Double™ *Shell Expansion Anchor*

PRODUCT DESCRIPTION

The Double is a dual expansion machine bolt anchor particularly suited for materials of questionable strength. It can be used in solid concrete, block, brick, and stone. Job site tests are recommended when used in base materials of questionable strength.

GENERAL APPLICATIONS AND USES

- Suspending Conduit
- Support Anchoring
- Cable Trays and Strut
- Suspended Lighting

FEATURES AND BENEFITS

- Performs in base material of questionable strength
- Internally threaded anchor for easy removability and service work

APPROVALS AND LISTINGS

Federal GSA Specification – Meets the proof load requirements of FF-S-325C, Group II, Type 2, Class 2, style 2 (superseded) and CID A-A 1923A, Type 3

GUIDE SPECIFICATIONS

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

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Double

THREAD VERSION

UNC Thread

ANCHOR MATERIALS

Zamac Alloy

ROD/ANCHOR SIZE RANGE (TYP.)

1/4" to 3/4" diameter

SUITABLE BASE MATERIALS

Normal-Weight Concrete
Hollow Concrete Masonry
Brick Masonry

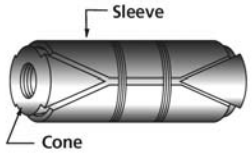
INSTALLATION AND MATERIAL SPECIFICATIONS

Installation Specifications

Dimension	Rod/Anchor Diameter, *d*					
	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size, d_{bit} (in.)	1/2	5/8	3/4	7/8	1	1 1/4
Max. Tightening Torque, T_{max} (ft.-lbs.)	5	7	10	20	30	60
Sleeve Length (in.)	1	1 3/16	1 9/16	2	2 1/4	3 1/4
Thread Size (UNC)	1/4-20	5/16-18	3/8-16	1/2-13	5/8-11	3/4-10
Thread Length In Cone (in.)	1/2	1/2	5/8	3/4	7/8	1 1/8
Overall Anchor Length (in.)	1 3/8	1 5/8	2	2 1/2	2 3/4	3 15/16

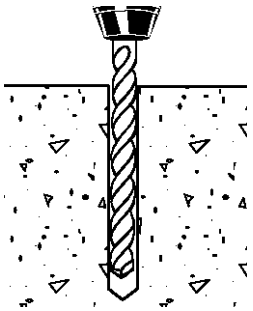
Material Specifications

Anchor Component	Component Material
Anchor Shield	Zamac Alloy
Cone	Zamac Alloy

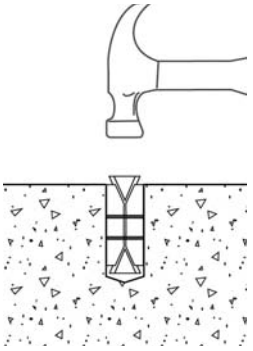


Installation Guidelines

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



Insert anchor into the hole, threaded cone end first until the sleeve is flush with the surface of the base material.



Position fixture, then insert screw or bolt and tighten. For maximum expansion, the upper cone should protrude slightly before setting. The bolt must engage a minimum of 2/3 of the anchor threads.

PERFORMANCE DATA

Ultimate Load Capacities for Double Expansion Anchor in Normal-Weight Concrete[1,2]

Rod/Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
		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)
1/4 (6.4)	1 1/4 (31.8)	1,290 (5.8)	1,585 (7.1)	1,650 (7.4)	1,620 (7.3)	2,220 (10.0)	1,910 (8.6)
5/16 (7.9)	1 1/2 (38.1)	1,610 (7.2)	2,040 (9.2)	2,200 (9.9)	2,375 (10.7)	2,540 (11.4)	2,535 (11.4)
3/8 (9.5)	1 3/4 (44.5)	2,275 (10.2)	3,590 (16.2)	3,500 (15.8)	4,000 (18.0)	4,115 (18.5)	5,370 (24.2)
1/2 (12.7)	2 1/4 (57.2)	4,710 (21.2)	5,345 (24.1)	6,500 (29.3)	6,155 (27.7)	6,635 (29.9)	9,900 (44.6)
5/8 (15.9)	2 1/2 (63.5)	5,045 (22.7)	10,710 (48.2)	7,000 (31.5)	11,410 (51.3)	7,660 (34.5)	12,870 (57.9)
3/4 (19.1)	3 1/2 (88.9)	10,005 (45.0)	14,565 (65.5)	14,000 (63.0)	17,775 (80.0)	15,350 (69.1)	19,310 (86.9)

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 Double Expansion Anchor in Normal-Weight Concrete[1,2,3]

Rod/Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
		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)
1/4 (6.4)	1 1/4 (31.8)	325 (1.5)	395 (1.8)	415 (1.9)	405 (1.8)	555 (2.5)	480 (2.2)
5/16 (7.9)	1 1/2 (38.1)	405 (1.8)	510 (2.3)	550 (2.5)	595 (2.7)	635 (2.9)	635 (2.9)
3/8 (9.5)	1 3/4 (44.5)	570 (2.6)	900 (4.1)	875 (3.9)	1,000 (4.5)	1,030 (4.6)	1,345 (6.1)
1/2 (12.7)	2 1/4 (57.2)	1,180 (5.3)	1,335 (6.0)	1,625 (7.3)	1,540 (6.9)	1,660 (7.5)	2,475 (11.1)
5/8 (15.9)	2 1/2 (63.5)	1,260 (5.7)	2,680 (12.1)	1,750 (7.9)	2,855 (12.8)	1,915 (8.6)	3,220 (14.5)
3/4 (19.1)	3 1/2 (88.9)	2,500 (11.3)	3,640 (16.4)	3,500 (15.8)	4,445 (20.0)	3,840 (17.3)	4,830 (21.7)

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. 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 Double Shell Expansion Anchor in Hollow Concrete Masonry[1,2,3]

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	$f'_m \geq$ 1,500 psi (10.4 MPa)			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 1/4 (31.8)	885 (4.0)	1,350 (6.1)	175 (0.8)	270 (1.2)
5/16 (7.9)	1 1/2 (38.1)	1,295 (5.8)	1,635 (7.4)	260 (1.2)	325 (1.5)
3/8 (9.5)	1 1/2 (38.1)	1,575 (7.1)	2,160 (9.7)	315 (1.4)	430 (1.9)
1/2 (12.7)	1 1/2 (38.1)	1,595 (7.2)	3,130 (14.1)	320 (1.4)	625 (2.8)

1. Tabulated load values are for anchors installed in minimum 8-inch wide, Grade N, Type II, medium and normal-weight 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 for carbon and stainless steel anchors and are based on average ultimate values using a safety factor of 5.0.
3. Anchors with diameters of 1/2" and larger installed in hollow concrete masonry units are limited to one anchor per unit cell.

Ultimate and Allowable Load Capacities for Double Shell Expansion Anchor in Clay Brick Masonry[1,2]

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Structural Brick Masonry $f'_m \geq$ 1,500 psi (10.4 MPa)			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 1/4 (31.8)	1,175 (5.3)	1,585 (7.1)	235 (1.1)	315 (1.4)
5/16 (7.9)	1 1/2 (38.1)	1,585 (7.1)	2,040 (9.2)	315 (1.4)	410 (1.8)
3/8 (9.5)	1 3/4 (44.5)	1,830 (8.2)	3,590 (16.2)	365 (1.6)	720 (3.2)
1/2 (12.7)	2 1/4 (57.2)	3,420 (15.4)	5,185 (23.3)	685 (3.1)	1,035 (4.7)
5/8 (15.9)	2 1/2 (63.5)	5,245 (23.6)	6,055 (27.2)	1,050 (4.7)	1,210 (5.4)
5/8 (15.9)	3 1/2 (88.9)	7,055 (31.7)	7,935 (35.7)	1,410 (6.3)	1,585 (7.1)

1. Tabulated load values are for anchors installed in Grade SW multiple wythe, solid brick masonry conforming to ASTM C62.
2. Tabulated load values are applicable to anchors with carbon and stainless steel cones. 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 (s)	Tension and Shear	$s_{cr} = 10d$	$F_N = F_V = 1.0$	$s_{min} = 5d$	$F_N = F_V = 0.50$
Edge Distance (c)	Tension	$c_{cr} = 12d$	$F_N = 1.0$	$c_{min} = 8d$	$F_N = 0.80$
	Shear	$c_{cr} = 12d$	$F_V = 1.0$	$c_{min} = 8d$	$F_V = 0.50$

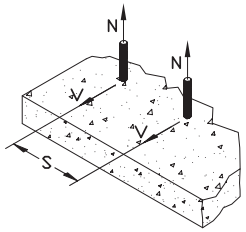
DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight Concrete

Spacing, Tension (F_N) & Shear (F_V)							
Dia. (in.)		1/4	5/16	3/8	1/2	5/8	3/4
s_{cr} (in.)		2 1/2	3 1/8	3 3/4	5	6 1/4	7 1/2
s_{min} (in.)		1 1/4	1 9/16	1 7/8	2 1/2	3 1/8	3 3/4
Spacing, s (inches)	1 1/4	0.50					
	1 9/16	0.63	0.50				
	1 7/8	0.75	0.60	0.50			
	2 1/2	1.00	0.80	0.67	0.50		
	3 1/8		1.00	0.83	0.63	0.50	
	3 3/4			1.00	0.75	0.60	0.50
	5				1.00	0.80	0.67
	6 1/4					1.00	0.83
	7 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.

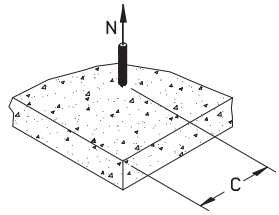
Minimum spacing (s_{min}) is equal to 5 anchor diameters (5d) at which the anchor achieves 50% of load.



Edge Distance, Tension (F_N)							
Dia. (in.)		1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)		3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)		2	2 1/2	3	4	5	6
Edge Distance, c (inches)	2	0.80					
	2 1/2	0.90	0.80				
	3	1.00	0.88	0.80			
	3 3/4		1.00	0.90			
	4			0.93	0.80		
	4 1/2			1.00	0.85		
	5				0.90	0.80	
	6				1.00	0.88	0.80
	7 1/2					1.00	0.90
	9						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.

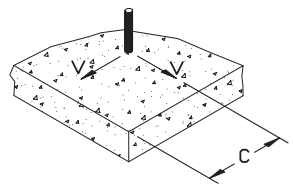
Minimum edge distance (c_{min}) is equal to 8 anchor diameters (8d) at which the anchor achieves 80% of load.



Edge Distance, Shear (F_V)							
Dia. (in.)		1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)		3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)		2	2 1/2	3	4	5	6
Edge Distance, c (inches)	2	0.50					
	2 1/2	0.75	0.50				
	3	1.00	0.70	0.50			
	3 3/4		1.00	0.75			
	4			0.83	0.50		
	4 1/2			1.00	0.63		
	5				0.75	0.50	
	6				1.00	0.70	0.50
	7 1/2					1.00	0.75
	9						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 8 anchor diameters (8d) at which the anchor achieves 50% of load.



ORDERING INFORMATION

Double Shell Expansion Anchor

Catalog Number	Rod/Anchor Diameter	Drill Diameter	Overall Length	Minimum Hole Depth	Standard Box	Standard Carton	Wt./ 100
9510	1/4"	1/2"	1 3/8"	1 1/4"	50	500	4
9515	5/16"	5/8"	1 5/8"	1 1/2"	50	500	7 1/2
9520	3/8"	3/4"	2"	1 3/4"	50	250	12 1/2
9525	1/2"	7/8"	2 1/2"	2 1/4"	25	250	18
9530	5/8"	1"	2 3/4"	2 1/2"	25	100	25 1/2
9535	3/4"	1 1/4"	3 15/16"	3 1/2"	10	50	54 1/2