

# BOLT LOAD (METRIC) SOCKET HEAD CAP SCREWS (MATERIAL 1.1181 Mpa=280)

40% - 99% YIELD



<b>Southwest Texas</b> 4802 Baldwin Blvd. Corpus Christi 78408 361-888-5080	<b>West Texas</b> 3508 S County Rd 1290 Odessa, TX 78765 432-561-8481	<b>Main Office</b> 12420 Texaco Rd Houston, TX 77013 713-453-6677	<b>Southeast Texas</b> 2484 W Cardinal #4 Beaumont, TX 77705 409-840-9699	<b>Central &amp; East Texas</b> 7900 Rodeo Trl. #500 Mansfield, TX 76063 682-334-2679
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TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280		<b>BOLT LOADS</b>							
BOLT LOAD BASED ON			40		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL & GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	27.42	60	55	69	77	82	86	110	241	60
M22x2.5	32	303	33.98	81	75	93	105	112	117	150	329	81
M24x3	36	353	39.48	103	95	118	133	142	149	190	417	103
M27x3	41	459	51.46	151	139	174	195	208	218	278	611	151
M30x3.5	46	561	62.79	205	188	235	264	283	296	377	829	205
M33x3.5	50	694	77.68	279	256	320	359	385	402	513	1,128	279
M36x4	55	817	91.48	359	329	412	461	494	517	659	1,449	359
M39x4	60	976	109.29	465	426	533	597	639	669	852	1,875	465
M42x4.5	65	1121	125.55	575	527	659	738	791	828	1,055	2,320	575
M45x4.5	70	1306	146.28	717	658	823	922	987	1,033	1,317	2,896	717
M48x5	75	1473	165.00	863	792	990	1,109	1,188	1,243	1,584	3,485	863
M52x5	80	1758	196.89	1,116	1,024	1,280	1,433	1,536	1,607	2,048	4,505	1,116
M56x5.5	85	2030	227.37	1,388	1,273	1,592	1,783	1,910	1,999	2,547	5,602	1,388
M60x5.5	90	2362	264.56	1,730	1,587	1,984	2,222	2,381	2,492	3,175	6,984	1,730
M64x6	95	2676	299.72	2,091	1,918	2,398	2,686	2,877	3,012	3,836	8,440	2,091
M68x6	100	3055	342.21	2,536	2,327	2,909	3,258	3,491	3,653	4,654	10,239	2,536
M72x6	105	3460	387.51	3,041	2,790	3,488	3,906	4,185	4,380	5,580	12,276	3,041
M76x6	110	3889	435.62	3,609	3,311	4,138	4,635	4,966	5,198	6,621	14,567	3,609
M80x6	115	4344	486.55	4,243	3,892	4,866	5,449	5,839	6,111	7,785	17,127	4,243
M90x6	130	5591	626.19	6,143	5,636	7,045	7,890	8,454	8,848	11,271	24,797	6,143
M100x6	145	6995	783.42	8,539	7,834	9,793	10,968	11,751	12,300	15,668	34,471	8,539
M110x6	155	8556	958.25	11,489	10,541	13,176	14,757	15,811	16,549	21,081	46,379	11,489
M125x6	180	11192	1,253.47	17,079	15,668	19,585	21,936	23,503	24,599	31,337	68,941	17,079

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280		<b>BOLT LOADS</b>							
BOLT LOAD BASED ON			50		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL & GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	34.27	75	69	86	96	103	108	137	302	75
M22x2.5	32	303	42.48	102	93	117	131	140	147	187	411	102
M24x3	36	353	49.35	129	118	148	166	178	186	237	521	129
M27x3	41	459	64.32	189	174	217	243	260	273	347	764	189
M30x3.5	46	561	78.49	257	235	294	330	353	370	471	1,036	257
M33x3.5	50	694	97.10	349	320	401	449	481	503	641	1,410	349
M36x4	55	817	114.35	449	412	515	576	617	646	823	1,811	449
M39x4	60	976	136.61	581	533	666	746	799	836	1,066	2,344	581
M42x4.5	65	1121	156.94	718	659	824	923	989	1,035	1,318	2,900	718
M45x4.5	70	1306	182.85	897	823	1,029	1,152	1,234	1,292	1,646	3,620	897
M48x5	75	1473	206.25	1,079	990	1,238	1,386	1,485	1,554	1,980	4,356	1,079
M52x5	80	1758	246.11	1,395	1,280	1,600	1,792	1,920	2,009	2,560	5,631	1,395
M56x5.5	85	2030	284.22	1,735	1,592	1,990	2,228	2,387	2,499	3,183	7,003	1,735
M60x5.5	90	2362	330.70	2,163	1,984	2,480	2,778	2,976	3,115	3,968	8,730	2,163
M64x6	95	2676	374.65	2,614	2,398	2,997	3,357	3,597	3,765	4,796	10,550	2,614
M68x6	100	3055	427.76	3,171	2,909	3,636	4,072	4,363	4,567	5,818	12,799	3,171
M72x6	105	3460	484.38	3,801	3,488	4,359	4,883	5,231	5,475	6,975	15,345	3,801
M76x6	110	3889	544.53	4,511	4,138	5,173	5,794	6,208	6,497	8,277	18,209	4,511
M80x6	115	4344	608.19	5,303	4,866	6,082	6,812	7,298	7,639	9,731	21,408	5,303
M90x6	130	5591	782.74	7,679	7,045	8,806	9,862	10,567	11,060	14,089	30,996	7,679
M100x6	145	6995	979.28	10,674	9,793	12,241	13,710	14,689	15,375	19,586	43,088	10,674
M110x6	155	8556	1,197.81	14,362	13,176	16,470	18,446	19,764	20,686	26,352	57,974	14,362
M125x6	180	11192	1,566.84	21,348	19,585	24,482	27,420	29,378	30,749	39,171	86,176	21,348

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280		<b>BOLT LOADS</b>							
BOLT LOAD BASED ON			60		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL& GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	41.13	90	82	103	115	123	129	165	362	90
M22x2.5	32	303	50.97	122	112	140	157	168	176	224	493	122
M24x3	36	353	59.22	155	142	178	199	213	223	284	625	155
M27x3	41	459	77.18	227	208	260	292	313	327	417	917	227
M30x3.5	46	561	94.18	308	283	353	396	424	444	565	1,243	308
M33x3.5	50	694	116.52	419	385	481	538	577	604	769	1,692	419
M36x4	55	817	137.22	538	494	617	692	741	776	988	2,174	538
M39x4	60	976	163.93	697	639	799	895	959	1,004	1,279	2,813	697
M42x4.5	65	1121	188.32	862	791	989	1,107	1,186	1,242	1,582	3,480	862
M45x4.5	70	1306	219.42	1,076	987	1,234	1,382	1,481	1,550	1,975	4,344	1,076
M48x5	75	1473	247.50	1,295	1,188	1,485	1,663	1,782	1,865	2,376	5,227	1,295
M52x5	80	1758	295.33	1,674	1,536	1,920	2,150	2,304	2,411	3,071	6,757	1,674
M56x5.5	85	2030	341.06	2,082	1,910	2,387	2,674	2,865	2,999	3,820	8,404	2,082
M60x5.5	90	2362	396.84	2,595	2,381	2,976	3,333	3,572	3,738	4,762	10,476	2,595
M64x6	95	2676	449.58	3,136	2,877	3,597	4,028	4,316	4,517	5,755	12,660	3,136
M68x6	100	3055	513.31	3,805	3,491	4,363	4,887	5,236	5,480	6,981	15,358	3,805
M72x6	105	3460	581.26	4,562	4,185	5,231	5,859	6,278	6,571	8,370	18,414	4,562
M76x6	110	3889	653.43	5,413	4,966	6,208	6,953	7,449	7,797	9,932	21,851	5,413
M80x6	115	4344	729.83	6,364	5,839	7,298	8,174	8,758	9,167	11,677	25,690	6,364
M90x6	130	5591	939.28	9,214	8,454	10,567	11,835	12,680	13,272	16,907	37,196	9,214
M100x6	145	6995	1,175.13	12,809	11,751	14,689	16,452	17,627	18,450	23,503	51,706	12,809
M110x6	155	8556	1,437.37	17,234	15,811	19,764	22,135	23,717	24,823	31,622	69,569	17,234
M125x6	180	11192	1,880.20	25,618	23,503	29,378	32,904	35,254	36,899	47,005	103,411	25,618

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280		<b>BOLT LOADS</b>							
BOLT LOAD BASED ON			70		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL& GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	47.98	105	96	120	134	144	151	192	422	105
M22x2.5	32	303	59.47	143	131	164	183	196	205	262	576	143
M24x3	36	353	69.09	181	166	207	232	249	260	332	730	181
M27x3	41	459	90.05	265	243	304	340	365	382	486	1,070	265
M30x3.5	46	561	109.88	359	330	412	461	494	518	659	1,450	359
M33x3.5	50	694	135.94	489	449	561	628	673	704	897	1,974	489
M36x4	55	817	160.09	628	576	720	807	864	905	1,153	2,536	628
M39x4	60	976	191.26	813	746	932	1,044	1,119	1,171	1,492	3,282	813
M42x4.5	65	1121	219.71	1,006	923	1,153	1,292	1,384	1,449	1,846	4,060	1,006
M45x4.5	70	1306	255.99	1,256	1,152	1,440	1,613	1,728	1,809	2,304	5,069	1,256
M48x5	75	1473	288.75	1,511	1,386	1,733	1,940	2,079	2,176	2,772	6,098	1,511
M52x5	80	1758	344.55	1,953	1,792	2,240	2,508	2,687	2,813	3,583	7,883	1,953
M56x5.5	85	2030	397.90	2,429	2,228	2,785	3,120	3,342	3,498	4,456	9,804	2,429
M60x5.5	90	2362	462.98	3,028	2,778	3,472	3,889	4,167	4,361	5,556	12,223	3,028
M64x6	95	2676	524.51	3,659	3,357	4,196	4,700	5,035	5,270	6,714	14,770	3,659
M68x6	100	3055	598.86	4,439	4,072	5,090	5,701	6,108	6,393	8,145	17,918	4,439
M72x6	105	3460	678.14	5,322	4,883	6,103	6,836	7,324	7,666	9,765	21,483	5,322
M76x6	110	3889	762.34	6,315	5,794	7,242	8,111	8,691	9,096	11,588	25,493	6,315
M80x6	115	4344	851.46	7,425	6,812	8,515	9,536	10,218	10,694	13,623	29,972	7,425
M90x6	130	5591	1,095.83	10,750	9,862	12,328	13,807	14,794	15,484	19,725	43,395	10,750
M100x6	145	6995	1,370.99	14,944	13,710	17,137	19,194	20,565	21,524	27,420	60,323	14,944
M110x6	155	8556	1,676.93	20,106	18,446	23,058	25,825	27,669	28,961	36,892	81,163	20,106
M125x6	180	11192	2,193.57	29,887	27,420	34,275	38,388	41,129	43,049	54,839	120,646	29,887

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280									
BOLT LOAD BASED ON			80		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL& GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	54.84	120	110	137	154	165	172	219	483	120
M22x2.5	32	303	67.96	163	150	187	209	224	235	299	658	163
M24x3	36	353	78.97	207	190	237	265	284	298	379	834	207
M27x3	41	459	102.91	303	278	347	389	417	436	556	1,223	303
M30x3.5	46	561	125.58	411	377	471	527	565	591	753	1,658	411
M33x3.5	50	694	155.36	559	513	641	718	769	805	1,025	2,256	559
M36x4	55	817	182.96	718	659	823	922	988	1,034	1,317	2,898	718
M39x4	60	976	218.58	929	852	1,066	1,193	1,279	1,338	1,705	3,751	929
M42x4.5	65	1121	251.10	1,150	1,055	1,318	1,476	1,582	1,656	2,109	4,640	1,150
M45x4.5	70	1306	292.56	1,435	1,317	1,646	1,843	1,975	2,067	2,633	5,793	1,435
M48x5	75	1473	330.00	1,727	1,584	1,980	2,218	2,376	2,487	3,168	6,970	1,727
M52x5	80	1758	393.77	2,232	2,048	2,560	2,867	3,071	3,215	4,095	9,010	2,232
M56x5.5	85	2030	454.74	2,776	2,547	3,183	3,565	3,820	3,998	5,093	11,205	2,776
M60x5.5	90	2362	529.11	3,460	3,175	3,968	4,445	4,762	4,984	6,349	13,969	3,460
M64x6	95	2676	599.44	4,182	3,836	4,796	5,371	5,755	6,023	7,673	16,880	4,182
M68x6	100	3055	684.41	5,073	4,654	5,818	6,516	6,981	7,307	9,308	20,478	5,073
M72x6	105	3460	775.01	6,082	5,580	6,975	7,812	8,370	8,761	11,160	24,552	6,082
M76x6	110	3889	871.24	7,217	6,621	8,277	9,270	9,932	10,396	13,243	29,134	7,217
M80x6	115	4344	973.10	8,485	7,785	9,731	10,899	11,677	12,222	15,570	34,253	8,485
M90x6	130	5591	1,252.38	12,286	11,271	14,089	15,780	16,907	17,696	22,543	49,594	12,286
M100x6	145	6995	1,566.84	17,079	15,668	19,586	21,936	23,503	24,599	31,337	68,941	17,079
M110x6	155	8556	1,916.49	22,979	21,081	26,352	29,514	31,622	33,098	42,163	92,758	22,979
M125x6	180	11192	2,506.94	34,157	31,337	39,171	43,871	47,005	49,199	62,673	137,882	34,157

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280									
BOLT LOAD BASED ON			90		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL& GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT) 0.109
M20x2.5	30	245	61.69	134	123	154	173	185	194	247	543	134
M22x2.5	32	303	76.46	183	168	210	235	252	264	336	740	183
M24x3	36	353	88.84	232	213	267	298	320	335	426	938	232
M27x3	41	459	115.78	341	313	391	438	469	491	625	1,375	341
M30x3.5	46	561	141.28	462	424	530	593	636	665	848	1,865	462
M33x3.5	50	694	174.78	629	577	721	808	865	906	1,154	2,538	629
M36x4	55	817	205.82	808	741	926	1,037	1,111	1,163	1,482	3,260	808
M39x4	60	976	245.90	1,045	959	1,199	1,343	1,439	1,506	1,918	4,220	1,045
M42x4.5	65	1121	282.48	1,293	1,186	1,483	1,661	1,780	1,863	2,373	5,220	1,293
M45x4.5	70	1306	329.13	1,614	1,481	1,851	2,074	2,222	2,325	2,962	6,517	1,614
M48x5	75	1473	371.25	1,942	1,782	2,228	2,495	2,673	2,798	3,564	7,841	1,942
M52x5	80	1758	442.99	2,511	2,304	2,879	3,225	3,455	3,617	4,607	10,136	2,511
M56x5.5	85	2030	511.59	3,123	2,865	3,581	4,011	4,297	4,498	5,730	12,606	3,123
M60x5.5	90	2362	595.25	3,893	3,572	4,464	5,000	5,357	5,607	7,143	15,715	3,893
M64x6	95	2676	674.37	4,704	4,316	5,395	6,042	6,474	6,776	8,632	18,990	4,704
M68x6	100	3055	769.96	5,707	5,236	6,545	7,330	7,854	8,220	10,472	23,037	5,707
M72x6	105	3460	871.89	6,843	6,278	7,847	8,789	9,416	9,856	12,555	27,621	6,843
M76x6	110	3889	980.15	8,120	7,449	9,311	10,429	11,174	11,695	14,898	32,776	8,120
M80x6	115	4344	1,094.74	9,546	8,758	10,947	12,261	13,137	13,750	17,516	38,535	9,546
M90x6	130	5591	1,408.93	13,822	12,680	15,850	17,752	19,020	19,908	25,361	55,793	13,822
M100x6	145	6995	1,762.70	19,213	17,627	22,034	24,678	26,440	27,674	35,254	77,559	19,213
M110x6	155	8556	2,156.05	25,851	23,717	29,646	33,203	35,575	37,235	47,433	104,353	25,851
M125x6	180	11192	2,820.31	38,427	35,254	44,067	49,355	52,881	55,349	70,508	155,117	38,427

TORQUE GUIDE FOR MATERIAL STANDARD 1.1181												
MINIMUM YIELD (Mpa)			280									
BOLT LOAD BASED ON			99		PERCENT YIELD							
REQUIRED TORQUE (N-m)												
BOLT SIZE DIA. x P	HEX NUT ACROSS FLAT (mm)	STRESS AREA (mm) <sup>2</sup>	BOLT LOAD (kN)	LoaDISC TS 801 MOLY K=.109	MOLYBDENUM DISULFIDE K=.100	MOLY/LEAD OXIDE/GRAPHITE K=.125	COPPER & GRAPHITE K=.140	NICKEL & GRAPHITE K=.150	API SA2 K=.157	MACHINE OIL K=.200	DRY STEEL K=.440 K=.300	CUSTOM (INSERT 0.109)
M20x2.5	30	245	67.86	148	136	170	190	204	213	271	597	148
M22x2.5	32	303	84.11	202	185	231	259	278	291	370	814	202
M24x3	36	353	97.72	256	235	293	328	352	368	469	1,032	256
M27x3	41	459	127.35	375	344	430	481	516	540	688	1,513	375
M30x3.5	46	561	155.40	508	466	583	653	699	732	932	2,051	508
M33x3.5	50	694	192.26	692	634	793	888	952	996	1,269	2,792	692
M36x4	55	817	226.41	888	815	1,019	1,141	1,223	1,280	1,630	3,586	888
M39x4	60	976	270.49	1,150	1,055	1,319	1,477	1,582	1,656	2,110	4,642	1,150
M42x4.5	65	1121	310.73	1,423	1,305	1,631	1,827	1,958	2,049	2,610	5,742	1,423
M45x4.5	70	1306	362.04	1,776	1,629	2,036	2,281	2,444	2,558	3,258	7,168	1,776
M48x5	75	1473	408.38	2,137	1,960	2,450	2,744	2,940	3,078	3,920	8,625	2,137
M52x5	80	1758	487.29	2,762	2,534	3,167	3,547	3,801	3,978	5,068	11,149	2,762
M56x5.5	85	2030	562.75	3,435	3,151	3,939	4,412	4,727	4,948	6,303	13,866	3,435
M60x5.5	90	2362	654.78	4,282	3,929	4,911	5,500	5,893	6,168	7,857	17,286	4,282
M64x6	95	2676	741.81	5,175	4,748	5,934	6,647	7,121	7,454	9,495	20,889	5,175
M68x6	100	3055	846.96	6,278	5,759	7,199	8,063	8,639	9,042	11,519	25,341	6,278
M72x6	105	3460	959.08	7,527	6,905	8,632	9,668	10,358	10,841	13,811	30,384	7,527
M76x6	110	3889	1,078.16	8,931	8,194	10,243	11,472	12,291	12,865	16,388	36,054	8,931
M80x6	115	4344	1,204.21	10,501	9,634	12,042	13,487	14,451	15,125	19,267	42,388	10,501
M90x6	130	5591	1,549.82	15,204	13,948	17,435	19,528	20,923	21,899	27,897	61,373	15,204
M100x6	145	6995	1,938.97	21,135	19,390	24,237	27,146	29,085	30,442	38,779	85,315	21,135
M110x6	155	8556	2,371.66	28,436	26,088	32,610	36,524	39,132	40,959	52,176	114,788	28,436
M125x6	180	11192	3,102.34	42,269	38,779	48,474	54,291	58,169	60,883	77,558	170,629	42,269