PRODUCT SUBMITTAL / SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section *Page* *Paragraph* *Description*

PRODUCT SUBMITTAL / SUBSTITUTION REQUESTED:

Lag Shield shell expansion anchor by Powers Fastener, Inc.

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:

Lag Shield *Shell Expansion Anchor*

PRODUCT DESCRIPTION

The Lag Shield is a screw style anchor designed for use with lag bolts. It is suitable for use in concrete and the mortar joints of block or brick walls. In harder masonry materials, short style Lag Shields are used to reduce drilling time. The long style version is used in soft or weak masonry to better develop strength. The Lag Shield is not recommended for overhead applications.

GENERAL APPLICATIONS AND USES

- Hard and Soft Base Materials
- Mortar Joints
- Shallow Attachments
- Masonry Anchorage

FEATURES AND BENEFITS

- Ideal for use in masonry materials
- Internally threaded anchor for easy removability and service work

TESTING, APPROVALS & LISTINGS

Federal GSA Specification – Meets the descriptive and proof load requirements of CID A-A 1923A, Type 1
Tested in accordance with ASTM E 488

GUIDE SPECIFICATIONS

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

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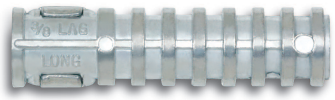


Lag Shield

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

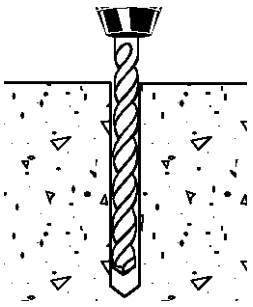
Dimension	Rod/Anchor Diameter, *d*					
	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size, d_{bit} (in.)	1/2	1/2	5/8	3/4	7/8	1
Max. Tightening Torque, T_{max} (ft.-lbs.)	5	7	10	20	30	60
Thread Size (UNC)	1/4-10	5/16-9	3/8-7	1/2-6	5/8-5	3/4-4-1/2

Material Specifications

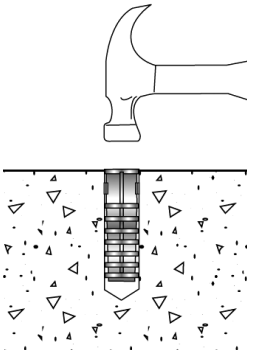
Anchor Component	Component Material
Anchor Body	Zamac Alloy

Installation Guidelines

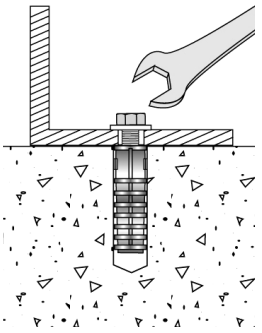
Drill a hole into the base material to the depth of at least 1/2" or one anchor diameter deeper than the embedment required. The tolerances of the drill bit used must meet the requirements of ANSI Standard B212.15.



Blow the hole clean of dust and other material. Insert the anchor into the hole until it is flush with the surface. If installing in a mortar joint, position the anchor to expand against the block or brick.



Position fixture, insert the lag bolt, and tighten. The lag bolt length selected should fully engage the entire anchor body.



(b)

PERFORMANCE DATA

Ultimate Load Capacities for Lag Shield in Normal-Weight Concrete[1]

Rod/Anchor Diameter	Minimum Embedment Depth	Minimum Concrete Compressive Strength (f'_c)					
		2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
d in. (mm)	h_v in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 Short (6.4)	1 (25.4)	200 (0.9)	790 (3.5)	280 (1.2)	1,005 (4.1)	370 (1.6)	1,005 (4.5)
1/4 Long (6.4)	1 1/2 (38.1)	300 (1.3)	790 (3.5)	345 (1.5)	1,005 (4.1)	425 (1.9)	1,005 (4.5)
5/16 Short (7.9)	1 1/4 (31.8)	315 (1.4)	995 (4.4)	515 (2.3)	1,115 (4.9)	660 (2.9)	1,115 (4.9)
5/16 Long (7.9)	1 3/4 (44.5)	375 (1.7)	995 (4.4)	550 (2.4)	1,115 (4.9)	570 (2.5)	1,115 (4.9)
3/8 Short (9.5)	1 3/4 (44.5)	590 (2.6)	1,175 (5.2)	855 (3.8)	1,450 (6.4)	910 (4.0)	1,450 (6.4)
3/8 Long (9.5)	2 1/2 (63.5)	740 (3.3)	1,175 (5.2)	1,080 (4.8)	1,450 (6.4)	1,290 (5.7)	1,450 (64)
1/2 Short (12.7)	2 (50.8)	800 (3.6)	1,335 (5.9)	1,190 (5.3)	1,600 (7.1)	1,265 (5.6)	1,600 (7.1)
1/2 Long (12.7)	3 (76.2)	1,460 (6.5)	1,335 (5.9)	2,110 (9.4)	1,600 (7.1)	2,370 (10.5)	1,600 (7.1)
5/8 Short (15.9)	2 (50.8)	855 (3.8)	2,000 (8.9)	1,230 (5.5)	2,250 (10.0)	1,355 (6.0)	2,250 (10.0)
5/8 Long (15.9)	3 1/2 (88.9)	1,730 (7.7)	2,000 (8.9)	2,660 (10.8)	2,250 (10.0)	2,985 (13.2)	2,250 (10.0)
3/4 Short (19.1)	2 (50.8)	930 (4.1)	2,000 (8.9)	1,540 (6.8)	2,400 (10.6)	1,640 (17.3)	2,400 (10.6)
3/4 Long (19.1)	3 1/2 (88.9)	2,045 (9.1)	2,000 (8.9)	2,800 (12.5)	2,400 (10.6)	2,935 (13.0)	2,400 (10.6)

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. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.

Allowable Load Capacities for Lag Shield in Normal-Weight Concrete[1,2,3]

Rod/Anchor Diameter	Minimum Embedment Depth	Minimum Concrete Compressive Strength (f'_c)					
		2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
d in. (mm)	h_v in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 Short (6.4)	1 (25.4)	50 (0.2)	200 (0.9)	70 (0.3)	250 (1.1)	90 (0.4)	250 (1.1)
1/4 Long (6.4)	1 1/2 (38.1)	75 (0.3)	200 (0.9)	85 (0.4)	250 (1.1)	105 (0.5)	250 (1.1)
5/16 Short (7.9)	1 1/4 (31.8)	80 (0.3)	245 (1.1)	130 (0.6)	275 (1.2)	165 (0.7)	275 (1.2)
5/16 Long (7.9)	1 3/4 (44.5)	90 (0.4)	245 (1.1)	135 (0.6)	275 (1.2)	140 (0.6)	275 (1.2)
3/8 Short (9.5)	1 3/4 (44.5)	145 (0.6)	290 (1.3)	210 (0.9)	360 (1.6)	225 (1.0)	360 (1.6)
3/8 Long (9.5)	2 1/2 (63.5)	185 (0.8)	290 (1.3)	270 (1.2)	360 (1.6)	320 (1.4)	360 (1.6)
1/2 Short (12.7)	2 (50.8)	200 (1.9)	330 (1.5)	300 (1.3)	400 (1.8)	315 (1.4)	400 (1.8)
1/2 Long (12.7)	3 (76.2)	365 (1.6)	330 (1.5)	525 (2.3)	400 (1.8)	590 (2.6)	400 (1.8)
5/8 Short (15.9)	2 (50.8)	215 (1.9)	500 (2.2)	305 (1.1)	560 (2.5)	335 (1.5)	560 (2.5)
5/8 Long (15.9)	3 1/2 (88.9)	430 (1.9)	500 (2.2)	665 (3.0)	560 (2.5)	745 (3.3)	560 (2.5)
3/4 Short (19.1)	2 (50.8)	230 (1.0)	500 (2.2)	385 (1.7)	600 (2.7)	410 (1.8)	600 (2.7)
3/4 Long (19.1)	3 1/2 (88.9)	510 (2.3)	500 (2.2)	700 (3.1)	600 (2.7)	730 (3.2)	600 (2.7)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
2. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.

(a1)

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Lag Shield in Hollow Concrete Masonry[1,2,3,4]

Rod/Anchor Diameter d in. (mm)	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 Short (6.4)	1 (25.4)	230 (1.0)	720 (3.2)	45 (0.2)	145 (0.7)
5/16 Short (7.9)	1 1/4 (31.8)	360 (1.6)	1,025 (4.6)	70 (0.3)	205 (0.9)
3/8 Short (9.5)	1 1/2 (38.1)	795 (3.6)	1,125 (5.1)	160 (0.7)	225 (1.0)
1/2 Short (12.7)	1 1/2 (38.1)	1,025 (4.6)	1,600 (7.2)	205 (0.9)	320 (1.4)

1. Tabulated load values are for anchors installed in minimum 6-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. Concrete masonry units may be grouted.
2. Allowable loads are based on average ultimate values using a safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.
3. Anchors with diameters of 3/8" and greater installed in hollow concrete masonry units are limited to one anchor per unit cell.
4. Anchors installed flush with face shell surface. The wall thickness of the masonry unit must be equal to or greater than the embedment depth.

Ultimate and Allowable Load Capacities for Lag Shield in Clay Brick Masonry[1,2]

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 Short (6.4)	1 (25.4)	240 (1.1)	1,025 (4.6)	50 (0.2)	205 (0.9)
5/16 Short (7.9)	1 1/4 (31.8)	425 (1.9)	1,485 (6.7)	85 (0.4)	295 (1.3)
3/8 Short (9.5)	1 3/4 (44.5)	1,190 (5.4)	1,620 (7.3)	240 (1.1)	325 (1.5)
1/2 Short (12.7)	2 (50.8)	1,230 (5.5)	2,140 (9.6)	245 (1.1)	430 (1.9)

1. Tabulated load values are for anchors installed in Grade SW multiple wythe, solid brick masonry conforming to ASTM C62.
2. Allowable loads are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety.

DESIGN CRITERIA (ALLOWABLE STRESS DESIGH)

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	$s_{cr} = 10d$	$F_{Ns} = F_{Vs} = 1.0$	$s_{min} = 5d$	$F_{Ns} = F_{Vs} = 0.50$
Edge Distance (c)	Tension	$c_{cr} = 12d$	$F_{Nc} = 1.0$	$c_{min} = 8d$	$F_{Nc} = 0.80$
	Shear	$c_{cr} = 12d$	$F_{Vc} = 1.0$	$c_{min} = 8d$	$F_{Vc} = 0.50$

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.

(b)

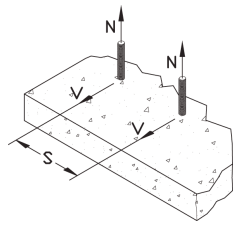
DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight Concrete

Spacing, Tension (F_{N_S}) & Shear (F_{V_S})							
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.

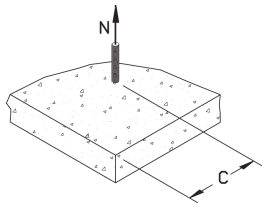
Minimum spacing (s_{min}) is equal to 5 anchor diameters (5d) at which the anchor achieves 50% of load.



Edge Distance, Tension (F_{N_c})							
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.

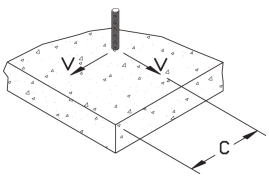
Minimum edge distance (c_{min}) is equal to 8 anchor diameters (8d) at which the anchor achieves 80% of load.



Edge Distance, Shear (F_{V_c})							
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.

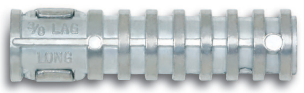
Minimum edge distance (c_{min}) is equal to 8 anchor diameters (8d) at which the anchor achieves 50% of load.



ORDERING INFORMATION

Lag Shield Anchor

Catalog Number	Size	Drill Diameter	Length	Thread Length	Standard Box	Standard Carton	Wt./ 100
1051	1/4" Short	1/2"	1"	1/2"	50	500	3
1055	1/4" Long	1/2"	1 1/2"	1"	50	500	4
1101	5/16" Short	1/2"	1 1/4"	3/4"	50	500	3
1105	5/16" Long	1/2"	1 3/4"	1"	50	500	4 1/4
1151	3/8" Short	5/8"	1 3/4"	1"	50	500	6 3/4
1155	3/8" Long	5/8"	2 1/2"	1 1/2"	50	250	9 1/2
1201	1/2" Short	3/4"	2"	1 1/8"	50	500	9 1/4
1205	1/2" Long	3/4"	3"	1 7/8"	50	200	14 1/4
1251	5/8" Short	7/8"	2"	1"	25	125	13
1255	5/8" Long	7/8"	3 1/2"	2 1/4"	25	125	22
1301	3/4" Short	1"	2"	1 1/8"	25	125	16
1305	3/4" Long	1"	3 1/2"	2 1/4"	25	100	24 1/2



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