

**STRONG-BOLT™** Wedge Anchor for Cracked and Uncracked Concrete



**Strong-Bolt™ Anchor Shear Design Data<sup>1</sup>**

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)										
			1/2			5/8			3/4			1	
Embedment Depth	$h_{nom}$	in.	2 3/4	3 3/8	5	3 3/8	5 1/8	6 1/8	4 1/8	5 3/4	7 1/2	5 1/4	9 3/4
<b>Steel Strength in Shear</b>													
Nominal Steel Strength in Shear	$V_{sa}$	lb.	6,560			10,475			19,305			15,020	
Strength Reduction Factor – Steel Failure	$\phi$	–	0.65 <sup>2</sup>			0.65 <sup>2</sup>			0.60 <sup>2</sup>			0.65 <sup>2</sup>	
<b>Concrete Breakout Strength in Shear<sup>5</sup></b>													
Outside Diameter	$d_o$	in.	0.5			0.625			0.75			1.00	
Load Bearing Length of Anchor in Shear	$\ell_e$	in.	2.25	3.375	4.00	2.75	4.50	5.00	3.375	5.00	6.00	4.50	8.00
Strength Reduction Factor – Concrete Breakout Failure	$\phi$	–	0.70 <sup>3</sup>										
<b>Concrete Pryout Strength in Shear</b>													
Coefficient for Pryout Strength	$k_{cp}$	–	1.0	2.0									
Strength Reduction Factor – Concrete Pryout Failure	$\phi$	–	0.70 <sup>4</sup>										
<b>Steel Strength in Shear for Seismic Applications</b>													
Nominal Steel Strength in Shear for Seismic Loads	$V_{eq}$	lb	6,560			8,380	9,715	10,475	15,445	17,305	19,305	15,020	
Strength Reduction Factor – Steel Failure	$\phi$	–	0.65 <sup>2</sup>			0.65 <sup>2</sup>			0.60 <sup>2</sup>			0.65 <sup>2</sup>	

- The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
- The value of  $\phi$  applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D4.5 to determine the appropriate value of  $\phi$ . The 3/4 inch diameter is considered as a brittle steel element. The 1/2 inch, 5/8 inch, and 1 inch diameters are considered as ductile steel elements.
- The value of  $\phi$  applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D4.4(c) for Condition A are met, refer to Section D4.4 to determine the appropriate value of  $\phi$ . If the load combinations of ACI 318 Appendix C are used, refer to Section D4.5 to determine the appropriate value of  $\phi$ .
- The value of  $\phi$  applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D4.5 to determine the appropriate value of  $\phi$ .
- For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of  $V_n$  by multiplying all values of  $\sqrt{f'_c}$  affecting  $V_n$  by 0.60. All-lightweight concrete is beyond the scope of this table.

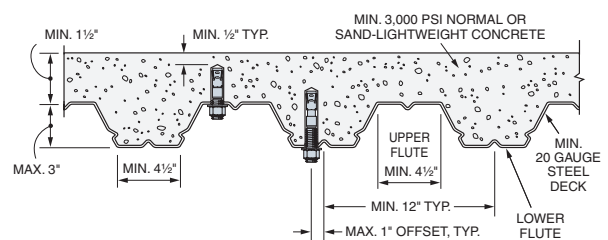
Mechanical Anchors

**Strong-Bolt™ Anchor Tension and Shear Data for Normal-Weight or Sand-Lightweight Concrete over Metal Deck<sup>1,2</sup>**



\*See page 10 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)			
			1/2		5/8	
Embedment Depth	$h_{nom}$	in.	2 3/4	4 1/2	3 3/8	5 3/8
Effective Embedment Depth	$h_{ef}$	in.	2.25	4.00	2.75	5.00
Installation Torque	$T_{inst}$	ft-lb	40	40	40	50
Pullout Resistance, concrete on metal deck (cracked) <sup>3,4</sup>	$N_{pn,deck,cr}$	lb	1,335 <sup>6</sup>	1,905	2,835	3,665
Pullout Resistance, concrete on metal deck (uncracked) <sup>3,4</sup>	$N_{pn,deck,uncr}$	lb	1,830 <sup>6</sup>	2,610	3,780	4,885
Steel Strength in Shear, concrete on metal deck <sup>5</sup>	$V_{st,deck}$	lb	4,405 <sup>6</sup>	6,690	6,270	8,865



**Figure A**  
**Installation in Concrete over Metal Deck**

- The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
- Concrete compressive strength shall be 3,000 psi minimum.
- For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, as shown in Figure A, calculation of the concrete breakout strength may be omitted.
- In accordance with ACI 318 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies  $N_{pn,deck,cr}$  shall be substituted for  $N_{pn,cr}$ . Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete  $N_{pn,deck,uncr}$  shall be substituted for  $N_{pn,uncr}$ .
- In accordance with ACI 318 Section D.6.1.2 (c), the shear strength for anchors installed in the soffit of sand-lightweight or normal-weight-concrete-over-metal-deck floor and roof assemblies  $V_{st,deck}$  shall be substituted for  $V_{sa}$ .
- Values applicable to both the lower and the upper flute, see Figure A.
- Minimum distance to edge of panel is  $2h_{ef}$ .