

Rivnut® Mechanical Properties

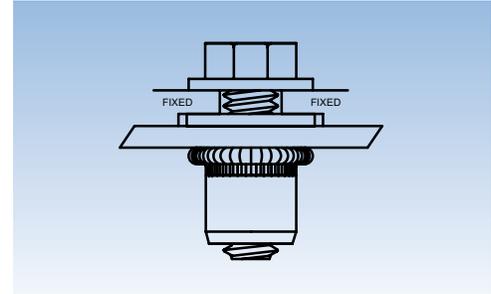
Please note that the test data provided are averages of multiple tests. This data is provided for comparative information only. Test data will vary with each actual application. Bollhoff suggests that tests are performed on actual application components before a Rivnut® fastener is specified.

Assembly Torques for Rivnut® and Rivstud® Fasteners

The following assembly torques are suggested for corresponding mating fasteners based on international fastening standards for Grade 5 and Metric Class 8.8 fasteners. Inch sizes shown in inch pounds, metric sizes shown in Newton meters.

Type	6-32	8-32	10-32	1/4-20	5/16-18	3/8-16	1/2-13
Steel Rivnut	12	22	36	75	156	276	660

Type	M4	M5	M6	M8	M10	M12
Steel Rivnut	2.5	5.0	8.6	21.0	42.0	72.0

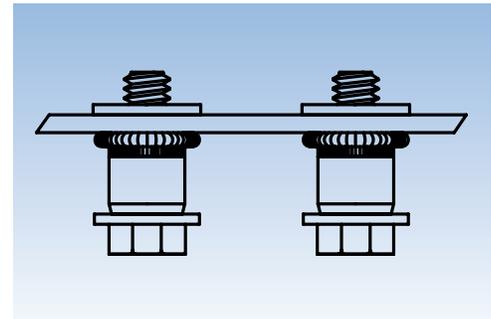


Spin-Out Torques for Steel Rivnut® Fasteners in Steel Sheet Metal

Inch sizes shown in inch pounds, metric sizes shown in Newton meters.

Type	Mat Tks	6-32	8-32	10-32	1/4-20	5/16-18	3/8-16	1/2-13
EZ Round	.030	19	19	21	39	60	230	
EZ Hex	.030		35	71	110	170	290	

Type	Mat Tks	M3	M4	M5	M6	M8	M10	M12
EZ Round	.76 mm	2.2	2.2	2.4	4.4	6.6	26.9	
EZ Hex	.76 mm		4.0	8.1	12.6	19.4	32.8	

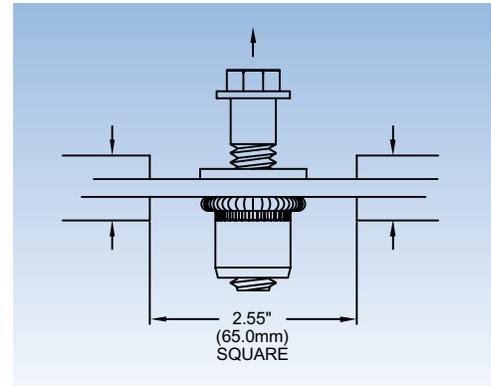


Pull-Out Strength for Rivnut® Fasteners in Steel Sheet Metals

Inch sizes shown in pounds, metric sizes shown in Kilo Newtons.

Type	Mat Tks	6-32	8-32	10-32	1/4-20	5/16-18	3/8-16	1/2-13
EZ Round	.030	330	330	385	480	500	590	
EZ Hex	.030		345	415	435	450	460	
Plusnut	.030	500	575	690	1215	1500	1675	

Type	Mat Tks	M3	M4	M5	M6	M8	M10	M12
EZ Round	.76 mm	1.47	1.47	1.71	2.14	2.22	2.62	
EZ Hex	.76 mm		1.54	1.85	1.93	2.00	2.05	
Plusnut	.76 mm		2.56	3.07	5.40	6.67	7.45	

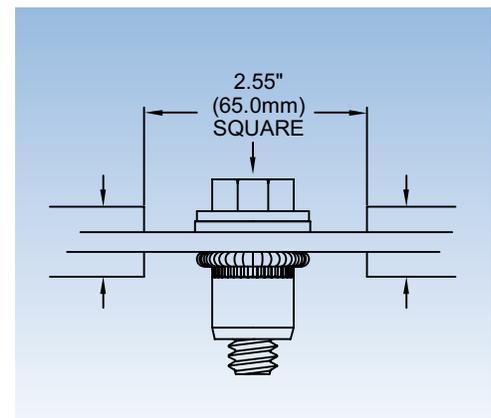


Push-Out Strength for Rivnut® Fasteners in .125 Thick Steel

Inch sizes shown in pounds, with metric sizes shown in Kilo Newtons.

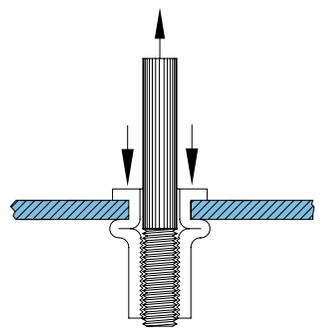
Type	Mat Tks	1/4-20	5/16-18	3/8-16	1/2-13
EZ Round	.120	950	1650	1900	
EZ Hex	.120	1875	2150	2250	
Rivnut®	.120	2025	2800	3600	3775

Type	Mat Tks	M6	M8	M10	M12
EZ Round	3 mm	4.2	7.3	8.4	
EZ Hex	3 mm	8.3	9.5	10.0	
Rivnut®	3 mm	9.0	12.4	16.0	16.5



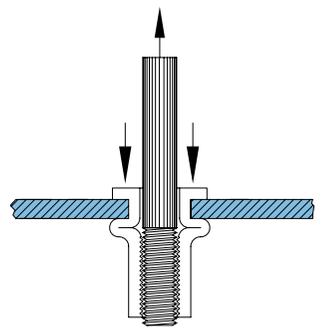
Upset Load (lbs.)						
RIVNUT* Size	Aluminum		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
#4-40	400	450	700	800	800	900
#6-32	500	600	850	1000	1000	1300
#8-32	600	700	1000	1250	1400	1650
#10-32	750	800	1300	1500	1900	2000
1/4-20	1300	1450	2300	2610	3300	3400
5/16-18	1900	2150	3300	3650	4800	5600
3/8-16	2570	2700	4965	5325	6100	6660
1/2-13	3000	3400	5800	6300	7200	7600

Fig. 1



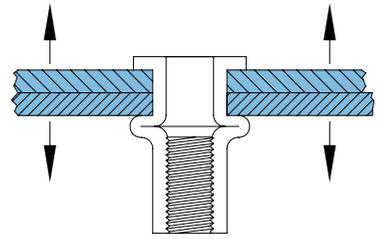
Ultimate thread strength (lbs.)						
RIVNUT* Size	Aluminum		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
#4-40	675	575	1180	1000	1600	1300
#6-32	964	820	1705	1450	2400	2000
#8-32	1095	935	1920	1630	3000	2200
#10-32	1600	1450	3000	2500	4000	3500
1/4-20	2500	2400	5240	4520	6000	5100
5/16-18	4000	3700	7625	6300	8700	7500
3/8-16	4700	4450	11500	10450	11700	9650
1/2-13	7900	6400	17250	14500	NA	NA

Fig.2



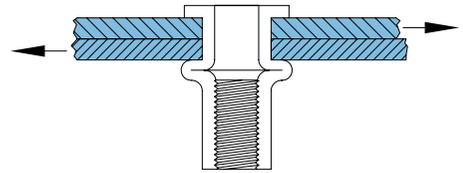
Ultimate tensile strength (lbs.)			
RIVNUT* Size	Aluminum	Steel	Stainless Steel
#4-40	261	458	621
#6-32	373	656	889
#8-32	485	853	1153
#10-32	617	1085	1470
1/4-20	1150	1850	2510
5/16-18	1600	2750	3730
3/8-16	2075	3900	5280
1/2-13	3100	4900	NA

Fig. 3



Ultimate shear strength (lbs.)			
RIVNUT* Size	Aluminum	Steel	Stainless Steel
#4-40	158	316	515
#6-32	230	460	749
#8-32	294	588	958
#10-32	374	748	1220
1/4-20	710	1100	1790
5/16-18	930	1750	2850
3/8-16	1260	2420	3940
1/2-13	1270	2440	3970

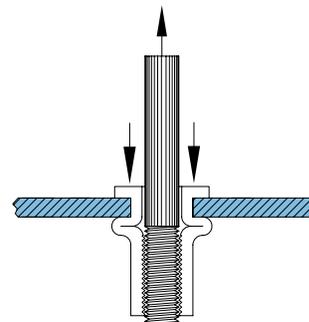
Fig. 4



Upset Load (N) See Fig. 1

RIVNUT® Size	Aluminum		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
M3 x 0.5	925	1059	1859	1957	3149	3447
M4 x 0.7	2678	3221	4915	5089	7620	8020
M5 x 0.8	4106	4555	7549	8332	9684	11717
M6 x 1.0	6210	6806	10903	12273	16116	16974
M8 x 1.25	8314	9074	13434	16214	18927	21627
M10 x 1.50	9194	9995	15071	16556	20146	21863
M12 x 1.75	19572	20795	32490	35399	42227	51288

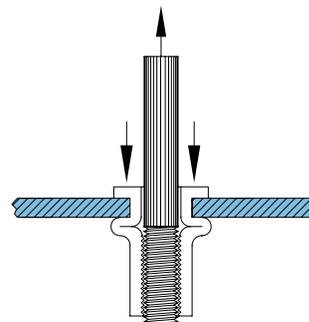
Fig. 1



Ultimate thread strength (N) See Fig. 2

RIVNUT® Size	Aluminum		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
M3 x 0.5	2300	1984	5075	4266	7878	7495
M4 x 0.7	5342	5053	9924	9617	13936	12330
M5 x 0.8	8251	7308	13727	14457	23100	19034
M6 x 1.0	10987	11121	23095	21218	30737	30350
M8 x 1.25	20150	18393	28736	25764	44393	39131
M10 x 1.50	25253	18651	33793	27623	50042	49446
M12 x 1.75	42779	35644	70135	62796	99694	88964

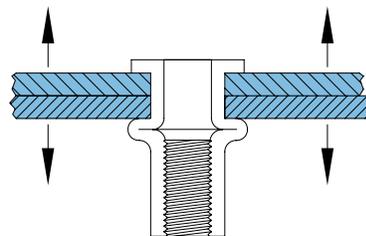
Fig.2



Ultimate tensile strength (N) See Fig. 3

RIVNUT® Size	Aluminum	Steel	Stainless Steel
M3 x 0.5	792	1503	2037
M4 x 0.7	1846	3447	5107
M5 x 0.8	2576	4889	7082
M6 x 1.0	4066	7709	10440
M8 x 1.25	5743	10765	14795
M10 x 1.50	6859	13011	17842
M12 x 1.75	12927	22370	33526

Fig. 3



Ultimate shear strength (N) See Fig. 4

RIVNUT® Size	Aluminum	Steel	Stainless Steel
M3 x 0.5	414	1223	1899
M4 x 0.7	1223	2451	3541
M5 x 0.8	2353	3416	4733
M6 x 1.0	2629	4430	6761
M8 x 1.25	3661	8558	12922
M10 x 1.50	5013	9123	12001
M12 x 1.75	9163	13100	21218

Fig. 4

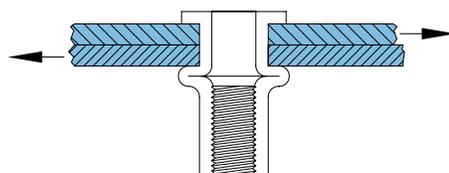


Fig. 5

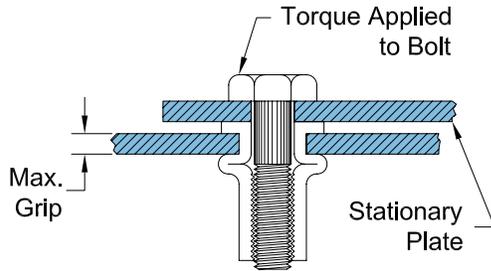
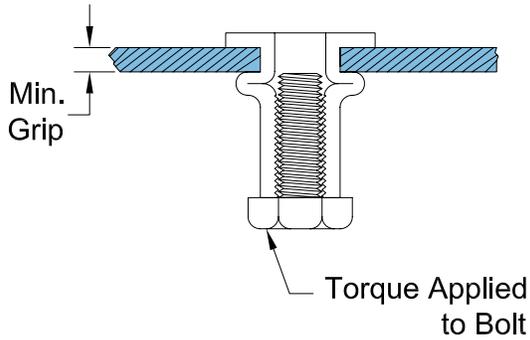


Fig.6



Torque strength data

Torque - axial load relationship

Used as nut plates, RIVNUT[®] fasteners may be safely loaded to torque equivalent of their maximum upset loads. Surpassing these loads will cause the screw to break, or the RIVNUT[®] will continue to upset until ultimate strip load is attained.

Because of the many variables such as type of lubrication, plating, type and property class of screw or bolt, it is recommended that a pilot test be conducted to determine the optimum assembly torque.

Torque Equiv. of Max. Upset Load (Lb.-In.)			
RIVNUT [®] Size	8	15	15
#4-40	8	15	15
#6-32	12	24	30
#8-32	16	38	45
#10-32	25	45	60
1/4-20	60	130	160
5/16-18	100	156	260
3/8-16	190	344	400
1/2-13	350	660	NA

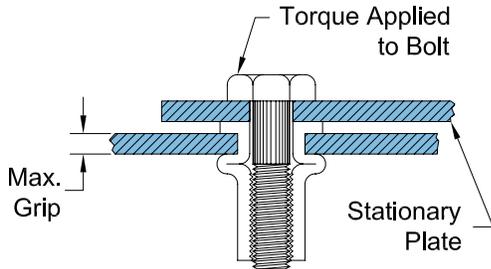
RIVNUT[®] torque-out strength

Although RIVNUT[®] fasteners are not normally used as shown in this view, it is used to illustrate the effect of accidental imposition of torque by: over-length screw bottoming in a blind end RIVNUT[®]; unthreaded shank area of an insufficiently threaded screw bottoming in the first thread of a RIVNUT[®]; cross threading in inserting screw.

RIVNUT [®] Size	Torque Required to Turn RIVNUT [®] (Lb.-In.)					
	Aluminum		Steel		Stainless Steel	
	Key	Keyless	Key	Keyless	Key	Keyless
#4-40	9	4	20	8	45	8
#6-32	12	4	29	13	46	15
#8-32	20	9	34	21	66	38
#10-32	22	12	43	23	77	38
1/4-20	55	30	93	51	134	78
5/16-18	101	46	176	70	360	115
3/8-16	116	83	361	131	400	201
1/2-13	216	130	NA	300	NA	NA

RIVNUT® Fastener Engineering Data - Metric Thread

Fig. 5



Torque strength data

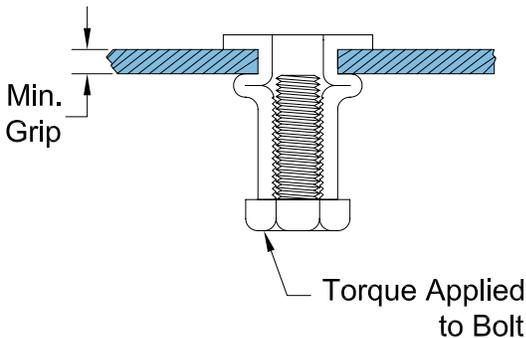
Torque - axial load relationship

Used as nut plates, RIVNUT® fasteners may be safely loaded to torque equivalent of their maximum upset loads. Surpassing these loads will cause the screw to break, or the RIVNUT® will continue to upset until ultimate strip load is attained.

Because of the many variables such as type of lubrication, plating, type and property class of screw or bolt, it is recommended that a pilot test be conducted to determine the optimum assembly torque.

Torque Equiv. of Max. Upset Load (N)			
RIVNUT® Size	Aluminum	Steel	Stainless Steel
M3 x 0.	0.9	1.5	2.1
M4 x 0.7	2.6	2.9	5.4
M5 x 0.8	3.5	10.4	12.4
M6 x 1.0	10.6	13.7	15.1
M8 x 1.25	23.5	32.1	46.5
M10 x 1.50	25.8	35.3	52.9
M12 x 1.75	56.3	71.2	107.7

Fig.6



RIVNUT® torque-out strength

Although RIVNUT® fasteners are not normally used as shown in this view, it is used to illustrate the effect of accidental imposition of torque by: over-length screw bottoming in a blind end RIVNUT®; unthreaded shank area of an insufficiently threaded screw bottoming in the first thread of a RIVNUT®; cross threading in inserting screw.

Torque Required to Turn RIVNUT® (N)						
RIVNUT® Size	Aluminum		Steel		Stainless Steel	
	Key	Keyless	Key	Keyless	Key	Keyless
M3 x 0.5	1.4	0.3	2.4	0.7	4.4	1.1
M4 x 0.7	2.0	1.1	3.6	1.4	6.0	2.4
M5 x 0.8	3.3	2.0	11.3	2.8	13.4	4.5
M6 x 1.0	10.6	4.5	16.0	5.5	19.0	8.2
M8 x 1.25	12.7	6.0	30.3	7.2	37.7	18.2
M10 x 1.50	13.6	7.9	40.2	14.0	60.1	22.1
M12 x 1.75	48.8	26.7	53.3	38.0	79.3	59.7

Aluminum RIVNUT® fasteners were tested in 2024-T4 aluminum plates. Steel RIVNUT® fasteners were tested in steel plates. Stainless steel RIVNUT® fasteners were tested in stainless steel plates. These values are averages only - certain variations must be expected in practice. NA - Test data not available

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