

PROJECT SUBMITTAL



Mini Dropin™ *Internally Threaded Expansion Anchor*

Anchoring into Solid Concrete, Precast Hollow Core Plank,
and Post Tensioned Concrete Slabs

Anchor Design Allows for Shallow Embedment Installation

Typical Size Range: 1/4" to 1/2" Diameter



Mini Dropin

PROJECT SUBMITTAL CONTENTS

- General Information
- Installation Specifications
- Material Specifications
- Performance Data
- Design Criteria
- Ordering Information

APPROVALS AND LISTINGS

Factory Mutual Research Corporation (FM Approvals) – File No. J.I. 3002071

Federal GSA Specification – Meets the proof load requirements of FF-S-325C, Group VIII, Type 1 (superseded)

PRODUCT SUBMITTAL / SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section

Page

Paragraph

Description

PRODUCT SUBMITTAL / SUBSTITUTION REQUESTED:

The attached submittal package includes the product description, specifications, drawings, and performance data for use in the evaluation of the request.

SUBMITTED BY:

Name:

Signature:

Company:

Address:

Date:

Telephone:

Fax:

FOR USE BY THE ARCHITECT AND/OR ENGINEER

Approved **Approved as Noted** **Not Approved**

(If not approved, please briefly explain why the product was not accepted.)

By:

Date:

Remarks:

Mini Dropin™ Internally Threaded Expansion Anchor

PRODUCT DESCRIPTION

The Mini Dropin is a carbon steel machine bolt anchor for use in shallow embedment applications. In addition to solid concrete and precast hollow core plank, it can be used in post-tensioned concrete slabs and concrete pours over metal deck. It is suitable for overhead applications.

GENERAL APPLICATIONS AND USES

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

FEATURES AND BENEFITS

- Anchor design allows for shallow embedment
- Internally threaded anchor for easy removability and service work
- Ideal for precast hollow core plank and post-tension concrete slabs
- Lip provides flush installation and consistent embedment
- Setting tool scores flange when set to verify proper expansion

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GUIDE SPECIFICATIONS

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

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Mini Dropin

THREAD VERSION

UNC Thread

ANCHOR MATERIALS

Zinc Plated Carbon Steel

ROD/ANCHOR SIZE RANGE (TYP.)

1/4" to 1/2" diameter

SUITABLE BASE MATERIALS

Normal-Weight Concrete
Structural Lightweight Concrete
Precast Hollow Core Plank

MATERIAL AND INSTALLATION SPECIFICATIONS

Material Specification

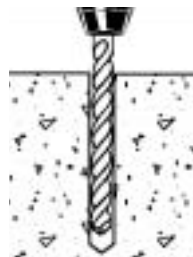
Anchor Component	Carbon Steel
Anchor Body	AISI 12L14
Plug	AISI 1018
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn 5)

Installation Specification

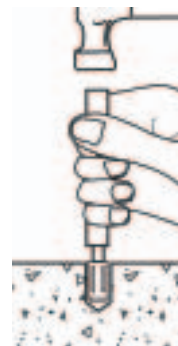
Dimension	Rod/Anchor Diameter, <i>d</i>		
	1/4"	3/8"	1/2"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	3/8	1/2	5/8
Maximum Tightening Torque, <i>T_{max}</i> , (ft-lbs)	3	5	10
Thread Size (UNC)	1/4 - 20	3/8 - 16	1/2 - 13
Thread Depth (in.)	3/8	13/32	5/8
Overall Anchor Length (in.)	5/8	3/4	1

Installation Guidelines

Drill a hole into the base material to the depth of embedment required. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15. *In post-tensioned concrete slabs, take care to avoid drilling into the post-tensioned cables.*



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 Load Capacities for Mini Dropin in Normal-Weight Concrete^{1,2}

Rod/Anchor Size <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	Minimum Concrete Compressive Strength (<i>f_c</i>)					
		3,000 psi (20.7 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)	5/8 (15.9)	1,400 (6.3)	1,260 (5.7)	1,400 (6.3)	1,650 (7.4)	1,400 (6.3)	1,650 (7.4)
3/8 (9.5)	3/4 (19.1)	1,980 (8.9)	2,700 (12.2)	2,120 (9.5)	4,220 (19.0)	2,270 (10.2)	4,220 (19.0)
1/2 (12.7)	1 (25.4)	3,360 (15.1)	4,400 (19.8)	3,360 (15.1)	4,875 (21.9)	3,750 (16.9)	4,875 (21.9)

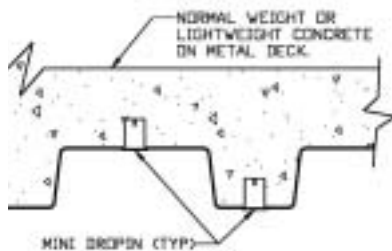
1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load.
2. Linear interpolation may be used to determine ultimate loads for intermediate compressive strengths.

Allowable Load Capacities for Mini Dropin in Normal-Weight Concrete^{1,2,3}

Rod/Anchor Size <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	Minimum Concrete Compressive Strength (<i>f_c</i>)					
		3,000 psi (20.7 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)	5/8 (15.9)	350 (1.6)	315 (1.4)	350 (1.6)	415 (1.9)	350 (1.6)	415 (1.9)
3/8 (9.5)	3/4 (19.1)	495 (2.2)	675 (3.0)	530 (2.4)	1,055 (4.7)	570 (2.6)	1,055 (4.7)
1/2 (12.7)	1 (25.4)	840 (3.8)	1,100 (5.0)	840 (3.8)	1,220 (5.5)	940 (4.2)	1,220 (5.5)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0.
2. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.
3. Spacing and edge distances shall be in accordance with the Load Adjustment Factors table for Normal-Weight concrete listed in the Design Criteria Section.

Ultimate and Allowable Load Capacities for Mini Dropin Installed Through Metal Deck into Structural Lightweight Concrete^{1,2,3,4}

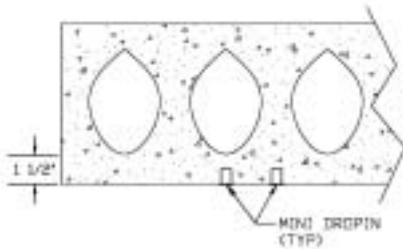


Rod/Anchor Size <i>d</i> in. (mm)	Minimum Embed. Depth <i>h_v</i> in. (mm)	Lightweight Concrete Over Min. 20 Ga. Metal Deck. <i>f_c</i> ≥ 3,000 psi (20.7 MPa)			
		Minimum 1 3/4" Wide Deck			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	5/8 (15.9)	740 (3.3)	1,880 (8.5)	185 (0.8)	470 (2.1)
3/8 (9.5)	3/4 (19.1)	880 (4.0)	2,040 (9.2)	220 (1.0)	510 (2.3)
1/2 (12.7)	1 (25.4)	1,380 (6.2)	2,120 (9.5)	345 (1.6)	530 (2.4)

1. The metal deck shall be No. 22 gage to No. 18 gage thick steel [0.030-inch to 0.047-inch base metal thickness (0.75mm to 1.20mm)].
2. Allowable load capacities are calculated using a safety factor of 4.0.
3. Tabulated load values are for anchors installed with a minimum edge distance of 7/8" when installed through the lower flute. Anchors installed through the upper flute may be in any location provided the proper installation procedures are maintained.
4. Spacing shall be in accordance with the Load Adjustment Factors table for lightweight concrete listed in the Design Criteria section.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Mini Dropin in Precast Hollow Core Concrete Plank^{1,2}



Rod/Anchor Size <i>d</i> in. (mm)	Minimum Embed. Depth <i>h_v</i> in. (mm)	Minimum Spacing in. (mm)	Edge Distance in. (mm)	Min. Concrete Compressive Strength <i>f_c</i> ≥ 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)	5/8 (15.9)	3 (76.2)	3 (76.2)	2,360 (10.6)	1,840 (8.3)	590 (2.7)	460 (2.1)
3/8 (9.5)	3/4 (19.1)	4 1/2 (114.3)	4 1/2 (114.3)	2,600 (11.7)	3,400 (15.3)	650 (2.9)	850 (3.8)
1/2 (12.7)	1 (25.4)	6 (152.4)	6 (152.4)	2,600 (11.7)	3,540 (15.9)	650 (2.9)	885 (4.0)

1. Allowable loads are calculated using an applied safety factor of 4.0.
2. Edge distances shall be in accordance with the Load Adjustment Factors table for Normal-Weight concrete listed in the Design Criteria section.

DESIGN CRITERIA

Combined Loading

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

$$\left(\frac{N_u}{N_n}\right)^{\frac{5}{3}} + \left(\frac{V_u}{V_n}\right)^{\frac{5}{3}} \leq 1 \quad \text{OR} \quad \left(\frac{N_u}{N_n}\right) + \left(\frac{V_u}{V_n}\right) \leq 1$$

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 Distances

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	<i>s_{cr}</i> = 3.0 <i>h_v</i>	<i>F_N</i> = <i>F_V</i> = 1.0	<i>s_{min}</i> = 1.5 <i>h_v</i>	<i>F_N</i> = <i>F_V</i> = 0.50
Edge Distance (<i>c</i>)	Tension	<i>c_{cr}</i> = 12 <i>d</i>	<i>F_N</i> = <i>F_V</i> = 1.0	<i>c_{min}</i> = 6 <i>d</i>	<i>F_N</i> = 0.90
	Shear ¹	<i>c_{cr}</i> = 12 <i>d</i>	<i>F_N</i> = <i>F_V</i> = 1.0	<i>c_{min}</i> = 6 <i>d</i>	<i>F_V</i> = 0.75

1. Allowable loads for anchors loaded in shear parallel to the edge have no reduction when installed at minimum edge distances.

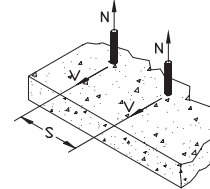
Anchor Installed in Lightweight Concrete					
Anchor Dimension	Load Type	Critical Distance (Full Anchor Capacity)	Critical Load Factor	Minimum Distance (Reduced Capacity)	Minimum Load Factor
Spacing (<i>s</i>)	Tension and Shear	<i>s_{cr}</i> = 3.0 <i>h_v</i>	<i>F_N</i> = <i>F_V</i> = 1.0	<i>s_{min}</i> = 1.5 <i>h_v</i>	<i>F_N</i> = <i>F_V</i> = 0.50

DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight and Lightweight Concrete

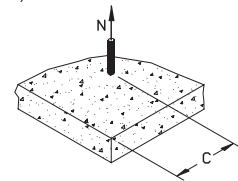
Spacing, Tension (F_N) & Shear (F_V) (Normal-Weight and Lightweight Concrete)			
Dia. (in.)	1/4	3/8	1/2
h_v (in.)	5/8	3/4	1
S_{cr} (in.)	1 7/8	2 1/4	3
S_{min} (in.)	1	1 1/8	1 1/2
Spacing, s (in.)	1	0.50	
	1 1/8	0.60	
	1 1/2	0.80	0.50
	1 7/8	1.00	0.63
	2		0.67
	2 1/4		0.75
	2 1/2		0.83
	3		1.00

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.



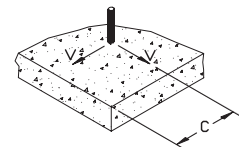
Edge Distance, Tension (F_N) (Normal-Weight concrete only)			
Dia. (in.)	1/4	3/8	1/2
C_{cr} (in.)	3	4 1/2	6
C_{min} (in.)	1 1/2	2 1/4	3
Edge Distance, c (in.)	1 1/2	0.90	
	2	0.93	
	2 1/4	0.95	0.90
	2 1/2	0.97	0.91
	3	1.00	0.93
	4		0.98
	4 1/2		1.00
	5		0.97
	6		1.00

Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 6 anchor diameters ($6d$) at which the anchor achieves 90% of load.



Edge Distance, Shear (F_V) (Normal-Weight concrete only)			
Dia. (in.)	1/4	3/8	1/2
C_{cr} (in.)	3	4 1/2	6
C_{min} (in.)	1 1/2	2 1/4	3
Edge Distance, c (in.)	1 1/2	0.75	
	2	0.83	
	2 1/4	0.88	0.75
	2 1/2	0.92	0.78
	3	1.00	0.83
	4		0.94
	4 1/2		1.00
	5		0.92
	6		1.00

Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 6 anchor diameters ($6d$) at which the anchor achieves 75% of load.



ORDERING INFORMATION

Carbon Steel Mini Dropin

Cat No.	Rod/Anchor Dia.	Drill Diameter	Overall Length	Standard Box	Standard Ctn.
6335	1/4"	5/8"	5/8"	100	1,000
6322	3/8"	3/4"	3/4"	100	1,000
6337	1/2"	1"	1"	50	500

Setting Tool for Mini Dropin

Cat No.	Rod/Anchor Size	Standard Box	Standard Carton
6336	1/4"	1	50
6323	3/8"	1	50
6338	1/2"	1	50

