

HYTORC

TORQUE GUIDE FOR ASTM A320 GRADE L7					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON		40 % YIELD												First Pass	Second Pass	All Subsequent Passes
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	30%	60%	100%
3/4 x 10	1-1/4"	0.334	105,000	14,040	96	88	110	123	132	138	176	263	132	39	79	132
7/8 x 9	1-7/16"	0.461	105,000	19,383	154	141	177	198	212	222	283	424	212	64	127	212
1x 8	1-5/8"	0.605	105,000	25,428	231	212	265	297	318	333	424	636	318	95	191	318
1-1/8 x 8	1-13/16"	0.790	105,000	33,182	339	311	389	436	467	488	622	933	467	140	280	467
1-1/4 x 8	2"	0.999	105,000	41,966	476	437	546	612	656	686	874	1,311	656	197	393	656
1-3/8 x 8	2-3/16"	1.233	105,000	51,781	647	593	742	831	890	932	1,187	1,780	890	267	534	890
1-1/2 x 8	2-3/8"	1.491	105,000	62,626	853	783	979	1,096	1,174	1,229	1,566	2,348	1,174	352	705	1,174
1-5/8 x 8	2-9/16"	1.774	105,000	74,501	1,100	1,009	1,261	1,412	1,513	1,584	2,018	3,027	1,513	454	908	1,513
1-3/4 x 8	2-3/4"	2.081	105,000	87,406	1,389	1,275	1,593	1,785	1,912	2,001	2,549	3,824	1,912	574	1,147	1,912
1-7/8 x 8	2-15/16"	2.413	105,000	101,342	1,726	1,583	1,979	2,217	2,375	2,486	3,167	4,750	2,375	713	1,425	2,375
2 x 8	3-1/8"	2.769	105,000	116,308	2,113	1,938	2,423	2,714	2,908	3,043	3,877	5,815	2,908	872	1,745	2,908
2-1/8 x 8	3-5/16"	3.150	105,000	132,304	2,554	2,343	2,929	3,280	3,514	3,678	4,686	7,029	3,514	1,054	2,109	3,514
2-1/4 x 8	3-1/2"	3.555	105,000	149,331	3,052	2,800	3,500	3,920	4,200	4,396	5,600	8,400	4,200	1,260	2,520	4,200
2-3/8 x 8	3-11/16"	3.985	105,000	167,388	3,611	3,313	4,141	4,638	4,969	5,201	6,626	9,939	4,969	1,491	2,982	4,969
2-1/2 x 8	3-7/8"	4.440	105,000	186,475	4,235	3,885	4,856	5,439	5,827	6,099	7,770	11,655	5,827	1,748	3,496	5,827

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361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

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 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
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BOLT TENSION BASED ON			50	% YIELD													
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	First Pass	Second Pass	All Subsequent Passes	
													0.15	30%	60%	100%	
3/4 x 10	1-1/4"	0.334	105,000	17,550	120	110	137	154	165	172	219	329	165	49	99	165	
7/8 x 9	1-7/16"	0.461	105,000	24,229	193	177	221	247	265	277	353	530	265	80	159	265	
1x 8	1-5/8"	0.605	105,000	31,785	289	265	331	371	397	416	530	795	397	119	238	397	
1-1/8 x 8	1-13/16"	0.790	105,000	41,478	424	389	486	544	583	611	778	1,167	583	175	350	583	
1-1/4 x 8	2"	0.999	105,000	52,458	596	546	683	765	820	858	1,093	1,639	820	246	492	820	
1-3/8 x 8	2-3/16"	1.233	105,000	64,726	808	742	927	1,038	1,112	1,164	1,483	2,225	1,112	334	667	1112	
1-1/2 x 8	2-3/8"	1.491	105,000	78,282	1,067	979	1,223	1,370	1,468	1,536	1,957	2,936	1,468	440	881	1468	
1-5/8 x 8	2-9/16"	1.774	105,000	93,126	1,375	1,261	1,576	1,766	1,892	1,980	2,522	3,783	1,892	567	1135	1892	
1-3/4 x 8	2-3/4"	2.081	105,000	109,257	1,737	1,593	1,992	2,231	2,390	2,502	3,187	4,780	2,390	717	1434	2390	
1-7/8 x 8	2-15/16"	2.413	105,000	126,677	2,157	1,979	2,474	2,771	2,969	3,108	3,959	5,938	2,969	891	1781	2969	
2 x 8	3-1/8"	2.769	105,000	145,385	2,641	2,423	3,029	3,392	3,635	3,804	4,846	7,269	3,635	1090	2181	3635	
2-1/8 x 8	3-5/16"	3.150	105,000	165,380	3,192	2,929	3,661	4,100	4,393	4,598	5,857	8,786	4,393	1318	2636	4393	
2-1/4 x 8	3-1/2"	3.555	105,000	186,663	3,815	3,500	4,375	4,900	5,250	5,495	7,000	10,500	5,250	1575	3150	5250	
2-3/8 x 8	3-11/16"	3.985	105,000	209,234	4,514	4,141	5,176	5,798	6,212	6,502	8,282	12,423	6,212	1863	3727	6212	
2-1/2 x 8	3-7/8"	4.440	105,000	233,094	5,293	4,856	6,070	6,799	7,284	7,624	9,712	14,568	7,284	2185	4371	7284	

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 Enter the desired percent yield in yellow field at top of form
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BOLT TENSION BASED ON		60 % YIELD												First Pass	Second Pass	All Subsequent Passes
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	30%	60%	100%
3/4 x 10	1-1/4"	0.334	105,000	21,060	143	132	165	184	197	207	263	395	197	59	118	197
7/8 x 9	1-7/16"	0.461	105,000	29,074	231	212	265	297	318	333	424	636	318	95	191	318
1x 8	1-5/8"	0.605	105,000	38,143	346	318	397	445	477	499	636	954	477	143	286	477
1-1/8 x 8	1-13/16"	0.790	105,000	49,773	509	467	583	653	700	733	933	1,400	700	210	420	700
1-1/4 x 8	2"	0.999	105,000	62,949	715	656	820	918	984	1,029	1,311	1,967	984	295	590	984
1-3/8 x 8	2-3/16"	1.233	105,000	77,671	970	890	1,112	1,246	1,335	1,397	1,780	2,670	1,335	400	801	1335
1-1/2 x 8	2-3/8"	1.491	105,000	93,938	1,280	1,174	1,468	1,644	1,761	1,844	2,348	3,523	1,761	528	1057	1761
1-5/8 x 8	2-9/16"	1.774	105,000	111,751	1,649	1,513	1,892	2,119	2,270	2,376	3,027	4,540	2,270	681	1362	2270
1-3/4 x 8	2-3/4"	2.081	105,000	131,109	2,084	1,912	2,390	2,677	2,868	3,002	3,824	5,736	2,868	860	1721	2868
1-7/8 x 8	2-15/16"	2.413	105,000	152,013	2,589	2,375	2,969	3,325	3,563	3,729	4,750	7,126	3,563	1069	2138	3563
2 x 8	3-1/8"	2.769	105,000	174,462	3,169	2,908	3,635	4,071	4,362	4,565	5,815	8,723	4,362	1308	2617	4362
2-1/8 x 8	3-5/16"	3.150	105,000	198,456	3,831	3,514	4,393	4,920	5,271	5,517	7,029	10,543	5,271	1581	3163	5271
2-1/4 x 8	3-1/2"	3.555	105,000	223,996	4,578	4,200	5,250	5,880	6,300	6,594	8,400	12,600	6,300	1890	3780	6300
2-3/8 x 8	3-11/16"	3.985	105,000	251,081	5,417	4,969	6,212	6,957	7,454	7,802	9,939	14,908	7,454	2236	4472	7454
2-1/2 x 8	3-7/8"	4.440	105,000	279,712	6,352	5,827	7,284	8,158	8,741	9,149	11,655	17,482	8,741	2622	5245	8741

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BOLT TENSION BASED ON			70	% YIELD													
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	First Pass	Second Pass	All Subsequent Passes	
													0.15	30%	60%	100%	
3/4 x 10	1-1/4"	0.334	105,000	24,570	167	154	192	215	230	241	307	461	230	69	138	230	
7/8 x 9	1-7/16"	0.461	105,000	33,920	270	247	309	346	371	388	495	742	371	111	223	371	
1x 8	1-5/8"	0.605	105,000	44,500	404	371	464	519	556	582	742	1,112	556	167	334	556	
1-1/8 x 8	1-13/16"	0.790	105,000	58,069	593	544	680	762	817	855	1,089	1,633	817	245	490	817	
1-1/4 x 8	2"	0.999	105,000	73,441	834	765	956	1,071	1,148	1,201	1,530	2,295	1,148	344	689	1,148	
1-3/8 x 8	2-3/16"	1.233	105,000	90,616	1,132	1,038	1,298	1,454	1,557	1,630	2,077	3,115	1,557	467	934	1,557	
1-1/2 x 8	2-3/8"	1.491	105,000	109,595	1,493	1,370	1,712	1,918	2,055	2,151	2,740	4,110	2,055	616	1,233	2,055	
1-5/8 x 8	2-9/16"	1.774	105,000	130,376	1,924	1,766	2,207	2,472	2,648	2,772	3,531	5,297	2,648	794	1,589	2,648	
1-3/4 x 8	2-3/4"	2.081	105,000	152,960	2,431	2,231	2,788	3,123	3,346	3,502	4,461	6,692	3,346	1,004	2,008	3,346	
1-7/8 x 8	2-15/16"	2.413	105,000	177,348	3,020	2,771	3,464	3,879	4,157	4,351	5,542	8,313	4,157	1,247	2,494	4,157	
2 x 8	3-1/8"	2.769	105,000	203,538	3,698	3,392	4,240	4,749	5,088	5,326	6,785	10,177	5,088	1,527	3,053	5,088	
2-1/8 x 8	3-5/16"	3.150	105,000	231,532	4,469	4,100	5,125	5,740	6,150	6,437	8,200	12,300	6,150	1,845	3,690	6,150	
2-1/4 x 8	3-1/2"	3.555	105,000	261,329	5,341	4,900	6,125	6,860	7,350	7,693	9,800	14,700	7,350	2,205	4,410	7,350	
2-3/8 x 8	3-11/16"	3.985	105,000	292,928	6,319	5,798	7,247	8,117	8,696	9,102	11,595	17,393	8,696	2,609	5,218	8,696	
2-1/2 x 8	3-7/8"	4.440	105,000	326,331	7,410	6,799	8,498	9,518	10,198	10,674	13,597	20,396	10,198	3,059	6,119	10,198	

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BOLT TENSION BASED ON		80 % YIELD												First Pass	Second Pass	All Subsequent Passes
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	30%	60%	100%
3/4 x 10	1-1/4"	0.334	105,000	28,080	191	176	219	246	263	276	351	527	263	79	158	263
7/8 x 9	1-7/16"	0.461	105,000	38,766	308	283	353	396	424	444	565	848	424	127	254	424
1x 8	1-5/8"	0.605	105,000	50,857	462	424	530	593	636	665	848	1,271	636	191	381	636
1-1/8 x 8	1-13/16"	0.790	105,000	66,364	678	622	778	871	933	977	1,244	1,866	933	280	560	933
1-1/4 x 8	2"	0.999	105,000	83,933	953	874	1,093	1,224	1,311	1,373	1,749	2,623	1,311	393	787	1311
1-3/8 x 8	2-3/16"	1.233	105,000	103,562	1,293	1,187	1,483	1,661	1,780	1,863	2,373	3,560	1,780	534	1068	1780
1-1/2 x 8	2-3/8"	1.491	105,000	125,251	1,707	1,566	1,957	2,192	2,348	2,458	3,131	4,697	2,348	705	1409	2348
1-5/8 x 8	2-9/16"	1.774	105,000	149,001	2,199	2,018	2,522	2,825	3,027	3,168	4,035	6,053	3,027	908	1816	3027
1-3/4 x 8	2-3/4"	2.081	105,000	174,812	2,779	2,549	3,187	3,569	3,824	4,002	5,099	7,648	3,824	1147	2294	3824
1-7/8 x 8	2-15/16"	2.413	105,000	202,683	3,452	3,167	3,959	4,434	4,750	4,972	6,334	9,501	4,750	1425	2850	4750
2 x 8	3-1/8"	2.769	105,000	232,615	4,226	3,877	4,846	5,428	5,815	6,087	7,754	11,631	5,815	1745	3489	5815
2-1/8 x 8	3-5/16"	3.150	105,000	264,608	5,107	4,686	5,857	6,560	7,029	7,357	9,372	14,057	7,029	2109	4217	7029
2-1/4 x 8	3-1/2"	3.555	105,000	298,661	6,104	5,600	7,000	7,840	8,400	8,792	11,200	16,800	8,400	2520	5040	8400
2-3/8 x 8	3-11/16"	3.985	105,000	334,775	7,222	6,626	8,282	9,276	9,939	10,402	13,252	19,877	9,939	2982	5963	9939
2-1/2 x 8	3-7/8"	4.440	105,000	372,950	8,469	7,770	9,712	10,878	11,655	12,199	15,540	23,309	11,655	3496	6993	11655

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BOLT TENSION BASED ON			90	% YIELD													
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	First Pass	Second Pass	All Subsequent Passes	
													0.15	30%	60%	100%	
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7/8 x 9	1-7/16"	0.461	105,000	43,612	347	318	398	445	477	499	636	954	477	143	286	477	
1x 8	1-5/8"	0.605	105,000	57,214	520	477	596	667	715	749	954	1,430	715	215	429	715	
1-1/8 x 8	1-13/16"	0.790	105,000	74,660	763	700	875	980	1,050	1,099	1,400	2,100	1,050	315	630	1050	
1-1/4 x 8	2"	0.999	105,000	94,424	1,072	984	1,229	1,377	1,475	1,544	1,967	2,951	1,475	443	885	1475	
1-3/8 x 8	2-3/16"	1.233	105,000	116,507	1,455	1,335	1,669	1,869	2,002	2,096	2,670	4,005	2,002	601	1201	2002	
1-1/2 x 8	2-3/8"	1.491	105,000	140,907	1,920	1,761	2,202	2,466	2,642	2,765	3,523	5,284	2,642	793	1585	2642	
1-5/8 x 8	2-9/16"	1.774	105,000	167,626	2,474	2,270	2,837	3,178	3,405	3,564	4,540	6,810	3,405	1021	2043	3405	
1-3/4 x 8	2-3/4"	2.081	105,000	196,663	3,126	2,868	3,585	4,015	4,302	4,503	5,736	8,604	4,302	1291	2581	4302	
1-7/8 x 8	2-15/16"	2.413	105,000	228,019	3,883	3,563	4,453	4,988	5,344	5,594	7,126	10,688	5,344	1603	3207	5344	
2 x 8	3-1/8"	2.769	105,000	261,692	4,754	4,362	5,452	6,106	6,542	6,848	8,723	13,085	6,542	1963	3925	6542	
2-1/8 x 8	3-5/16"	3.150	105,000	297,684	5,746	5,271	6,589	7,380	7,907	8,276	10,543	15,814	7,907	2372	4744	7907	
2-1/4 x 8	3-1/2"	3.555	105,000	335,994	6,867	6,300	7,875	8,820	9,450	9,891	12,600	18,900	9,450	2835	5670	9450	
2-3/8 x 8	3-11/16"	3.985	105,000	376,622	8,125	7,454	9,317	10,436	11,181	11,703	14,908	22,362	11,181	3354	6709	11181	
2-1/2 x 8	3-7/8"	4.440	105,000	419,568	9,528	8,741	10,926	12,237	13,112	13,723	17,482	26,223	13,112	3933	7867	13112	

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REV 7.31.09

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 Enter the desired percent yield in yellow field at top of form
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HYTORC

TORQUE GUIDE FOR ASTM A320 GRADE L7					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON		99 % YIELD												First Pass	Second Pass	All Subsequent Passes
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)	LoaDISC TS 801MOLY 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	CUSTOM (INSERT K) K=.300	30%	60%	100%
3/4 x 10	1-1/4"	0.334	105,000	34,749	237	217	271	304	326	341	434	652	326	98	195	326
7/8 x 9	1-7/16"	0.461	105,000	47,973	381	350	437	490	525	549	700	1,049	525	157	315	525
1x 8	1-5/8"	0.605	105,000	62,935	572	524	656	734	787	823	1,049	1,573	787	236	472	787
1-1/8 x 8	1-13/16"	0.790	105,000	82,126	839	770	962	1,078	1,155	1,209	1,540	2,310	1,155	346	693	1,155
1-1/4 x 8	2"	0.999	105,000	103,867	1,179	1,082	1,352	1,515	1,623	1,699	2,164	3,246	1,623	487	974	1,623
1-3/8 x 8	2-3/16"	1.233	105,000	128,157	1,601	1,468	1,836	2,056	2,203	2,305	2,937	4,405	2,203	661	1,322	2,203
1-1/2 x 8	2-3/8"	1.491	105,000	154,998	2,112	1,937	2,422	2,712	2,906	3,042	3,875	5,812	2,906	872	1,744	2,906
1-5/8 x 8	2-9/16"	1.774	105,000	184,389	2,722	2,497	3,121	3,496	3,745	3,920	4,994	7,491	3,745	1,124	2,247	3,745
1-3/4 x 8	2-3/4"	2.081	105,000	216,330	3,439	3,155	3,944	4,417	4,732	4,953	6,310	9,464	4,732	1,420	2,839	4,732
1-7/8 x 8	2-15/16"	2.413	105,000	250,821	4,272	3,919	4,899	5,487	5,879	6,153	7,838	11,757	5,879	1,764	3,527	5,879
2 x 8	3-1/8"	2.769	105,000	287,862	5,229	4,798	5,997	6,717	7,197	7,532	9,595	14,393	7,197	2,159	4,318	7,197
2-1/8 x 8	3-5/16"	3.150	105,000	327,452	6,321	5,799	7,248	8,118	8,698	9,104	11,597	17,396	8,698	2,609	5,219	8,698
2-1/4 x 8	3-1/2"	3.555	105,000	369,593	7,554	6,930	8,662	9,702	10,395	10,880	13,860	20,790	10,395	3,118	6,237	10,395
2-3/8 x 8	3-11/16"	3.985	105,000	414,284	8,937	8,199	10,249	11,479	12,299	12,873	16,399	24,598	12,299	3,690	7,379	12,299
2-1/2 x 8	3-7/8"	4.440	105,000	461,525	10,480	9,615	12,019	13,461	14,423	15,096	19,230	28,845	14,423	4,327	8,654	14,423

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