

Zamac Nailin™ Nail Anchor

PRODUCT DESCRIPTION

The Zamac Nailin is a nail drive anchor which has a body formed from Zamac alloy. Drive nails are available in carbon or stainless steel. The anchor can be used in concrete, block, brick or stone.

A corrosion resistant Zamac alloy is used to form the anchor body with either a mushroom or flat head. The anchor can be used for light duty, tamperproof applications. This anchor is not recommended for applications overhead. For overhead applications, please refer to the Zamac Hammer-Screw.

GENERAL APPLICATIONS AND USES

- Roof Flashing
- Mechanical Attachments
- Brick Ties and Masonry Anchorage
- Furring Strips
- Electrical Fixtures
- Maintenance

FEATURES AND BENEFITS

- General purpose anchoring
- Installs in a variety of base materials

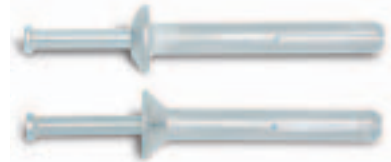
APPROVALS AND LISTINGS

Southern Building Code Conference International (SBCCI) #9944A
 Florida Building Code Approval – FL2209.11
 Miami-Dade County Notice of Acceptance (NOA) 03-0311.08
 Federal GSA Specification – Meets the proof load requirements of FF-S-325C, Group V, Type 2, Class 3, (superseded) and CID A-A 1925A, Type 1 (mushroom head) & Type 2 (flat head)

GUIDE SPECIFICATIONS

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

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Zamac Nailin

ANCHOR MATERIALS

Zamac Alloy with Carbon or Stainless Steel Drive Nail

ANCHOR SIZE RANGE (TYP.)

3/16" diameter x 7/8" length to 1/4" diameter x 2" length

SUITABLE BASE MATERIALS

Normal-Weight Concrete
 Hollow Concrete Masonry
 Brick Masonry
 Stone

INSTALLATION AND MATERIAL SPECIFICATIONS

Installation Specifications

Dimension	Anchor Diameter, d		
	3/16" MH	1/4" MH	1/4" FH
ANSI Drill Bit Size, d_{bit} (in.)	3/16	1/4	1/4
Fixture Clearance Hole (in.)	1/4	5/16	5/16
Head Height (in.)	7/64	9/64	3/16
Head Width d_{hd} (in.)	13/32	35/64	35/64

MH = Mushroom Head FH = Flat Head

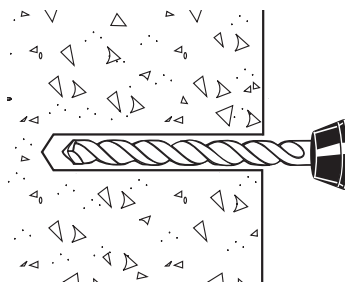
Material Specifications

Anchor Component	Component Material		
	Mushroom Head	Flat Head	Mushroom Head
Drive Nail	AISI 1018	AISI 1018	Type 304 SS
Anchor Body	Zamac Alloy	Zamac Alloy	Zamac Alloy
Nail Plating	ASTM B 633, SC1, Type III (Fe/Zn 5)		N/A

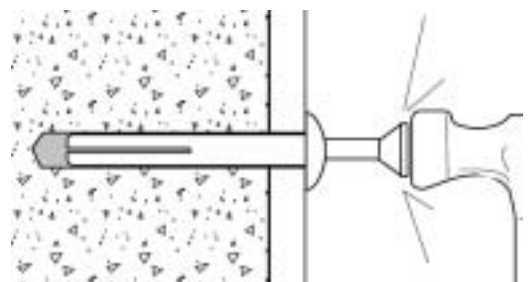
CS = Carbon Steel SS = Stainless Steel

Installation Guidelines

Using the proper diameter bit, drill a hole into the base material to a depth of at least 1/4" deeper than the required embedment. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15. Blow the hole clean of dust and other material.



Insert the anchor through the fixture. Drive the nail into the anchor body to expand it. Be sure the head is seated firmly against the fixture and that the anchor is at the proper embedment. Take care not to overdrive. This anchor is not recommended for use overhead.



PERFORMANCE DATA

Ultimate Load Capacities for Zamac Nailin in Normal-Weight Concrete^{1,2}

Anchor Diameter <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	Minimum Concrete Compressive Strength (<i>f_c</i>)					
		2,000 psi (13.8 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)
3/16 (4.8)	3/4 (19.1)	460 (2.1)	520 (2.3)	500 (2.3)	700 (3.2)	580 (2.6)	700 (3.2)
	5/8 (15.9)	480 (2.2)	550 (2.5)	600 (2.7)	820 (3.7)	640 (2.9)	820 (3.7)
1/4 (6.4)	3/4 (19.1)	655 (2.9)	755 (3.4)	1,045 (4.7)	1,065 (4.8)	1,045 (4.7)	1,065 (4.8)
	7/8 (22.2)	780 (3.5)	800 (3.6)	1,070 (4.8)	1,115 (5.0)	1,070 (4.8)	1,115 (5.0)
	1 1/8 (28.6)	1,030 (4.6)	900 (4.1)	1,120 (5.0)	1,215 (5.5)	1,120 (5.0)	1,215 (5.5)
	1 3/8 (34.9)	1,085 (4.9)	1,105 (5.0)	1,150 (5.2)	1,460 (6.6)	1,230 (5.5)	1,460 (6.6)
	1 3/4 (44.5)	1,165 (5.2)	1,420 (6.4)	1,200 (5.4)	1,825 (8.2)	1,260 (5.7)	1,825 (8.2)
	1 7/8 (47.6)	1,165 (5.2)	1,420 (6.4)	1,300 (5.9)	1,825 (8.2)	1,365 (6.1)	1,825 (8.2)

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 embedments and compressive strengths.

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

Anchor Diameter <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	Minimum Concrete Compressive Strength (<i>f_c</i>)					
		2,000 psi (13.8 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)
3/16 (4.8)	3/4 (19.1)	115 (0.5)	130 (0.6)	125 (0.6)	175 (0.8)	145 (0.7)	175 (0.8)
	5/8 (15.9)	120 (0.5)	140 (0.6)	150 (0.7)	205 (0.9)	160 (0.7)	205 (0.9)
1/4 (6.4)	3/4 (19.1)	165 (0.7)	190 (0.9)	260 (1.2)	265 (1.2)	260 (1.2)	265 (1.2)
	7/8 (22.2)	195 (0.9)	200 (0.9)	270 (1.2)	280 (1.3)	270 (1.2)	280 (1.3)
	1 1/8 (28.6)	260 (1.2)	225 (1.0)	280 (1.3)	305 (1.4)	280 (1.3)	305 (1.4)
	1 3/8 (34.9)	270 (1.2)	275 (1.2)	290 (1.3)	365 (1.6)	310 (1.4)	365 (1.6)
	1 3/4 (44.5)	290 (1.3)	355 (1.6)	300 (1.4)	455 (2.0)	315 (1.4)	455 (2.0)
	1 7/8 (47.6)	290 (1.3)	355 (1.6)	325 (1.5)	455 (2.0)	340 (1.5)	455 (2.0)

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 embedments and compressive strengths.
 3. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in the Design Criteria section.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Zamac Nailin in Hollow Concrete Masonry^{1,2,3}

Anchor Diameter <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	<i>f'_m</i> ≥ 1,500 psi (10.4 MPa)			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16 (4.8)	3/4 (19.1)	270 (1.2)	860 (3.9)	55 (0.2)	170 (0.8)
1/4 (6.4)	5/8 (15.9)	360 (1.6)	1,040 (4.7)	70 (0.3)	210 (0.9)
	3/4 (19.1)	735 (3.3)	1,075 (4.8)	145 (0.7)	215 (1.0)
	1 (25.4)	835 (3.8)	1,130 (5.1)	165 (0.7)	225 (1.0)
	1 1/8 (28.6)	1,040 (4.7)	1,250 (5.6)	210 (0.9)	250 (1.1)
	1 3/8 (34.9)	1,090 (4.9)	1,275 (5.7)	220 (1.0)	255 (1.1)
	1 1/2 (38.1)	1,090 (4.9)	1,275 (5.7)	220 (1.0)	255 (1.1)

1. Tabulated load values are for anchors installed in minimum 6-inch wide, Grade N, Type II, medium and normal-weight and lightweight concrete masonry units. Mortar must be minimum Type N. Masonry compressive strength must be 1,500 psi minimum at the time of installation.
2. Allowable loads are based on average ultimate values using a safety factor of 5.0.
3. Anchors installed flush with face shell surface.

Ultimate and Allowable Load Capacities for Zamac Nailin in Solid or Hollow Clay Brick Masonry^{1,2}

Anchor Diameter <i>d</i> in. (mm)	Minimum Embedment Depth <i>h_v</i> in. (mm)	<i>f'_m</i> ≥ 1,500 psi (10.4 MPa)			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16 (4.8)	3/4 (19.1)	460 (2.1)	920 (4.1)	90 (0.4)	185 (0.8)
1/4 (6.4)	5/8 (15.9)	570 (2.6)	1,250 (5.6)	115 (0.5)	250 (1.1)
	3/4 (19.1)	790 (3.6)	1,400 (6.3)	160 (0.7)	280 (1.3)
	1 (25.4)	820 (3.7)	1,400 (6.3)	165 (0.7)	280 (1.3)
	1 1/8 (28.6)	865 (3.9)	1,400 (6.3)	175 (0.8)	280 (1.3)
	1 3/8 (34.9)	950 (4.3)	1,400 (6.3)	190 (0.9)	280 (1.3)
	1 1/2 (38.1)	1,015 (4.6)	1,400 (6.3)	205 (0.9)	280 (1.3)

1. Tabulated load values are for anchors installed in Grade SW multiple wythe, brick masonry conforming to ASTM C62.
2. Allowable loads are calculated using an applied safety factor of 5.0.

DESIGN CRITERIA

Combined Loading

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

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

- 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> = 10 <i>d</i>	<i>F_N</i> = <i>F_V</i> = 1.0	<i>s_{min}</i> = 5 <i>d</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> = 1.0	<i>c_{min}</i> = 5 <i>d</i>	<i>F_N</i> = 0.80
	Shear	<i>c_{cr}</i> = 12 <i>d</i>	<i>F_V</i> = 1.0	<i>c_{min}</i> = 5 <i>d</i>	<i>F_V</i> = 0.50

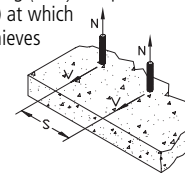
DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight Concrete

Spacing, Tension (F_N) & Shear (F_V)		
Dia. (in.)	3/16	1/4
S_{cr} (in.)	1 7/8	2 1/2
S_{min} (in.)	1	1 1/4
Spacing, s (in.)	1	0.50
	1 1/4	0.67
	1 1/2	0.80
	1 7/8	1.00
	2	0.80
	2 1/2	1.00

Notes: For anchors loaded in tension and shear, the critical spacing (S_{cr}) is equal to 10 anchor diameters ($10d$) at which the anchor achieves 100% of load.

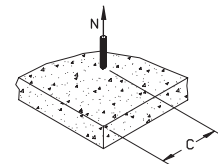
Minimum spacing (S_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 50% of load.



Edge Distance, Tension (F_N)		
Dia. (in.)	3/16	1/4
C_{cr} (in.)	2 1/4	3
C_{min} (in.)	1	1 1/4
Edge Dist., c (in.)	1	0.80
	1 1/4	0.85
	1 1/2	0.89
	2	0.96
	2 1/4	1.00
	2 1/2	0.94
	3	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.

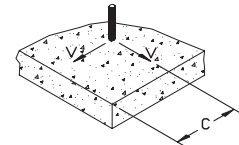
Minimum edge distance (C_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 80% of load.



Edge Distance, Shear (F_V)		
Dia. (in.)	3/16	1/4
C_{cr} (in.)	2 1/4	3
C_{min} (in.)	1	1 1/4
Edge Dist., c (in.)	1	0.50
	1 1/4	0.62
	1 1/2	0.71
	2	0.90
	2 1/4	1.00
	2 1/2	0.79
	3	0.86

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 5 anchor diameters ($5d$) at which the anchor achieves 50% of load.



ORDERING INFORMATION

Mushroom Head Zamac Nailin with Carbon Steel Nail

Cat. No.	Anchor Size	Drill Diameter	Std. Box	Std. Carton	Wt./100
2802	3/16" x 7/8"	3/16"	100	500	3/4
2806	1/4" x 3/4"	1/4"	100	500	1 1/2
2808	1/4" x 1"	1/4"	100	500	1 3/4
2814	1/4" x 1 1/4"	1/4"	100	500	2 1/4
2820	1/4" x 1 1/2"	1/4"	100	500	2 1/2
2826	1/4" x 2"	1/4"	100	500	3
2804	1/4" x 3"	1/4"	100	500	4

Master Pack Mushroom Head Zamac Nailin with Carbon Steel Nail

Cat. No.	Anchor Size	Drill Diameter	Std. Box	Std. Carton	Wt./100
2803	3/16" x 7/8"	3/16"	-	1,000	3/4
2807	1/4" x 3/4"	1/4"	-	1,000	1 1/2
2809	1/4" x 1"	1/4"	-	1,000	1 3/4
2815	1/4" x 1 1/4"	1/4"	-	1,000	2 1/4
2821	1/4" x 1 1/2"	1/4"	-	1,000	2 1/2
2827	1/4" x 2"	1/4"	-	1,000	3
2805	1/4" x 3"	1/4"	-	1,000	4

Flat Head Zamac Nailin with Carbon Steel Nail

Cat. No.	Anchor Size	Drill Diameter	Std. Box	Std. Carton	Wt./100
2836	1/4" x 1 1/2"	1/4"	100	500	2 1/2
2838	1/4" x 2"	1/4"	100	500	3

Mushroom Head Zamac Nailin with Stainless Steel Nail

Cat. No.	Anchor Size	Drill Diameter	Std. Box	Std. Carton	Wt./100
2858	1/4" x 1"	1/4"	100	500	1 3/4
2864	1/4" x 1 1/4"	1/4"	100	500	2 1/4
2870	1/4" x 1 1/2"	1/4"	100	500	2 1/2
2876	1/4" x 2"	1/4"	100	500	3

