

Safe-T+ Pin™ Nail Anchor

PRODUCT DESCRIPTION

The Safe-T+ Pin is a small-steel nail anchor which is designed for use in a variety of applications and as an improved alternative to traditional zamac nailin anchors where overhead use is not recommended. The Safe-T+ Pin can be used pre-drilled holes in solid base materials such as concrete, grouted block, brick and stone. It can also be used in cracked concrete applications where the anchors are engineered for redundant fastening.

GENERAL APPLICATIONS AND USES

- Electrical fixtures
- Signage
- Maintenance
- Interior applications / low level corrosion environment
- HVAC / Mechanical
- Drywall track
- Redundant fastening

FEATURES AND BENEFITS

- + General purpose anchoring
- + Installs in a variety of solid base materials
- + Suitable for overhead use where specified
- + All-steel anchor components

APPROVALS AND LISTINGS

Tested in accordance with ASTM E 488
 Tested in accordance with ICC-ES AC193 for use in structural concrete
 Evaluated and qualified by an accredited independent laboratory for recognition in redundant fastening applications in cracked and uncracked concrete

GUIDE SPECIFICATIONS

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

MATERIAL SPECIFICATIONS

Material Specifications

Anchor component	Specification
Anchor body	Low carbon steel (AISI 1008 or equivalent)
Zinc plating according to ASTM B 633 SC1, Type III Minimum plating requirement for Mild Service Condition	

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Safe-T+ Pin

ANCHOR MATERIALS

Zinc Plated Carbon Steel

ANCHOR SIZE RANGE (TYP.)

1/4" diameter (6mm) x 1-3/8" length
 1/4" diameter (6mm) x 2-1/2" length

SUITABLE BASE MATERIALS

Normal-weight Concrete
 Structural Sand-lightweight Concrete
 Grout-filled Concrete Masonry
 Brick Masonry
 Stone

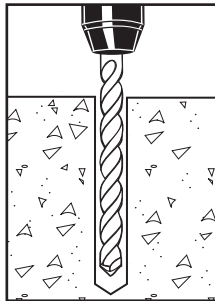
INSTALLATION SPECIFICATIONS

Anchor Property / Setting Information	Notation	Units	Nominal Anchor Size, <i>d</i> (inch)	
			1/4	
Nominal outside anchor diameter	d_o	in. (mm)	0.250 (6.4)	
Safe-T+ Pin drill bit diameter	d_{bit}	mm	6	
Safe-T+ Pin bit tolerance range	-	mm	5.9 to 6.4	
Nominal Embedment	h_{nom}	in. (mm)	1-3/16 (30)	2-1/2 (64)
Minimum hole depth	h_o	in. (mm)	1-1/2 (38)	2-3/4 (70)
Minimum concrete member thickness	h_{min}	in. (mm)	3 (76)	4 (102)
Minimum edge distance ¹	c_{min}	in. (mm)	3-1/2 (90)	3-1/2 (90)
Minimum spacing distance ²	s_{min}	in. (mm)	3-1/2 (90)	3-1/2 (90)

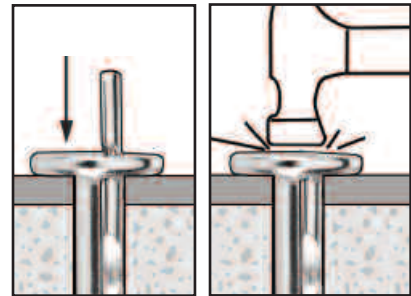
1. For redundant fastening design, edge distance must be a minimum of 4 inches.
2. For redundant fastening design, anchor spacing must be a minimum of 8 inches.

Installation Guidelines

Using the proper Safe-T+ Pin drill bit size, drill a hole into the base material to the required depth. The tolerances of the Safe-T+ Pin bit used must meet the requirements of the published range. Blow the hole clean of dust and other material.



Insert the anchor through the fixture. Drive the anchor pin into the anchor body to expand it. Be sure the head is seated firmly against the fixture and that the anchor is at the minimum required embedment.



REDUNDANT FASTENING APPLICATIONS

For an anchoring system designed with redundancy, the load maintained by an anchor that experiences failure or excessive deflection can be transmitted to neighboring anchors without significant consequences to the fixture or remaining resistance of the anchoring system. In addition to the requirements for anchors, the fixture being attached shall be able to resist the forces acting on it assuming one of the fixing points is not carrying load. It is assumed that by adhering to the limits placed on n_1 , n_2 and n_3 below, redundancy will be satisfied.

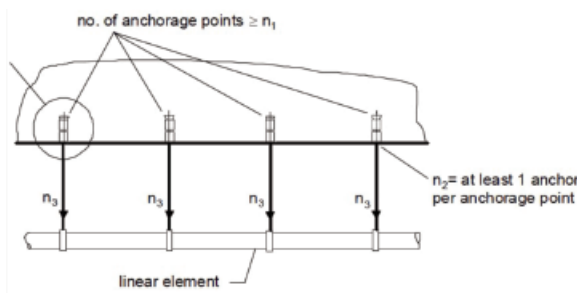
Anchors qualified for redundant applications may be designed for use in normal weight and sand-lightweight cracked and uncracked concrete. Concrete compressive strength of 2,500 psi shall be used for design. No increase in anchor capacity is permitted for concrete compressive strengths greater than 2,500 psi. The anchor installation is limited to concrete with a compressive strength of 8,500 psi or less.

Redundant applications shall be limited to structures assigned to Seismic Design Categories A or B only.

Redundant applications shall be limited to support of nonstructural elements.

Strength Design (Redundant Fastening):

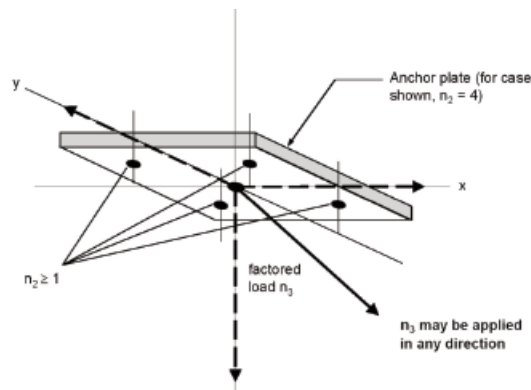
For strength design, a redundant system is achieved by specifying and limiting the following variables
 n_1 = the total number of anchorage points supporting the linear element
 n_2 = number of anchors per anchorage point
 n_3 = factored load at each anchorage point, lbs., using load combinations from IBC Section 1605.2.1 or ACI 318 Section 9.2



Allowable Stress Design (Redundant Fastening):

Design values for use with allowable stress design shall be established taking $R_d, ASD = \frac{\phi_{ra} \cdot F_{ra}}{\alpha}$

Where α is the conversion factor calculated as the weighted average of the load factors from the controlling load combination. The conversion factor, α is equal to 1.4 assuming all dead load.



RedundantFastening Design information for Safe-T+ Pin Anchors^{1,2}

Design Characteristic	Notation	Units	Nominal Anchor Size (inch)	
			1/4	3/8
Anchor category	1, 2 or 3	-	3	
Minimum nominal embedment depth	h_{nom}	in (mm)	1 3/16 (41)	
Characteristic Strength (Resistance) Installed in Concrete⁴				
Resistance at each anchorage point, cracked or uncracked concrete (2,500 psi)	F_{ra}	lb (kN)	Number of Anchor Points	
			$n_1 \geq 4$	$n_1 \geq 3$
			675 (3.0)	450 (2.0)
Strength reduction factor ³	ϕ_{ra}	-	0.45	

For SI: 1 inch = 25.4 mm, 1 lbf = 0.0044 kN.

- The data in this table is intended to be used with the redundant design provisions of this product section; design loads may be applied in any direction.
- Installation must comply with published instructions and details.
- All values of ϕ were determined from the load combinations of ACI 318 Section 9.2.
- Anchors are permitted to be used in structural sand-lightweight concrete provided the design strength $\phi_{ra} F_{ra}$ must be multiplied by 0.6

PERFORMANCE DATA

Ultimate Load Capacities for Safe-T+ Pin in Normal-Weight Concrete^{1,2,3,4}

Nominal Anchor Diameter in. (mm)	Nominal Drill Bit Diameter (mm)	Minimum Embedment Depth in. (mm)	Minimum Concrete Compressive Strength, f'_c 3,000 psi (20.7 MPa)	
			Ultimate Tension lbs. (kN)	Ultimate Shear lbs. (kN)
1/4 (6.3)	6	1-3/16 (30)	1,330 (5.9)	1,745 (7.8)

1. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load.
3. The tabulated load values are applicable to single anchors in uncracked concrete.
4. Minimum spacing and edge distances for anchors is 4 inches.

Ultimate Load Capacities for the Safe-T+ Pin in Grout-filled Concrete Masonry^{1,2,3}

Nominal Anchor Diameter in. (mm)	Nominal Drill Bit Diameter (mm)	Minimum Embedment Depth in. (mm)	Minimum Concrete Compressive Strength, f'_m 1,500 psi (10.3 MPa)	
			Ultimate Tension lbs. (kN)	Ultimate Shear lbs. (kN)
1/4 (6.3)	6	1-3/16 (30)	920 (4.1)	1,745 (7.8)

1. Tabulated load values are for anchors installed in minimum 6-inch 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 compressive strength must be at the specified minimum at the time of installation.
2. Ultimate load capacities must be reduced by a minimum safety factor of 5.0 or greater to determine allowable working load. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety.
3. Minimum spacing and edge distances for anchors is 4 inches.

Ultimate Load Capacities for the Safe-T+ Pin in Solid Clay Brick Masonry^{1,2,3}

Nominal Anchor Diameter in. (mm)	Nominal Drill Bit Diameter (mm)	Minimum Embedment Depth in. (mm)	Minimum Concrete Compressive Strength, f'_m 1,500 psi (10.3 MPa)	
			Ultimate Tension lbs. (kN)	Ultimate Shear lbs. (kN)
1/4 (6.3)	6	1-3/16 (30)	1,100 (4.9)	1,745 (7.8)

1. 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 ($f'_m \geq 1,500$ psi).
2. Ultimate load capacities must be reduced by a minimum safety factor of 5.0 or greater to determine allowable working load. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety.
3. Minimum spacing and edge distances for anchors is 4 inches.

ORDERING INFORMATION

Cat. No.	Size	Std. Box	Std. Carton
2800SD	1/4" (6mm) x 1-3/8"	100	600
2801SD	1/4" (6mm) x 2-1/2"	100	600

Cat. No.	Description	Std. Box	Std. Carton
2800	6 mm Drill Bit	1	50

One 6mm drill bit is included in each box of Safe-T+ anchors.

