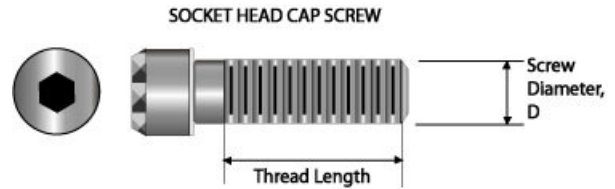


Threaded Insert Torque Analysis

Traditional material Dial Tables manufactured from either Aluminum or Steel have tooling attachment holes drilled and tapped into the Dial surface. Of particular interest is the pull out performance of threaded inserts in the Carbon Dial Table compared to drill and tapped holes in traditional Dial Tables.

Tooling attachment is usually accomplished using Steel Socket Head Cap Screws with a Tensile Strength of 190,000 psi minimum.



Before looking at the pull out performance of a threaded insert and comparing it with the pull out performance of threaded holes in aluminum and steel Dial Tables, it is informative to look at the screw first, with respect to diameter, threads per inch (Unified Course [UNRC] Unified Fine [UNRF]), thread length, tensile strength and recommended seating torque (based on 100,000 psi Tensile Stress in the Screw, REF Unbrako Screw Data Guide).

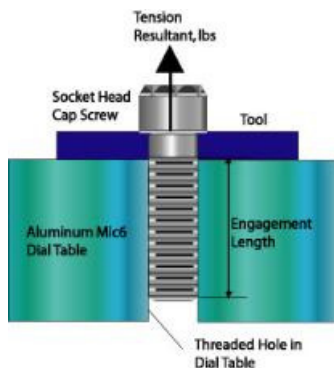
Screw sizes are those usually encountered in the automation assembly industry for attachment of tooling.



Insert diameter/size can be viewed using Insert Button.

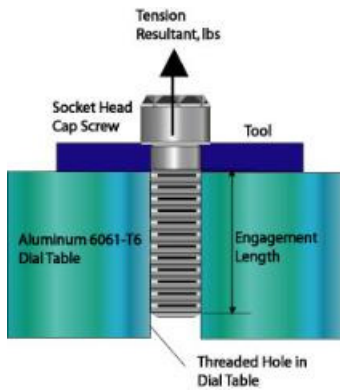
Screw Size	Screw Dia.	UNRC	UNRF	Thread Length	UNRC	UNRF	UNRC	UNRF
	inch	Threads per inch	Threads per inch	inch	Tensile Strength, lbs	Tensile Strength, lbs	Torque, in-lb	Torque, in-lb
6	0.138	32	40	0.75	1,730	1,930	28	32
8	0.164	32	36	0.875	2,660	2,800	49	50
10	0.190	24	32	0.875	3,330	3,800	64	76
1/4	0.250	20	28	1.000	6,050	6,910	150	170
5/16	0.312	18	24	1.125	9,960	11,000	305	325
3/8	0.375	16	24	1.25	14,700	17,700	545	570
1/2	0.500	13	20	1.5	27,000	30,400	1,300	1,370

Bolt analysis performed using FUTEK screw torque calculations, Aluminum Mic6 yield 15,000 psi, k=2.



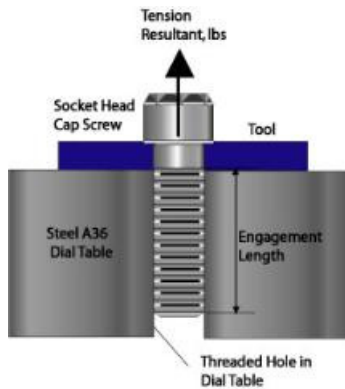
Screw Size	Screw Dia.	Engagement Length	UNRC	UNRF	UNRC	UNRF
	inch	inch	Tension Resultant, lbs	Tension Resultant, lbs	Maximum Torque, in-lb	Maximum Torque, in-lb
6	0.138	0.207	234	266	6.5	7.3
8	0.164	0.246	372	392	12.2	12.9
10	0.190	0.285	466	539	17.7	20.5
1/4	0.250	0.375	870	1,001	43.5	50.1
5/16	0.312	0.468	1,463	1,620	91.5	101.3
3/8	0.375	0.563	2,190	2,466	164	185
1/2	0.500	0.750	4,080	4,552	408	455

Bolt analysis performed using FUTEK screw torque calculations, Aluminum 6061-T6 yield 40,000 psi, k=2.



Screw Size	Screw Dia.	Engagement, Length	UNRC	UNRF	UNRC	UNRF
	inch	inch	Tension Resultant, lbs	Tension Resultant, lbs	Maximum Torque, in-lb	Maximum Torque, in-lb
6	0.138	0.207	625	709	17.3	19.6
8	0.164	0.246	992	1,046	32.6	34.3
10	0.190	0.285	1,243	1,439	47.3	54.7
1/4	0.250	0.375	2,322	2,669	116	133
5/16	0.312	0.468	3,903	4,322	244	270
3/8	0.375	0.563	5,842	6,576	438	493
1/2	0.500	0.750	10,879	12,138	1,087	1,213

Bolt analysis performed using FUTEK screw torque calculations, A36 steel yield 36,000 psi, k=2.



Screw Size	Screw Dia.	Engagement, Length	UNRC	UNRF	UNRC	UNRF
	inch	inch	Tension Resultant, lbs	Tension Resultant, lbs	Maximum Torque, in-lb	Maximum Torque, in-lb
6	0.138	0.207	562	638	15.5	17.6
8	0.164	0.246	893	942	29.3	30.9
10	0.190	0.285	1,119	1,294	42.5	49.2
1/4	0.250	0.375	2,089	2,402	104	120
5/16	0.312	0.468	3,513	3,890	219	243
3/8	0.375	0.563	5,258	5,919	394	443
1/2	0.500	0.750	9,792	10,924	979	1,092

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