box Quantity	Carton Quantity
PD38	3/8-16	1/2 x 2-5/16	1-1/16	25	200
PD12	1/2-13	5/8 x 3-3/32	1-1/2	10	80
PD58	5/8-11	7/8 x 3-13/16	1-1/2	5	30
PD34	3/4-10	1 x 4-5/8	1-23/32	5	30
PD1	1-8	1-1/4 x 5	1-1/2	5	30

* One setting tool included per box of anchors

Setting Tools*

Catalog Number	Thread Size (UNC)	Tool Dimension (in.)
PDST38	3/8-16	3/8 x 3
PDST12	1/2-13	1/2 x 3-1/2
PDST58	5/8-11	5/8 x 4
PDST34	3/4-10	3/4 x 4-1/2
PDST1	1-8	1 x 4-1/2

For more information, please contact:

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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)

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 Powers Fasteners, Inc., Brewster, NY.

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SMOOTH WALL DROPIN



FLANGE (LIPPED) DROPIN

THREAD VERSION

- UNC Coarse Thread
- Coil Thread

ANCHOR MATERIALS

- Zinc Plated Carbon Steel
- 303 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

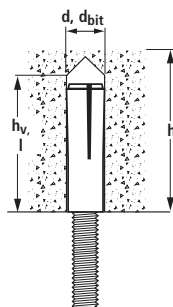
- Normal-weight Concrete
- Lightweight Concrete

MATERIAL SPECIFICATIONS

Anchor Component	Carbon Steel	Type 303 Stainless Steel	Type 316 Stainless Steel
Anchor Body	AISI 1008	Type 303 Stainless Steel	Type 316 Stainless Steel
Plug	AISI 1018	Type 303 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	3/4-4 1/2
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

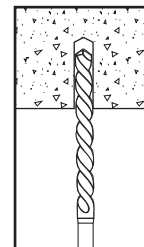
- d = Diameter of anchor
- d_{bit} = Diameter of drill bit
- h = Base material thickness. The minimum value of h should be $1.5h_v$ or 3" min. (whichever is greater)
- h_v = Minimum embedment depth
- l = Overall length of anchor
- T_{max} = Maximum tightening torque



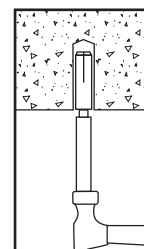
internal
plug

Installation Procedure

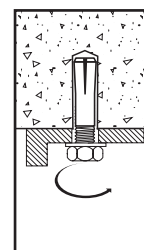
Drill a hole into the base material to the depth of embedment required. The tolerances of the drill bit used must meet the requirements of ANSI Standard B212.15. Do not over drill the hole unless the application calls for a subset anchor.



Blow the hole clean of dust and other materials. Insert the anchor into the hole and tap flush with surface. Using a Powers 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 Powers 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.

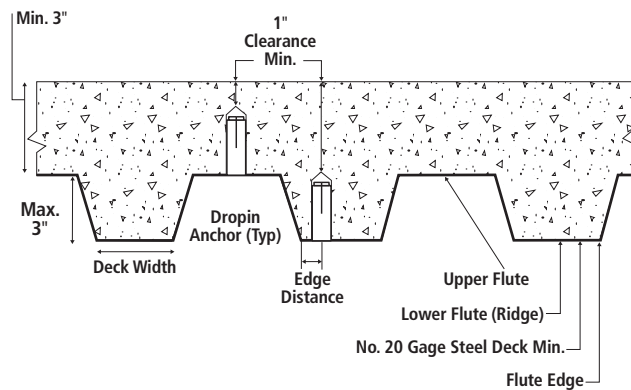
2. Allowable load capacities listed are calculated using and applied safety factor of 4.0.

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:

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

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 (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.

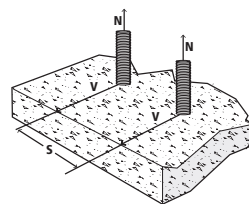
LOAD ADJUSTMENT FACTORS FOR NORMAL-WEIGHT AND LIGHTWEIGHT CONCRETE

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		0.83	0.63	
	4		0.89	0.67	
	4-1/2		1.00	0.75	0.50
	5			0.83	0.56
	6			0.80	0.67
	7-1/2			1.00	0.83
	9				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.

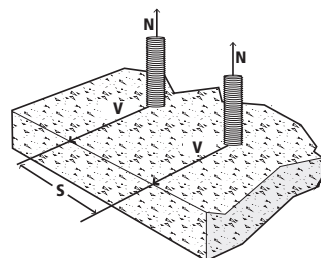
Minimum spacing (s_{min}) is equal to 1.5 embedment depths ($1.5h_v$) at which the anchor achieves 50% of load.

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		0.97	0.93	
	5-1/4		0.95	0.92	0.90
	6		0.97	0.94	0.91
	7		1.00	0.96	0.93
	8			0.98	0.95
	8-3/4			1.00	0.97
	10-1/2				1.00

Notes: For anchors loaded in tension, the critical edge (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 90% of load for normal-weight concrete and 80% of load for light-weight concrete.

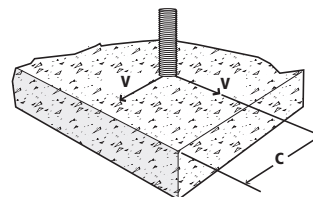
Edge Distance, Tension (F_{NC}) (Lightweight concrete only)

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		0.93	0.85	0.80
	5-1/4		1.00	0.90	0.84
	6			0.94	0.87
	7		1.00	0.92	0.87
	8			0.97	0.90
	8-3/4			1.00	0.93
	10-1/2				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		0.83	0.63	0.50
	5		0.95	0.71	0.57
	5-1/4		1.00	0.75	0.60
	6			0.86	0.69
	7		1.00	0.80	0.67
	8			0.91	0.76
	8-3/4			1.00	0.83
	10				0.95
	10-1/2				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.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100	UL
6304	1/4"	1"	7/16"	100	1,000	2	-
6306	3/8"	1-9/16"	5/8"	50	500	6	UL
6308	1/2"	2"	13/16"	50	300	12	UL
6320	5/8"	2-1/2"	1-3/16"	25	125	32	UL
6312	3/4"	3-3/16"	1-3/8"	10	50	48	UL



Carbon Steel Knurled Wall Dropin

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



Type 303 Stainless Steel Dropin

Cat.No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100	UL
6204	1/4"	1"	7/16"	100	1,000	2	-
6206	3/8"	1-9/16"	5/8"	50	500	6	UL
6208	1/2"	2"	13/16"	50	300	12	UL
6210	5/8"	2-1/2"	1-3/16"	25	125	32	UL
6212	3/4"	3-3/16"	1-3/8"	10	50	48	UL



Type 316 Stainless Steel Dropin

Cat.No.	Rod/Anchor Size	Overall Length	Thread Depth	Std. Box	Std. Carton	Wt./100	UL
6224	1/4"	1"	7/16"	100	1,000	2	-
6226	3/8"	1-9/16"	5/8"	50	500	6	UL
6228	1/2"	2"	13/16"	50	300	12	UL
6230	5/8"	2-1/2"	1-3/16"	25	125	32	UL
6232	3/4"	3-3/16"	1-3/8"	10	50	48	UL



Carbon Steel Coil Thread Dropin

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








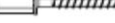

















Setting Tools for Steel Dropin

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"



Anchor Selection Guide

		Approvals						Head type				Corrosion resistance ¹				Size ²	
		ICC-ES	ACI 355.2	FM	UL	COLA	Florida Building Code High Velocity Hurricane Zone	Stud (Externally threaded)	Flush (Internally threaded)	Hex bolt	Round / mushroom	Electro / mechanically zinc plated	Hot dip galvanized	Sheradized carbon steel	Stainless steel	Minimum size (diameter)	Maximum size (diameter)
HDA Undercut Anchor		AC193	■			■		■				■		■	316	M10	M20
HSL-3 Heavy duty Expansion Anchor		AC193	■			■		■	■	■		■				M8	M24
HSL-GR Heavy duty Expansion Anchor								■	■			■			316	M10	M20
HSL-I Internally Threaded Exp. Anchor								■	■			■				M12	M12
KWIK Bolt TZ Expansion Anchor		AC01 AC193	■	■	■	■		■				■			304/ 316	3/8"	3/4"
KWIK HUS-EZ Screw Anchor		AC193 AC106	■			■	■			■		■				1/4"	3/4"
KWIK HUS-EZ I Screw Anchor w/coupler		AC193	■	■		■	■		■ ⁷			■				1/4"	3/8"
KWIK Bolt 3 Expansion Anchor		AC01 AC193	■	■	■	■	■	■				■	■		304/ 316	1/4"	1"
KWIK HUS Screw Anchor			■							■		■				3/8"	3/4"
KB-VTZ Expansion Anchor		AC193	■	■	■	■		■				■				3/8"	3/4"
KBV Expansion Anchor					■			■				■				1/4"	3/4"
HCA Coil Anchor										■		■				1/4"	3/4"
HDI+/HDI-L+/HDI/HDI-L Drop-In Anchor				■	■				■			■			303	1/4"	3/4"
HDV Drop-In Anchor				■	■				■			■			303	1/4"	1/2"
HDI-P Drop-In Anchor				■					■			■				3/8"	3/8"
KCS-WF/MD Cast-In Anchor		AC446		■	■	■			■			■				1/4"	3/4"
HLC Sleeve Anchor					■						■	■			304	1/4"	3/4"
KWIK CON II+ Screw Anchor							■					■			410	3/16"	1/4"
Metal HIT Anchor												■			304	3/16"	1/4"
HPS-1 Impact Anchor												■			304	3/16"	5/16"
HTB TOGGLER® Bolt												■				3/16"	1/2"
HLD KWIK-Tog																#8	#10
IDP Insulation Anchor																	

■ Suitable. Technical data is available for this application. Refer to related sections within this technical guide.

□ May be suitable. Anchor system may function properly for this application. However, no substantiating data is available.

* No diamond cored holes

1 Refer to Section 2.3 for a more detailed discussion on corrosion and corrosion resistance.

2 Listed diameters are those with published load data.

Multi-Set II® Drop-In Anchors

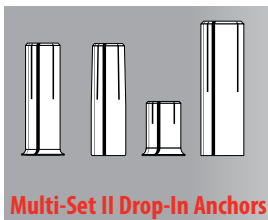
Internally Threaded Heavy- Duty Anchoring Systems

DESCRIPTION/SUGGESTED SPECIFICATIONS

Drop-In, Shell-Type Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Drop-In, shell-type anchors feature an internally threaded, all-steel shell with expansion cone insert and flush embedment lip. Anchors are manufactured from zinc-plated carbon steel, 18-8 stainless steel and 316 stainless steel.



Multi-Set II Drop-In Anchors

Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994 specifications.

Anchors should be tested to ASTM E488 criteria and listed by ICC-ES. Anchors should also be listed by the following agencies as required by the local building code: UL, FM, City of Los Angeles, California State Fire Marshal and Caltrans.

ADVANTAGES

Depth Charge Stop Drill and RX Drop-In Anchors

Ideal for Hollow-Core, Pre-Cast Plank and Post Tension Slabs



- Optimized for use in hollow-core, pre-cast plank and post-tension slabs
- Lip keeps anchor flush during installation
- Shallow drilling—fast installation



RX Drop-In
Anchor



See page 81 for kits

RM Drop-In Anchor



- Lipped anchor body keeps anchor flush
- Easy installation
- Keeps all rods same length
- Easy inspection
- Available in carbon steel, 18-8 and 316 stainless steel

RL Drop-In Anchor



- Below surface setting for easy patch work

Coil Thread Anchor



- Quick thread attachment—ideal for 1 sided forming
- Use coil rod on job
- 2 diameters (1/2" and 3/4")

APPLICATIONS



Pumps and heavy piping are common applications for larger diameter Multi-Set Drop-In Anchors.

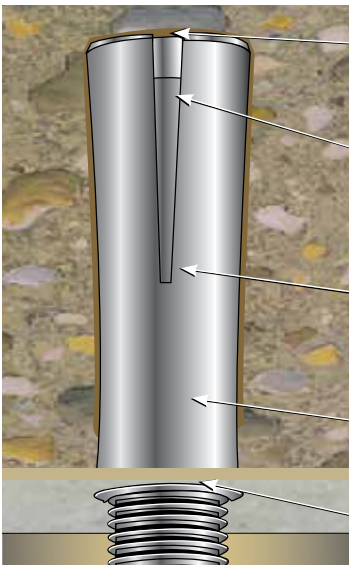


Cable tray and strut suspended from concrete ceilings are ideal Multi-Set applications. In post-tension or hollow-core slabs use the RX-38.



The Multi-Set Anchor is the standard for pipe-hanging. The RM version has a retainer lip to keep all anchors flush at the surface, keeping all your threaded rod the same length.

FEATURES



Expander Slots—allow for easy setting and superior performance

Cone Insert—that expands the anchor when driven with setting tool and hammer

Body—available in zinc-plated steel, 18-8 stainless steel, and 316 stainless steel

Easy Depth Inspection—keeps threaded rod drop lengths consistent

Retainer Lip—to keep anchor flush with surface

For use with threaded rods or headed bolts (supplied by contractor)

SELECTION CHART

Multi-Set II Depth Charge Bits

PART NUMBER	DESCRIPTION FEATURE BENEFITS	DRILLING DEPTH
DCX-138	3/8" Depth Charge Stop Drill	3/4"
DCX-112	1/2" Depth Charge Stop Drill	1"

APPROVALS/LISTINGS

Meets or exceeds U.S. Government G.S.A. Specification A-A-55614 Type 1 (Formerly GSA: FF-S-325 Group VIII)

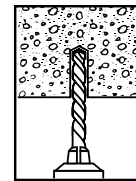
Underwriters Laboratories

Factory Mutual

Caltrans

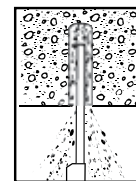
For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

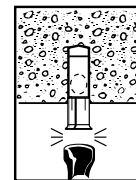


To set anchor flush with surface:

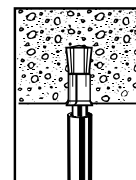
1. Drill hole to required embedment (see Table on page 69).



2. Clean hole with pressurized air.



3. Drive anchor flush with surface of concrete.



4. Expand anchor with setting tool provided (see chart on page 69). Anchor is properly expanded when shoulder of setting tool is flush with top of anchor.



■ Shoulder prevents over drilling. Less likely to hit reinforcing steel or post-tension cable in concrete



■ No wasted time or energy drilling deeper than necessary
■ Prevents anchor from dropping too far into hole below work surface


SELECTION CHARTS

Multi-Set II Drop-In Anchors

PART NUMBER RT-138
1 setting tool per master carton
(See above for part numbers.)

PART NUMBER RTX-138
For use with RX-38 only.

PART NUMBER RTX-112
For use with RX-12 only.

USER TYPE / APPLICATION	BASE MATERIAL	CORROSION RESISTANCE LEVEL	DROP-IN ANCHOR TYPE	PART NUMBER	SETTING TOOL PART NUMBER*	BOLT SIZE-THREADS PER INCH	DRILL BIT DIA. In. (mm)	THREAD DEPTH In. (mm)	EMBEDMENT MIN. HOLE DEPTH*** In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CTN lbs. *
	Solid concrete/lightweight fill deck	Low	RM	RM-14	RT-114	1/4" - 20	3/8 (9.5)	3/8 (9.5)	1 (25.4)	100/ 2.6	1000/ 28
				RM-38	RT-138	3/8" - 16	1/2 (12.7)	1/2 (12.7)	1-5/8 (41.3)	50/ 3.4	500/ 36
				RM-12	RT-112	1/2" - 13	5/8 (15.9)	3/4 (19.1)	2 (50.8)	50/ 5.8	400/ 49
				RM-58	RT-158	5/8" - 11	7/8 (22.2)	1 (25.4)	2-1/2 (63.5)	25/ 7.8	125/ 41
				RM-34	RT-134	3/4" - 10	1 (25.4)	1-1/4 (31.8)	3-3/16 (81.0)	25/11.9	100/ 49
	Hollow-core pre-cast or Post-tension	Low	RX	RX-38	RTX-138	3/8" - 16	1/2 (12.7)	3/8 (9.5)	3/4 (19.1)	100/ 3.5	1000/ 36
				RX-12	RTX-112	1/2" - 13	5/8 (15.9)	1/2 (12.7)	1 (25.4)	50/ 3.0	500/ 31
	Solid concrete/lightweight fill deck	Medium	SRM** 18-8 S.S.	SRM-14	RT-114	1/4" - 20	3/8 (9.5)	3/8 (9.5)	1 (25.4)	100/ 2.7	1000/ 28
				SRM-38	RT-138	3/8" - 16	1/2 (12.7)	1/2 (12.7)	1-5/8 (41.3)	50/ 3.4	500/ 36
				SRM-12	RT-112	1/2" - 13	5/8 (15.9)	3/4 (19.1)	2 (50.8)	50/ 6.0	400/ 50
				SRM-58	RT-158	5/8" - 11	7/8 (22.2)	1 (25.4)	2-1/2 (63.5)	25/ 7.9	125/ 42
	Solid concrete	High 316 S.S.	SSRM**	SSRM-12	RT-112	1/2" - 13	5/8 (15.9)	3/4 (19.1)	2 (50.8)	50/ 6.0	400/ 50
Concrete Contractor, General Contractor, Highway	Solid concrete	Low	CL-Coil Threaded	CL-12	RT-112	1/2" - 6	5/8 (15.9)	3/4 (19.1)	2 (50.8)	50/ 5.7	400/ 47
				CL-34	RT-134	3/4" - 4.5	1 (25.4)	1-1/4 (31.8)	3-3/16 (81.0)	25/11.9	100/ 49
Concrete Cutting/Sawing Contractor/Misc. Metal	Solid concrete/lightweight fill deck	Low	RL (w/o lip)	RL-14	RT-114	1/4" - 20	3/8 (9.5)	3/8 (9.5)	1 (25.4)	100/ 2.6	1000/ 28
				RL-38	RT-138	3/8" - 16	1/2 (12.7)	1/2 (12.7)	1-5/8 (41.3)	50/ 3.4	500/ 36
				RL-12	RT-112	1/2" - 13	5/8 (15.9)	3/4 (19.1)	2 (50.8)	50/ 5.8	400/ 49
				RL-58	RT-158	5/8" - 11	7/8 (22.2)	1 (25.4)	2-1/2 (63.5)	25/ 7.8	125/ 41
				RL-34	RT-134	3/4" - 10	1 (25.4)	1-1/4 (31.8)	3-3/16 (81.0)	25/11.9	100/ 49

* 1 setting tool per master carton.

** For continuous extreme low temperature, use stainless steel.

***Embedment is equal to overall length of Drop-In Anchor

Multi-Set II RX Drop-In Kits

Part No.	Description
RX-38	3/8" drop-in using 1/2" drill bit
RTX-138	Setting Tool
DCX-138	Depth Charge Stop Drill

Part No.	Description
RX-12	1/2" drop-in using 5/8" drill bit
RTX-112	Setting Tool
DCX-112	Depth Charge Stop Drill

PERFORMANCE TABLE

Multi-Set II Drop-In Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	TENSION Lbs. (kN)			SHEAR Lbs. (kN)
				$f'_c = 2000 \text{ PSI}$ (13.8 MPa)	$f'_c = 4000 \text{ PSI}$ (27.6 MPa)	$f'_c = 6000 \text{ PSI}$ (41.4 MPa)	$f'_c > 2000 \text{ PSI}$ (13.8 MPa)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1,680 (7.5)	2,360 (10.5)	2,980 (13.3)	1,080 (4.8)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2,980 (13.3)	3,800 (16.9)	6,240 (27.8)	3,160 (14.1)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3,300 (14.7)	5,840 (26.0)	8,300 (36.9)	4,580 (20.4)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		5,500 (24.5)	8,640 (38.4)	11,020 (49.0)	7,440 (33.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		8,280 (36.8)	9,480 (42.2)	12,260 (54.5)	10,480 (46.6)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

* For continuous extreme low temperature applications, use stainless steel.

Multi-Set II Drop-In Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Lightweight Concrete*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	LIGHTWEIGHT CONCRETE $f'_c = 3000 \text{ PSI}$ (20.7 MPa)		LOWER FLUTE OF STEEL DECK WITH LIGHTWEIGHT CONCRETE FILL $f'_c = 3000 \text{ PSI}$ (20.7 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	1-5/8 (39.7)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	2,035 (9.1)	1,895 (8.4)	3,340 (14.9)	4,420 (19.6)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		2,740 (12.2)	2,750 (12.2)	3,200 (14.2)	4,940 (22.0)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4,240 (18.9)	4,465 (19.9)	5,960 (26.5)	5,840 (26.0)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5,330 (23.7)	6,290 (28.0)	8,180 (36.4)	9,120 (40.6)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Multi-Set II Drop-In Anchors

Recommended Edge and Spacing Distance Requirements*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH LOAD FACTOR APPLIED =.80 FOR TENSION =.70 FOR SHEAR In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS LOAD FACTOR APPLIED =.80 FOR TENSION =.55 FOR SHEAR In. (mm)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1-3/4 (44.5)	7/8 (22.2)	3-1/2 (88.9)	1-3/4 (44.5)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2-7/8 (73.0)	1-7/16 (36.5)	5-11/16 (144.5)	2-7/8 (73.0)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3-1/2 (88.9)	1-3/4 (44.5)	7 (177.8)	3-1/2 (88.9)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4-3/8 (111.1)	2-3/16 (55.6)	8-3/4 (222.3)	4-3/8 (111.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5-5/8 (142.9)	2-13/16 (71.4)	11-3/16 (284.2)	5-5/8 (142.9)

* Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLES

Multi-Set II Drop-In Anchors Ultimate Tension and Shear Values (Lbs/kN) for RX-series (3/4" and 1" Embedment)*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT In. (mm)	2500 PSI (17.2 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		HOLLOW CORE	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1,571 (7.0)	2,295 (10.2)	1,987 (8.8)	2,903 (12.9)	1,908 (8.5)	2,401 (10.7)
1/2 (12.7)	5/8 (15.9)	1 (25.4)	2,113 (9.4)	2,585 (11.5)	2,673 (11.9)	3,270 (14.5)	2,462 (11.0)	2,401 (10.7)

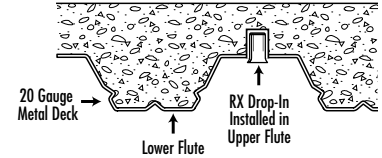
* The tabulated values are for RX anchors installed at a minimum of 12 diameters on center and minimum edge distance of 6 diameters for 100 percent anchor efficiency. Spacing and edge distance may be reduced to 6 diameters spacing and 3 diameter edge distance provided the values are reduced 50 percent. Linear Interpolation may be used for intermediate spacings and edge margins.

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Multi-Set II Drop-In Anchors Anchoring Overhead in 3000 PSI Lightweight Concrete On Metal Deck

ANCHOR	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	3000PSI (20.7 MPa) CONCRETE			
			ULTIMATE TENSION LOAD Lbs. (kN)		ALLOWABLE WORKING LOAD Lbs. (kN)	
RX-38 Drop-In	1/2 (12.7)	3/4 (19.1)	Upper Flute	1,410 (6.3)	353 (1.6)	
			Lower Flute	1,206 (5.4)	301 (1.3)	

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.



Combined Tension and Shear Loading—for Multi-Set Anchors

Allowable loads for anchors subjected to combined shear and tension forces are determined by the following equation:

$$(P_s/P_t)^{5/3} + (V_s/V_t)^{5/3} \leq 1$$

P_s = Applied tension load

V_s = Applied shear load

P_t = Allowable tension load

V_t = Allowable shear load