

GENERAL INFORMATION

DOUBLE™

Shield Expansion Anchor

PRODUCT DESCRIPTION

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

FEATURE AND BENEFITS

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

APPROVALS AND LISTINGS

- Tested in accordance with ASTM E488
- Federal GSA Specification – Meets descriptive and proof load requirements of CID A-A-1923A, Type 3

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 - Masonry Anchors and 05 05 19 - Post-Installed Concrete Anchors. Expansion anchors shall be Double as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

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DOUBLE

THREAD VERSION

- UNC Thread

ANCHOR MATERIALS

- Zamac Alloy

ANCHOR SIZE RANGE (TYP.)

- 1/4" to 3/4" diameter

SUITABLE BASE MATERIALS

- Normal-weight Concrete
- Grout-filled Concrete Masonry (CMU)
- Hollow Concrete Masonry (CMU)
- Brick Masonry
- Stone

INSTALLATION AND MATERIAL SPECIFICATIONS

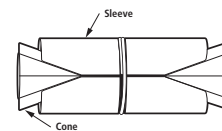
Installation Specifications

Dimension	Rod/Anchor Diameter, d					
	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size (in.)	1/2	5/8	3/4	7/8	1	1-1/4
Max. Tightening Torque, (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

Nominal outside diameter of anchor is the same as the corresponding ANSI drill bit size.

Material Specifications

Anchor Component	Component Material
Anchor Sleeve	Zamac Alloy
Cone	Zamac Alloy

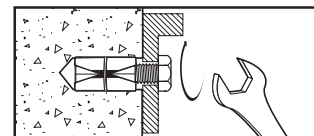
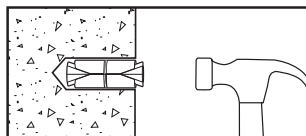
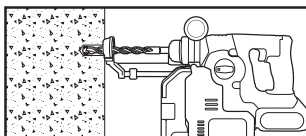


Installation Guidelines

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 B21.15. 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 outer 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 Size in.	Minimum Embedment Depth 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)	710 (3.2)	1,110 (5.0)	900 (4.0)	1,135 (5.2)	1,220 (5.5)	1,335 (6.0)
5/16 (7.9)	1-1/2 (38.1)	1,130 (5.1)	1,735 (7.8)	1,500 (6.7)	2,020 (9.1)	2,160 (9.7)	2,155 (9.7)
3/8 (9.5)	1-3/4 (44.5)	1,365 (6.1)	2,690 (12.1)	2,000 (9.0)	3,000 (13.5)	3,085 (13.9)	4,030 (18.1)
1/2 (12.7)	2-1/4 (57.2)	2,590 (11.7)	3,740 (16.8)	3,550 (16.0)	4,310 (19.4)	4,645 (20.9)	6,930 (31.2)
5/8 (15.9)	2-1/2 (63.5)	4,290 (19.3)	9,640 (43.4)	6,150 (27.7)	10,270 (46.2)	6,890 (31.0)	11,580 (52.2)
3/4 (19.1)	3-1/2 (88.9)	6,000 (27.0)	10,920 (49.2)	8,150 (36.7)	13,330 (60.0)	11,510 (51.8)	14,480 (65.2)

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. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, overhead and in sustained tensile loading applications.

Allowable Load Capacities for Double Expansion Anchor in Normal-Weight Concrete^{1,2,3}

Rod/Anchor Size in.	Minimum Embedment Depth 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)	180 (0.8)	280 (1.3)	225 (1.0)	285 (1.3)	305 (1.4)	335 (1.5)
5/16 (7.9)	1-1/2 (38.1)	285 (1.3)	435 (20)	375 (1.7)	505 (2.3)	540 (2.4)	540 (2.4)
3/8 (9.5)	1-3/4 (44.5)	340 (1.5)	675 (3.0)	500 (2.3)	750 (3.4)	770 (3.5)	1,010 (4.5)
1/2 (12.7)	2-1/4 (57.2)	650 (2.9)	935 (4.2)	890 (4.0)	1,080 (4.9)	1,160 (5.2)	1,735 (7.8)
5/8 (15.9)	2-1/2 (63.5)	1,075 (4.8)	2,410 (10.9)	1,540 (6.9)	2,570 (11.6)	1,725 (20.3)	2,895 (13.1)
3/4 (19.1)	3-1/2 (88.9)	1,500 (6.8)	2,730 (12.3)	2,040 (9.2)	3,335 (15.0)	2,880 (13.0)	3,620 (16.3)

1. Allowable load capacities listed are calculated using and applied safety factor of 4.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, overhead and in sustained tensile loading applications.
2. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.
3. The tabulated load values are applicable to single anchors installed at critical edge and spacing distances. Allowable load capacities are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances.

Ultimate and Allowable Load Capacities for Double Expansion Anchor in Hollow Concrete Masonry^{1,2,3}

Rod/Anchor Diameter d in. (mm)	Minimum Embedment Depth h in. (mm)	f'm ≥ 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)	2,710 (12.2)	3,130 (14.1)	540 (2.4)	625 (2.8)

1. Tabulated load values are for anchors installed in minimum 8-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 cells may be grouted. Masonry compressive strength must be at the specified minimum at the time of installation (f'm ≥ 1,500 psi).
2. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, and in sustained tensile loading applications.
3. Anchors with diameters of 3/8" and 1/2" 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 in. (mm)	f'm ≥ 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)	4,460 (19.8)	6,055 (27.2)	890 (4.0)	1,210 (5.4)
3/4 (19.1)	3-1/2 (88.9)	6,000 (26.7)	7,935 (35.7)	1,200 (5.3)	1,585 (7.1)

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 ≥ 1,500 psi).
2. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 20 or higher may be necessary depending upon the application such as life safety, and in sustained tensile loading applications.

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	$S_{cr} = 10d$	$F_{NS} = F_{VS} = 1.0$	$S_{min} = 5d$	$F_{NS} = F_{VS} = 0.50$
Edge Distance (c)	Tension	$C_{cr} = 8d$	$F_{NC} = 1.0$	$C_{min} = 5d$	$F_{NC} = 0.80$
	Shear	$C_{cr} = 12d$	$F_{VC} = 1.0$	$C_{min} = 5d$	$F_{VC} = 0.50$

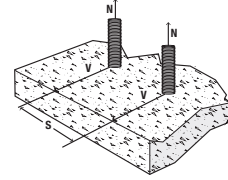
1. Allowable load values found in the performance data tables are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances. Linear interpolation is allowed for intermediate anchor spacing and edge distances between critical and minimum distances. When an 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 CONCRETE

Spacing Distance, Tension (F_{NS} and F_{VS})

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
Edge Distance, c (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	1.00	0.83	0.63	0.50
	3-3/4	1.00	1.00	1.00	0.75	0.60
	5	1.00	1.00	1.00	1.00	0.80
	6-1/4	1.00	1.00	1.00	1.00	1.00
7-1/2	1.00	1.00	1.00	1.00	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.

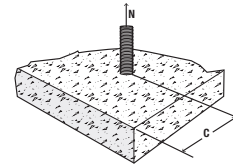


Edge Distance, Tension (F_{NC})

Dia. (in.)	1/4	5/8	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	1.00	0.90	-	-
	4	1.00	1.00	0.93	0.80	-
	4-1/2	1.00	1.00	1.00	0.85	-
	5	1.00	1.00	1.00	0.90	0.80
	6	1.00	1.00	1.00	1.00	0.88
	7-1/2	1.00	1.00	1.00	1.00	1.00
9	1.00	1.00	1.00	1.00	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.

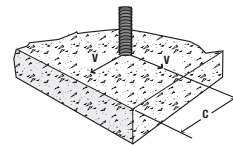


Edge Distance, Shear (F_{VC})

Dia. (in.)	1/4	5/8	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	1.00	0.75	-	-
	4	1.00	1.00	0.83	0.50	-
	4-1/2	1.00	1.00	1.00	0.63	-
	5	1.00	1.00	1.00	0.75	0.50
	6	1.00	1.00	1.00	1.00	0.70
	7-1/2	1.00	1.00	1.00	1.00	1.00
9	1.00	1.00	1.00	1.00	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 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

