



## PULLOUT LOADS IN STEEL AND CONCRETE



### Performance Tables

#### FASTENERS IN STEEL

PART NUMBER SERIES	SHANK DIA. (INCH)	TYPE OF SHANK	INSTALLED IN A36 STRUCTURAL STEEL—STEEL THICKNESS (INCHES)									
			ALLOWABLE LOAD — <i>Ultimate Load</i>									
			3/16		1/4		3/8		1/2		3/4	
		TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	
1500/1600	0.145	SMOOTH	<b>81</b> <i>790</i>	<b>373</b> <i>2039</i>	<b>181</b> <i>1269</i>	<b>273</b> <i>1642</i>	<b>397</b> <i>2169</i>	<b>489</b> <i>2771</i>	<b>243</b> <i>1328<sup>8</sup></i>	<b>277</b> <i>1514<sup>8</sup></i>	----	----
		KNURLED	<b>296</b> <i>1633</i>	<b>636</b> <i>3516</i>	<b>584</b> <i>3384</i>	<b>659</b> <i>3822</i>	<b>680</b> <i>3755</i>	<b>730</b> <i>4030</i>	<b>253</b> <i>1459<sup>8</sup></i>	<b>293</b> <i>1632<sup>8</sup></i>	----	----
SP	0.150	SMOOTH	<b>385</b> <i>2107</i>	<b>662</b> <i>3618</i>	<b>445</b> <i>2549</i>	<b>477</b> <i>2736</i>	<b>393</b> <i>2145</i>	<b>574</b> <i>3137</i>	<b>948</b> <i>5180</i>	<b>597</b> <i>3500</i>	<b>234</b> <i>1244<sup>8</sup></i>	<b>356</b> <i>1895<sup>8</sup></i>
3300	0.180	SMOOTH	<b>281</b> <i>1536</i>	<b>580</b> <i>3169</i>	<b>385</b> <i>2212</i>	<b>507</b> <i>2931</i>	<b>460</b> <i>2631</i>	<b>644</b> <i>3518</i>	<b>641</b> <i>3499</i>	<b>684</b> <i>3739</i>	----	----
9100	0.205	KNURLED	<b>160</b> <i>1469</i>	<b>931</b> <i>5084</i>	<b>350</b> <i>3115</i>	<b>617</b> <i>3542</i>	<b>843</b> <i>4605</i>	<b>803</b> <i>4391</i>	<b>565</b> <i>3086<sup>9</sup></i>	<b>547</b> <i>3373<sup>9</sup></i>	----	----

PART NUMBER SERIES	SHANK DIA. (INCH)	TYPE OF SHANK	INSTALLED IN A572 GRADE 50 STRUCTURAL STEEL—STEEL THICKNESS (INCHES)									
			ALLOWABLE LOAD — <i>Ultimate Load</i>									
			3/16		1/4		3/8		1/2		3/4	
		TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	
1500/1600	0.145	SMOOTH	----	----	----	----	----	----	----	----	----	----
		KNURLED	<b>260</b> <i>1609</i>	<b>499</b> <i>3182</i>	<b>579</b> <i>3411</i>	<b>725</b> <i>4272</i>	<b>383</b> <i>2216<sup>7</sup></i>	<b>595</b> <i>3431<sup>7</sup></i>	----	----	----	----
SP	0.150	SMOOTH	<b>356</b> <i>2123</i>	<b>569</b> <i>3394</i>	<b>554</b> <i>3232</i>	<b>637</b> <i>3710</i>	<b>604</b> <i>3447</i>	<b>602</b> <i>3437</i>	<b>814</b> <i>4473<sup>9</sup></i>	<b>820</b> <i>4503<sup>9</sup></i>	<b>243</b> <i>1362<sup>8</sup></i>	<b>381</b> <i>2147<sup>8</sup></i>
3300	0.180	SMOOTH	----	----	----	----	----	----	----	----	----	----
9100	0.205	KNURLED	<b>365</b> <i>2175</i>	<b>903</b> <i>5385</i>	<b>697</b> <i>4061</i>	<b>907</b> <i>5285</i>	<b>155</b> <i>842<sup>7</sup></i>	<b>376</b> <i>2143<sup>7</sup></i>	----	----	----	----

**Note 1:** ALLOWABLE loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190. **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor. **Note 5:** Job site testing may be required to determine actual job site values. **Note 6:** Values shown are for fastenings that have the entire pointed end of the fastener driven through the steel plate; except as noted below. **Note 7:** Fastener penetration is 3/8" minimum. **Note 8:** Fastener penetration is 7/16" minimum. **Note 9:** Fastener penetration is 1/2" minimum. **Note 10:** For Sl: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

#### FASTENERS IN LIGHTWEIGHT CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	ALLOWABLE WORKING VALUES INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE							
			ALLOWABLE LOAD — <i>Ultimate Load</i>							
			3000 PSI LIGHTWEIGHT W/DECKING				3000 PSI LIGHTWEIGHT			
			LOWER FLUTE TENSION	LOWER FLUTE SHEAR	TENSION	SHEAR	TENSION	SHEAR		
1500 SERIES	0.145	3/4	<b>76</b>	<i>395</i>	<b>260</b>	<i>1409</i>	<b>167</b>	<i>837</i>	<b>179</b>	<i>894</i>
		1	<b>134</b>	<i>668</i>	<b>265</b>	<i>1505</i>	<b>200</b>	<i>998</i>	<b>228</b>	<i>1141</i>
		1-1/4	<b>157</b>	<i>784</i>	<b>269</b>	<i>1344</i>	<b>333</b>	<i>1664</i>	<b>400</b>	<i>2090</i>
		1-1/2	<b>233</b>	<i>1163</i>	<b>346</b>	<i>1728</i>	<b>391</b>	<i>1957</i>	<b>410</b>	<i>2050</i>
SP SERIES	.150/.180	1	<b>119</b>	<i>593</i>	<b>336</b>	<i>1679</i>	<b>226</b>	<i>1129</i>	<b>250</b>	<i>1249</i>
		1-1/4	<b>175</b>	<i>957</i>	<b>372</b>	<i>1860</i>	<b>329</b>	<i>1644</i>	<b>377</b>	<i>1885</i>
		1-1/2	<b>179</b>	<i>1055</i>	<b>426</b>	<i>2128</i>	<b>406</b>	<i>2030</i>	<b>380</b>	<i>1900</i>
9100 SERIES	0.205	3/4	<b>70</b>	<i>351</i>	<b>277</b>	<i>1386</i>	----	----	----	----
		1	<b>112</b>	<i>559</i>	<b>378</b>	<i>1891</i>	----	----	----	----
		1-1/4	<b>118</b>	<i>689</i>	----	----	----	----	----	----

**Note 1:** ALLOWABLE loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190. **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Values shown in concrete are for the fastener only. Connected members must be investigated separately. **Note 5:** Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor. **Note 6:** Job site testing may be required to determine actual job site values. **Note 7:** For Sl: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

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