Zinc-Plated Carbon-Steel Strong-Bolt 2 Tension and Shear Loads in 8" Lightweight, Medium-Weight and Normal-Weight Grout-Filled CMU

IBC *

Size in. (mm)	Drill Bit Diameter (in.)	Min. Embed. Depth in. (mm)	Install. Torque ft.-lb. (N-m)	Critical Edge Dist. in. (mm)	Critical End Dist. in. (mm)	Critical Spacing in. (mm)	Tension Load		Shear Load	
							Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
Anchor Installed in the Face of the CMU Wall (See Figure 1)										
¼ (6.4)	¼	1¾ (45)	4 (5.4)	12 (305)	12 (305)	8 (203)	1,150 (5.1)	230 (1.0)	1,500 (6.7)	300 (1.3)
⅜ (9.5)	⅜	2⅝ (67)	20 (27.1)	12 (305)	12 (305)	8 (203)	2,185 (9.7)	435 (1.9)	3,875 (17.2)	775 (3.4)
½ (12.7)	½	3½ (89)	35 (47.5)	12 (305)	12 (305)	8 (203)	2,645 (11.8)	530 (2.4)	5,055 (22.5)	1,010 (4.5)
⅝ (15.9)	⅝	4⅜ (111)	55 (74.6)	20 (508)	20 (508)	8 (203)	4,460 (19.8)	890 (4.0)	8,815 (39.2)	1,765 (7.9)
¾ (19.1)	¾	5¼ (133)	100 (135.6)	20 (508)	20 (508)	8 (203)	5,240 (23.3)	1,050 (4.7)	12,450 (55.4)	2,490 (11.1)

1. The tabulated allowable loads are based on a safety factor of 5.0 for installation under the IBC and IRC.
2. Listed loads may be applied to installations on the face of the CMU wall at least 1¼" away from head joints.
3. Values for 8"-wide concrete masonry units (CMU) with a minimum specified compressive strength of masonry, f'_m, at 28 days is 1,500 psi.
4. Embedment depth is measured from the outside face of the concrete masonry unit.
5. Tension and shear loads may be combined using the parabolic interaction equation (n = ⅝).
6. Refer to allowable load adjustment factors for edge distance and spacing on p. 106.

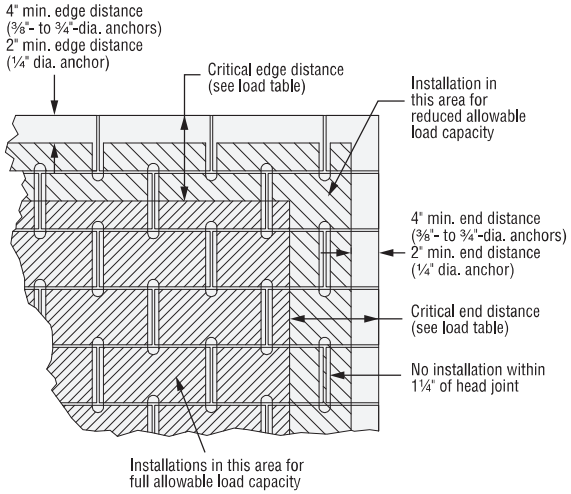

Figure 1

Zinc-Plated Carbon-Steel Strong-Bolt 2 Tension and Shear Loads in 8" Lightweight, Medium-Weight and Normal-Weight Grout-Filled CMU

IBC *

Size in. (mm)	Drill Bit Diameter in.	Min. Embed. Depth. in. (mm)	Install. Torque ft.-lb. (N-m)	Min. Edge Dist. in. (mm)	Critical End Dist. in. (mm)	Critical Spacing in. (mm)	Tension Load		Shear Load Perpendicular to Edge		Shear Load Parallel to Edge	
							Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
Anchor Installed in Cell Opening or Web (Top of Wall) (See Figure 2)												
½ (12.7)	½	3½ (89)	35 (47.5)	1¾ (45)	12 (305)	8 (203)	2,080 (9.3)	415 (1.8)	1,165 (5.2)	235 (1.0)	3,360 (14.9)	670 (3.0)
⅝ (15.9)	⅝	4⅜ (111)	55 (74.6)	1¾ (45)	12 (305)	8 (203)	3,200 (14.2)	640 (2.8)	1,370 (6.1)	275 (1.2)	3,845 (17.1)	770 (3.4)

1. The tabulated allowable loads are based on a safety factor of 5.0 for installation under the IBC and IRC.
2. Values for 8"-wide concrete masonry units (CMU) with a minimum specified compressive strength of masonry, f'_m, at 28 days is 1,500 psi.
3. Tension and shear loads may be combined using the parabolic interaction equation (n = ⅝).
4. Refer to allowable load adjustment factors for edge distance and spacing on p. 106.

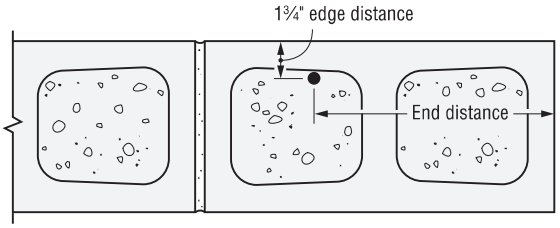

Figure 2

**See p. 14 for an explanation of the load table icons.*

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Strong-Bolt® 2 Design Information — Masonry

Zinc-Plated Carbon-Steel Strong-Bolt 2 Allowable Load Adjustment Factors for Face-of-Wall Installation in 8" Grout-Filled CMU: Edge Distance and Spacing, Tension and Shear Loads

How to use these charts:

1. The following tables are for reduced edge distance and spacing.
2. Locate the anchor size to be used for either a tension and/or shear load application.
3. Locate the embedment (E) at which the anchor is to be installed.
4. Locate the edge distance (c_{act}) or spacing (s_{act}) at which the anchor is to be installed.
5. The load adjustment factor (f_c or f_s) is the intersection of the row and column.
6. Multiply the allowable load by the applicable load adjustment factor.
7. Reduction factors for multiple edges or spacings are multiplied together.

Edge or End Distance Tension (f_c)

c_{act} (in.)	Dia.	¼	⅜	½	⅝	¾
	E	1¾	2⅝	3½	4⅜	5¼
	c_{cr}	12	12	12	20	20
	c_{min}	2	4	4	4	4
	f_{cmin}	**1.00**	**1.00**	**1.00**	**1.00**	**0.97**
2		1.00				
4		1.00	1.00	1.00	1.00	0.97
6		1.00	1.00	1.00	1.00	0.97
8		1.00	1.00	1.00	1.00	0.98
10		1.00	1.00	1.00	1.00	0.98
12		1.00	1.00	1.00	1.00	0.99
14					1.00	0.99
16					1.00	0.99
18					1.00	1.00
20					1.00	1.00

Edge or End Distance Shear (f_c)

c_{act} (in.)	Dia.	¼	⅜	½	⅝	¾
	E	1¾	2⅝	3½	4⅜	5¼
	c_{cr}	12	12	12	20	20
	c_{min}	2	4	4	4	4
	f_{cmin}	**0.88**	**0.71**	**0.60**	**0.36**	**0.28**
2		0.88				
4		0.90	0.71	0.60	0.36	0.28
6		0.93	0.78	0.70	0.44	0.37
8		0.95	0.86	0.80	0.52	0.46
10		0.98	0.93	0.90	0.60	0.55
12		1.00	1.00	1.00	0.68	0.64
14					0.76	0.73
16					0.84	0.82
18					0.92	0.91
20					1.00	1.00

Spacing Tension (f_s)

s_{act} (in.)	Dia.	¼	⅜	½	⅝	¾
	E	1¾	2⅝	3½	4⅜	5¼
	s_{cr}	8	8	8	8	8
	s_{min}	4	4	4	4	4
	f_{smin}	**1.00**	**1.00**	**0.93**	**0.86**	**0.80**
4		1.00	1.00	0.93	0.86	0.80
6		1.00	1.00	0.97	0.93	0.90
8		1.00	1.00	1.00	1.00	1.00

Spacing Shear (f_s)

s_{act} (in.)	Dia.	¼	⅜	½	⅝	¾
	E	1¾	2⅝	3½	4⅜	5¼
	s_{cr}	8	8	8	8	8
	s_{min}	4	4	4	4	4
	f_{smin}	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
4		1.00	1.00	1.00	1.00	1.00
6		1.00	1.00	1.00	1.00	1.00
8		1.00	1.00	1.00	1.00	1.00

Load Adjustment Factors for Carbon-Steel Strong-Bolt 2 Wedge Anchors in Top-of-Wall Installation in 8" Grout-Filled CMU: Edge Distance and Spacing, Tension and Shear Loads

End Distance Tension (f_c)

s_{act} (in.)	Dia.	½	⅝
	E	3½	4⅜
	c_{cr}	12	12
	c_{min}	4	4
	f_{cmin}	**1.00**	**1.00**
4		1.00	1.00
6		1.00	1.00
8		1.00	1.00
10		1.00	1.00
12		1.00	1.00

End Distance Shear Perpendicular to Edge (f_c)

c_{act} (in.)	Dia.	½	⅝
	E	3½	4⅜
	c_{cr}	12	12
	c_{min}	4	4
	f_{cmin}	**0.90**	**0.83**
4		0.90	0.83
6		0.93	0.87
8		0.95	0.92
10		0.98	0.96
12		1.00	1.00

End Distance Shear Parallel to Edge (f_c)

c_{act} (in.)	Dia.	½	⅝
	E	3½	4⅜
	c_{cr}	12	12
	c_{min}	4	4
	f_{cmin}	**0.53**	**0.50**
4		0.53	0.50
6		0.65	0.63
8		0.77	0.75
10		0.88	0.88
12		1.00	1.00

Spacing Tension (f_s)

s_{act} (in.)	Dia.	½	⅝
	E	3½	4⅜
	s_{cr}	8	8
	s_{min}	4	4
	f_{cmin}	0.93	0.86
4		0.93	0.86
6		0.97	0.93
8		1.00	1.00

Spacing Shear Perpendicular or Parallel to Edge (f_s)

s_{act} (in.)	Dia.	½	⅝
	E	3½	4⅜
	s_{cr}	8	8
	s_{min}	4	4
	f_{cmin}	1.00	1.00
4		1.00	1.00
6		1.00	1.00
8		1.00	1.00

For footnotes, please see p. 105.

*See p. 14 for an explanation of the load table icons.

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