

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON														First Pass	Second Pass	All Subsequent Passes
40 % YIELD					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 K=.300	CUSTOM (INSERT K) K=.300	30%	60%	100%
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)								0.15				
3/4 x 10	1-1/4"	0.334	136,000	18,185	124	114	142	159	170	178	227	341	170	51	102	170
7/8 x 9	1-7/16"	0.461	136,000	25,106	200	183	229	256	275	287	366	549	275	82	165	275
1x 8	1-5/8"	0.605	136,000	32,936	299	274	343	384	412	431	549	823	412	124	247	412
1-1/8 x 8	1-13/16"	0.790	136,000	42,979	439	403	504	564	604	633	806	1,209	604	181	363	604
1-1/4 x 8	2"	0.999	136,000	54,356	617	566	708	793	849	889	1,132	1,699	849	255	510	849
1-3/8 x 8	2-3/16"	1.233	136,000	67,068	838	768	961	1,076	1,153	1,207	1,537	2,305	1,153	346	692	1,153
1-1/2 x 8	2-3/8"	1.491	136,000	81,115	1,105	1,014	1,267	1,420	1,521	1,592	2,028	3,042	1,521	456	913	1,521
1-5/8 x 8	2-9/16"	1.774	136,000	96,496	1,424	1,307	1,633	1,829	1,960	2,052	2,613	3,920	1,960	588	1,176	1,960
1-3/4 x 8	2-3/4"	2.081	136,000	113,212	1,800	1,651	2,064	2,311	2,477	2,592	3,302	4,953	2,477	743	1,486	2,477
1-7/8 x 8	2-15/16"	2.413	136,000	131,262	2,236	2,051	2,564	2,871	3,076	3,220	4,102	6,153	3,076	923	1,846	3,076
2 x 8	3-1/8"	2.769	136,000	150,646	2,737	2,511	3,138	3,515	3,766	3,942	5,022	7,532	3,766	1,130	2,260	3,766
2-1/8 x 8	3-5/16"	3.150	136,000	171,365	3,308	3,035	3,793	4,248	4,552	4,764	6,069	9,104	4,552	1,366	2,731	4,552
2-1/4 x 8	3-1/2"	3.555	136,000	193,419	3,953	3,627	4,533	5,077	5,440	5,694	7,253	10,880	5,440	1,632	3,264	5,440
2-3/8 x 8	3-11/16"	3.985	136,000	216,807	4,677	4,291	5,364	6,007	6,436	6,737	8,582	12,873	6,436	1,931	3,862	6,436
2-1/2 x 8	3-7/8"	4.440	136,000	241,529	5,485	5,032	6,290	7,045	7,548	7,900	10,064	15,096	7,548	2,264	4,529	7,548
2-3/4 x 8	4-1/4"	5.422	136,000	294,978	7,368	6,760	8,450	9,464	10,140	10,613	13,520	20,280	10,140	3,042	6,084	10,140
3 x 8	4-5/8"	6.503	136,000	353,765	9,640	8,844	11,055	12,382	13,266	13,885	17,688	26,532	13,266	3,980	7,960	13,266
3-1/4 x 8	5"	7.682	136,000	417,889	12,336	11,318	14,147	15,845	16,977	17,769	22,636	33,953	16,977	5,093	10,186	16,977
3-1/2 x 8	5-3/8"	8.959	136,000	487,352	15,494	14,214	17,768	19,900	21,322	22,317	28,429	42,643	21,322	6,396	12,793	21,322
3-3/4 x 8	5-3/4"	10.334	136,000	562,152	19,148	17,567	21,959	24,594	26,351	27,581	35,135	52,702	26,351	7,905	15,811	26,351
4 x 8	6-1/8"	11.807	136,000	642,291	23,337	21,410	26,762	29,974	32,115	33,613	42,819	64,229	32,115	9,634	19,269	32,115
4-1/4 x 8	6-1/2"	13.378	136,000	727,767	28,095	25,775	32,219	36,085	38,663	40,467	51,550	77,325	38,663	11,599	23,198	38,663
4-1/2 x 8	6-7/8"	15.047	136,000	818,582	33,460	30,697	38,371	42,976	46,045	48,194	61,394	92,090	46,045	13,814	27,627	46,045
4-3/4 x 8	7-1/4"	16.815	136,000	914,735	39,467	36,208	45,260	50,692	54,312	56,847	72,416	108,625	54,312	16,294	32,587	54,312
5 x 8	7-5/8"	18.681	136,000	1,016,225	46,154	42,343	52,928	59,280	63,514	66,478	84,685	127,028	63,514	19,054	38,108	63,514
5-1/4 x 8	8"	20.644	136,000	1,123,054	53,556	49,134	61,417	68,787	73,700	77,140	98,267	147,401	73,700	22,110	44,220	73,700
5-1/2 x 8	8-3/8"	22.706	136,000	1,235,220	61,710	56,614	70,768	79,260	84,921	88,884	113,229	169,843	84,921	25,476	50,953	84,921
5-3/4 x 8	8-3/4"	24.866	136,000	1,352,725	70,652	64,818	81,023	90,745	97,227	101,764	129,636	194,454	97,227	29,168	58,336	97,227
6 x 8	9-1/8"	27.124	136,000	1,475,568	80,418	73,778	92,223	103,290	110,668	115,832	147,557	221,335	110,668	33,200	66,401	110,668

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN				
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 K=.300	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	136,000	22,732	155	142	178	199	213	223	284	426	213	64	128	213		
7/8 x 9	1-7/16"	0.461	136,000	31,382	249	229	286	320	343	359	458	686	343	103	206	343		
1x 8	1-5/8"	0.605	136,000	41,170	374	343	429	480	515	539	686	1,029	515	154	309	515		
1-1/8 x 8	1-13/16"	0.790	136,000	53,724	549	504	630	705	755	791	1,007	1,511	755	227	453	755		
1-1/4 x 8	2"	0.999	136,000	67,945	771	708	885	991	1,062	1,111	1,416	2,123	1,062	318	637	1062		
1-3/8 x 8	2-3/16"	1.233	136,000	83,836	1,047	961	1,201	1,345	1,441	1,508	1,921	2,882	1,441	432	865	1441		
1-1/2 x 8	2-3/8"	1.491	136,000	101,394	1,381	1,267	1,584	1,774	1,901	1,990	2,535	3,802	1,901	570	1141	1901		
1-5/8 x 8	2-9/16"	1.774	136,000	120,620	1,780	1,633	2,042	2,287	2,450	2,564	3,267	4,900	2,450	735	1470	2450		
1-3/4 x 8	2-3/4"	2.081	136,000	141,514	2,249	2,064	2,580	2,889	3,096	3,240	4,128	6,191	3,096	929	1857	3096		
1-7/8 x 8	2-15/16"	2.413	136,000	164,077	2,794	2,564	3,205	3,589	3,846	4,025	5,127	7,691	3,846	1154	2307	3846		
2 x 8	3-1/8"	2.769	136,000	188,308	3,421	3,138	3,923	4,394	4,708	4,927	6,277	9,415	4,708	1412	2825	4708		
2-1/8 x 8	3-5/16"	3.150	136,000	214,206	4,135	3,793	4,742	5,311	5,690	5,955	7,586	11,380	5,690	1707	3414	5690		
2-1/4 x 8	3-1/2"	3.555	136,000	241,773	4,941	4,533	5,667	6,347	6,800	7,117	9,067	13,600	6,800	2040	4080	6800		
2-3/8 x 8	3-11/16"	3.985	136,000	271,008	5,846	5,364	6,705	7,509	8,046	8,421	10,727	16,091	8,046	2414	4827	8046		
2-1/2 x 8	3-7/8"	4.440	136,000	301,912	6,856	6,290	7,862	8,806	9,435	9,875	12,580	18,869	9,435	2830	5661	9435		
2-3/4 x 8	4-1/4"	5.422	136,000	368,722	9,210	8,450	10,562	11,830	12,675	13,266	16,900	25,350	12,675	3802	7605	12675		
3 x 8	4-5/8"	6.503	136,000	442,206	12,050	11,055	13,819	15,477	16,583	17,357	22,110	33,165	16,583	4975	9950	16583		
3-1/4 x 8	5"	7.682	136,000	522,361	15,421	14,147	17,684	19,806	21,221	22,211	28,295	42,442	21,221	6366	12733	21221		
3-1/2 x 8	5-3/8"	8.959	136,000	609,190	19,367	17,768	22,210	24,875	26,652	27,896	35,536	53,304	26,652	7996	15991	26652		
3-3/4 x 8	5-3/4"	10.334	136,000	702,690	23,935	21,959	27,449	30,743	32,939	34,476	43,918	65,877	32,939	9882	19763	32939		
4 x 8	6-1/8"	11.807	136,000	802,864	29,171	26,762	33,453	37,467	40,143	42,017	53,524	80,286	40,143	12043	24086	40143		
4-1/4 x 8	6-1/2"	13.378	136,000	909,709	35,119	32,219	40,274	45,106	48,328	50,584	64,438	96,657	48,328	14498	28997	48328		
4-1/2 x 8	6-7/8"	15.047	136,000	1,023,228	41,824	38,371	47,964	53,719	57,557	60,243	76,742	115,113	57,557	17267	34534	57557		
4-3/4 x 8	7-1/4"	16.815	136,000	1,143,418	49,334	45,260	56,575	63,364	67,890	71,059	90,521	135,781	67,890	20367	40734	67890		
5 x 8	7-5/8"	18.681	136,000	1,270,282	57,692	52,928	66,160	74,100	79,393	83,098	105,857	158,785	79,393	23818	47636	79393		
5-1/4 x 8	8"	20.644	136,000	1,403,817	66,945	61,417	76,771	85,984	92,126	96,425	122,834	184,251	92,126	27638	55275	92126		
5-1/2 x 8	8-3/8"	22.706	136,000	1,544,026	77,137	70,768	88,460	99,075	106,152	111,106	141,536	212,304	106,152	31846	63691	106152		
5-3/4 x 8	8-3/4"	24.866	136,000	1,690,906	88,315	81,023	101,278	113,432	121,534	127,205	162,045	243,068	121,534	36460	72920	121534		
6 x 8	9-1/8"	27.124	136,000	1,844,460	100,523	92,223	115,279	129,112	138,334	144,790	184,446	276,669	138,334	41500	83001	138334		

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON				60												
				% 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 K=.300	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	136,000	27,278	186	170	213	239	256	268	341	511	256	77	153	256
7/8 x 9	1-7/16"	0.461	136,000	37,658	299	275	343	384	412	431	549	824	412	124	247	412
1x 8	1-5/8"	0.605	136,000	49,404	449	412	515	576	618	646	823	1,235	618	185	371	618
1-1/8 x 8	1-13/16"	0.790	136,000	64,468	659	604	755	846	907	949	1,209	1,813	907	272	544	907
1-1/4 x 8	2"	0.999	136,000	81,535	926	849	1,062	1,189	1,274	1,333	1,699	2,548	1,274	382	764	1274
1-3/8 x 8	2-3/16"	1.233	136,000	100,603	1,256	1,153	1,441	1,614	1,729	1,810	2,305	3,458	1,729	519	1037	1729
1-1/2 x 8	2-3/8"	1.491	136,000	121,672	1,658	1,521	1,901	2,129	2,281	2,388	3,042	4,563	2,281	684	1369	2281
1-5/8 x 8	2-9/16"	1.774	136,000	144,744	2,136	1,960	2,450	2,744	2,940	3,077	3,920	5,880	2,940	882	1764	2940
1-3/4 x 8	2-3/4"	2.081	136,000	169,817	2,699	2,477	3,096	3,467	3,715	3,888	4,953	7,430	3,715	1114	2229	3715
1-7/8 x 8	2-15/16"	2.413	136,000	196,892	3,353	3,076	3,846	4,307	4,615	4,830	6,153	9,229	4,615	1384	2769	4615
2 x 8	3-1/8"	2.769	136,000	225,969	4,105	3,766	4,708	5,273	5,649	5,913	7,532	11,298	5,649	1695	3390	5649
2-1/8 x 8	3-5/16"	3.150	136,000	257,048	4,962	4,552	5,690	6,373	6,828	7,146	9,104	13,656	6,828	2048	4097	6828
2-1/4 x 8	3-1/2"	3.555	136,000	290,128	5,929	5,440	6,800	7,616	8,160	8,541	10,880	16,320	8,160	2448	4896	8160
2-3/8 x 8	3-11/16"	3.985	136,000	325,210	7,016	6,436	8,046	9,011	9,655	10,105	12,873	19,309	9,655	2896	5793	9655
2-1/2 x 8	3-7/8"	4.440	136,000	362,294	8,227	7,548	9,435	10,567	11,322	11,850	15,096	22,643	11,322	3397	6793	11322
2-3/4 x 8	4-1/4"	5.422	136,000	442,467	11,052	10,140	12,675	14,196	15,210	15,920	20,280	30,420	15,210	4563	9126	15210
3 x 8	4-5/8"	6.503	136,000	530,647	14,460	13,266	16,583	18,573	19,899	20,828	26,532	39,799	19,899	5970	11940	19899
3-1/4 x 8	5"	7.682	136,000	626,834	18,505	16,977	21,221	23,767	25,465	26,653	33,953	50,930	25,465	7640	15279	25465
3-1/2 x 8	5-3/8"	8.959	136,000	731,028	23,241	21,322	26,652	29,850	31,982	33,475	42,643	63,965	31,982	9595	19189	31982
3-3/4 x 8	5-3/4"	10.334	136,000	843,228	28,722	26,351	32,939	36,891	39,526	41,371	52,702	79,053	39,526	11858	23716	39526
4 x 8	6-1/8"	11.807	136,000	963,436	35,005	32,115	40,143	44,960	48,172	50,420	64,229	96,344	48,172	14452	28903	48172
4-1/4 x 8	6-1/2"	13.378	136,000	1,091,651	42,142	38,663	48,328	54,128	57,994	60,700	77,325	115,988	57,994	17398	34796	57994
4-1/2 x 8	6-7/8"	15.047	136,000	1,227,873	50,189	46,045	57,557	64,463	69,068	72,291	92,090	138,136	69,068	20720	41441	69068
4-3/4 x 8	7-1/4"	16.815	136,000	1,372,102	59,200	54,312	67,890	76,037	81,469	85,270	108,625	162,937	81,469	24441	48881	81469
5 x 8	7-5/8"	18.681	136,000	1,524,338	69,230	63,514	79,393	88,920	95,271	99,717	127,028	190,542	95,271	28581	57163	95271
5-1/4 x 8	8"	20.644	136,000	1,684,581	80,333	73,700	92,126	103,181	110,551	115,710	147,401	221,101	110,551	33165	66330	110551
5-1/2 x 8	8-3/8"	22.706	136,000	1,852,831	92,564	84,921	106,152	118,890	127,382	133,327	169,843	254,764	127,382	38215	76429	127382
5-3/4 x 8	8-3/4"	24.866	136,000	2,029,088	105,978	97,227	121,534	136,118	145,841	152,647	194,454	291,681	145,841	43752	87504	145841
6 x 8	9-1/8"	27.124	136,000	2,213,351	120,628	110,668	138,334	154,935	166,001	173,748	221,335	332,003	166,001	49800	99601	166001

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN			
BOLT TENSION BASED ON														First Pass	Second Pass	All Subsequent Passes	
70 % YIELD														0.15	30%	60%	100%
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 K=.300	CUSTOM (INSERT K) K=.300	30%	60%	100%	
3/4 x 10	1-1/4"	0.334	136,000	31,824	217	199	249	278	298	312	398	597	298	90	179	298	
7/8 x 9	1-7/16"	0.461	136,000	43,935	349	320	400	449	481	503	641	961	481	144	288	481	
1x 8	1-5/8"	0.605	136,000	57,638	524	480	600	672	720	754	961	1,441	720	216	432	720	
1-1/8 x 8	1-13/16"	0.790	136,000	75,213	769	705	881	987	1,058	1,107	1,410	2,115	1,058	317	635	1,058	
1-1/4 x 8	2"	0.999	136,000	95,124	1,080	991	1,239	1,387	1,486	1,556	1,982	2,973	1,486	446	892	1,486	
1-3/8 x 8	2-3/16"	1.233	136,000	117,370	1,466	1,345	1,681	1,883	2,017	2,111	2,690	4,035	2,017	605	1210	2,017	
1-1/2 x 8	2-3/8"	1.491	136,000	141,951	1,934	1,774	2,218	2,484	2,662	2,786	3,549	5,323	2,662	798	1597	2,662	
1-5/8 x 8	2-9/16"	1.774	136,000	168,868	2,493	2,287	2,858	3,201	3,430	3,590	4,574	6,860	3,430	1029	2058	3,430	
1-3/4 x 8	2-3/4"	2.081	136,000	198,120	3,149	2,889	3,612	4,045	4,334	4,536	5,779	8,668	4,334	1300	2600	4,334	
1-7/8 x 8	2-15/16"	2.413	136,000	229,708	3,912	3,589	4,486	5,025	5,384	5,635	7,178	10,768	5,384	1615	3230	5,384	
2 x 8	3-1/8"	2.769	136,000	263,631	4,789	4,394	5,492	6,151	6,591	6,898	8,788	13,182	6,591	1977	3954	6,591	
2-1/8 x 8	3-5/16"	3.150	136,000	299,889	5,788	5,311	6,638	7,435	7,966	8,338	10,621	15,932	7,966	2390	4779	7,966	
2-1/4 x 8	3-1/2"	3.555	136,000	338,483	6,918	6,347	7,933	8,885	9,520	9,964	12,693	19,040	9,520	2856	5712	9,520	
2-3/8 x 8	3-11/16"	3.985	136,000	379,412	8,185	7,509	9,386	10,513	11,264	11,789	15,018	22,528	11,264	3379	6758	11,264	
2-1/2 x 8	3-7/8"	4.440	136,000	422,676	9,598	8,806	11,007	12,328	13,209	13,825	17,612	26,417	13,209	3963	7925	13,209	
2-3/4 x 8	4-1/4"	5.422	136,000	516,211	12,895	11,830	14,787	16,562	17,745	18,573	23,660	35,490	17,745	5323	10647	17,745	
3 x 8	4-5/8"	6.503	136,000	619,088	16,870	15,477	19,346	21,668	23,216	24,299	30,954	46,432	23,216	6965	13929	23,216	
3-1/4 x 8	5"	7.682	136,000	731,306	21,589	19,806	24,758	27,729	29,709	31,096	39,612	59,419	29,709	8913	17826	29,709	
3-1/2 x 8	5-3/8"	8.959	136,000	852,865	27,114	24,875	31,094	34,825	37,313	39,054	49,750	74,626	37,313	11194	22388	37,313	
3-3/4 x 8	5-3/4"	10.334	136,000	983,767	33,510	30,743	38,428	43,040	46,114	48,266	61,485	92,228	46,114	13834	27668	46,114	
4 x 8	6-1/8"	11.807	136,000	1,124,009	40,839	37,467	46,834	52,454	56,200	58,823	74,934	112,401	56,200	16860	33720	56,200	
4-1/4 x 8	6-1/2"	13.378	136,000	1,273,593	49,166	45,106	56,383	63,149	67,660	70,817	90,213	135,319	67,660	20298	40596	67,660	
4-1/2 x 8	6-7/8"	15.047	136,000	1,432,519	58,554	53,719	67,149	75,207	80,579	84,340	107,439	161,158	80,579	24174	48348	80,579	
4-3/4 x 8	7-1/4"	16.815	136,000	1,600,786	69,067	63,364	79,206	88,710	95,047	99,482	126,729	190,093	95,047	28514	57028	95,047	
5 x 8	7-5/8"	18.681	136,000	1,778,394	80,769	74,100	92,625	103,740	111,150	116,337	148,200	222,299	111,150	33345	66690	111,150	
5-1/4 x 8	8"	20.644	136,000	1,965,344	93,722	85,984	107,480	120,377	128,976	134,995	171,968	257,951	128,976	38693	77385	128,976	
5-1/2 x 8	8-3/8"	22.706	136,000	2,161,636	107,992	99,075	123,844	138,705	148,612	155,548	198,150	297,225	148,612	44584	89167	148,612	
5-3/4 x 8	8-3/4"	24.866	136,000	2,367,269	123,640	113,432	141,790	158,804	170,147	178,088	226,863	340,295	170,147	51044	102088	170,147	
6 x 8	9-1/8"	27.124	136,000	2,582,243	140,732	129,112	161,390	180,757	193,668	202,706	258,224	387,337	193,668	58100	116201	193,668	

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON				80												
				% 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 K=.300	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	136,000	36,371	248	227	284	318	341	357	455	682	341	102	205	341
7/8 x 9	1-7/16"	0.461	136,000	50,211	399	366	458	513	549	575	732	1,098	549	165	330	549
1x 8	1-5/8"	0.605	136,000	65,872	598	549	686	769	823	862	1,098	1,647	823	247	494	823
1-1/8 x 8	1-13/16"	0.790	136,000	85,958	878	806	1,007	1,128	1,209	1,265	1,612	2,418	1,209	363	725	1,209
1-1/4 x 8	2"	0.999	136,000	108,713	1,234	1,132	1,416	1,585	1,699	1,778	2,265	3,397	1,699	510	1,019	1,699
1-3/8 x 8	2-3/16"	1.233	136,000	134,137	1,675	1,537	1,921	2,152	2,305	2,413	3,074	4,611	2,305	692	1,383	2,305
1-1/2 x 8	2-3/8"	1.491	136,000	162,230	2,210	2,028	2,535	2,839	3,042	3,184	4,056	6,084	3,042	913	1,825	3,042
1-5/8 x 8	2-9/16"	1.774	136,000	192,992	2,849	2,613	3,267	3,659	3,920	4,103	5,227	7,840	3,920	1,176	2,352	3,920
1-3/4 x 8	2-3/4"	2.081	136,000	226,423	3,599	3,302	4,128	4,623	4,953	5,184	6,604	9,906	4,953	1,486	2,972	4,953
1-7/8 x 8	2-15/16"	2.413	136,000	262,523	4,471	4,102	5,127	5,743	6,153	6,440	8,204	12,306	6,153	1,846	3,692	6,153
2 x 8	3-1/8"	2.769	136,000	301,292	5,473	5,022	6,277	7,030	7,532	7,884	10,043	15,065	7,532	2,260	4,519	7,532
2-1/8 x 8	3-5/16"	3.150	136,000	342,730	6,615	6,069	7,586	8,497	9,104	9,529	12,138	18,208	9,104	2,731	5,462	9,104
2-1/4 x 8	3-1/2"	3.555	136,000	386,837	7,906	7,253	9,067	10,154	10,880	11,388	14,506	21,760	10,880	3,264	6,528	10,880
2-3/8 x 8	3-11/16"	3.985	136,000	433,614	9,354	8,582	10,727	12,015	12,873	13,474	17,164	25,746	12,873	3,862	7,724	12,873
2-1/2 x 8	3-7/8"	4.440	136,000	483,059	10,969	10,064	12,580	14,089	15,096	15,800	20,127	30,191	15,096	4,529	9,057	15,096
2-3/4 x 8	4-1/4"	5.422	136,000	589,956	14,737	13,520	16,900	18,928	20,280	21,226	27,040	40,559	20,280	6,084	12,168	20,280
3 x 8	4-5/8"	6.503	136,000	707,529	19,280	17,688	22,110	24,764	26,532	27,771	35,376	53,065	26,532	7,960	15,919	26,532
3-1/4 x 8	5"	7.682	136,000	835,778	24,673	22,636	28,295	31,690	33,953	35,538	45,271	67,907	33,953	10,186	20,372	33,953
3-1/2 x 8	5-3/8"	8.959	136,000	974,703	30,987	28,429	35,536	39,800	42,643	44,633	56,858	85,287	42,643	12,793	25,586	42,643
3-3/4 x 8	5-3/4"	10.334	136,000	1,124,305	38,297	35,135	43,918	49,188	52,702	55,161	70,269	105,404	52,702	15,811	31,621	52,702
4 x 8	6-1/8"	11.807	136,000	1,284,582	46,673	42,819	53,524	59,947	64,229	67,226	85,639	128,458	64,229	19,269	38,537	64,229
4-1/4 x 8	6-1/2"	13.378	136,000	1,455,535	56,190	51,550	64,438	72,170	77,325	80,934	103,100	154,651	77,325	23,198	46,395	77,325
4-1/2 x 8	6-7/8"	15.047	136,000	1,637,164	66,919	61,394	76,742	85,951	92,090	96,388	122,787	184,181	92,090	27,627	55,254	92,090
4-3/4 x 8	7-1/4"	16.815	136,000	1,829,469	78,934	72,416	90,521	101,383	108,625	113,694	144,833	217,249	108,625	32,587	65,175	108,625
5 x 8	7-5/8"	18.681	136,000	2,032,451	92,307	84,685	105,857	118,560	127,028	132,956	169,371	254,056	127,028	38,108	76,217	127,028
5-1/4 x 8	8"	20.644	136,000	2,246,108	107,111	98,267	122,834	137,574	147,401	154,280	196,534	294,802	147,401	44,220	88,440	147,401
5-1/2 x 8	8-3/8"	22.706	136,000	2,470,441	123,419	113,229	141,536	158,520	169,843	177,769	226,457	339,686	169,843	50,953	101,906	169,843
5-3/4 x 8	8-3/4"	24.866	136,000	2,705,450	141,303	129,636	162,045	181,491	194,454	203,529	259,272	388,908	194,454	58,336	116,673	194,454
6 x 8	9-1/8"	27.124	136,000	2,951,135	160,837	147,557	184,446	206,579	221,335	231,664	295,114	442,670	221,335	66,401	132,801	221,335

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					REQUIRED TORQUE (FtLbs)									THESE TORQUE VALUES ARE BASED ON FRICTION FACTOR IN "CUSTOM" COLUMN		
BOLT TENSION BASED ON														First Pass	Second Pass	All Subsequent Passes
90 % YIELD					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 K=.300	CUSTOM (INSERT K) K=.300	30%	60%	100%
BOLT SIZE DIA. x TPI	HEX NUT ACROSS FLAT	STRESS AREA (IN ²)	MIN YIELD STRENGTH (PSI)	BOLT TENSION (LBS)								0.15				
3/4 x 10	1-1/4"	0.334	136,000	40,917	279	256	320	358	384	401	511	767	384	115	230	384
7/8 x 9	1-7/16"	0.461	136,000	56,487	449	412	515	577	618	647	824	1,236	618	185	371	618
1x 8	1-5/8"	0.605	136,000	74,105	673	618	772	865	926	970	1,235	1,853	926	278	556	926
1-1/8 x 8	1-13/16"	0.790	136,000	96,702	988	907	1,133	1,269	1,360	1,423	1,813	2,720	1,360	408	816	1360
1-1/4 x 8	2"	0.999	136,000	122,302	1,389	1,274	1,592	1,784	1,911	2,000	2,548	3,822	1,911	573	1147	1911
1-3/8 x 8	2-3/16"	1.233	136,000	150,904	1,885	1,729	2,161	2,421	2,594	2,715	3,458	5,187	2,594	778	1556	2594
1-1/2 x 8	2-3/8"	1.491	136,000	182,509	2,487	2,281	2,852	3,194	3,422	3,582	4,563	6,844	3,422	1027	2053	3422
1-5/8 x 8	2-9/16"	1.774	136,000	217,116	3,205	2,940	3,675	4,116	4,410	4,616	5,880	8,820	4,410	1323	2646	4410
1-3/4 x 8	2-3/4"	2.081	136,000	254,726	4,049	3,715	4,643	5,201	5,572	5,832	7,430	11,144	5,572	1672	3343	5572
1-7/8 x 8	2-15/16"	2.413	136,000	295,339	5,030	4,615	5,768	6,461	6,922	7,245	9,229	13,844	6,922	2077	4153	6922
2 x 8	3-1/8"	2.769	136,000	338,954	6,158	5,649	7,062	7,909	8,474	8,869	11,298	16,948	8,474	2542	5084	8474
2-1/8 x 8	3-5/16"	3.150	136,000	385,572	7,442	6,828	8,535	9,559	10,242	10,720	13,656	20,483	10,242	3073	6145	10242
2-1/4 x 8	3-1/2"	3.555	136,000	435,192	8,894	8,160	10,200	11,424	12,240	12,811	16,320	24,480	12,240	3672	7344	12240
2-3/8 x 8	3-11/16"	3.985	136,000	487,815	10,524	9,655	12,068	13,517	14,482	15,158	19,309	28,964	14,482	4345	8689	14482
2-1/2 x 8	3-7/8"	4.440	136,000	543,441	12,341	11,322	14,152	15,850	16,983	17,775	22,643	33,965	16,983	5095	10190	16983
2-3/4 x 8	4-1/4"	5.422	136,000	663,700	16,579	15,210	19,012	21,294	22,815	23,879	30,420	45,629	22,815	6844	13689	22815
3 x 8	4-5/8"	6.503	136,000	795,970	21,690	19,899	24,874	27,859	29,849	31,242	39,799	59,698	29,849	8955	17909	29849
3-1/4 x 8	5"	7.682	136,000	940,250	27,757	25,465	31,831	35,651	38,198	39,980	50,930	76,395	38,198	11459	22919	38198
3-1/2 x 8	5-3/8"	8.959	136,000	1,096,541	34,861	31,982	39,978	44,775	47,974	50,212	63,965	95,947	47,974	14392	28784	47974
3-3/4 x 8	5-3/4"	10.334	136,000	1,264,843	43,084	39,526	49,408	55,337	59,289	62,056	79,053	118,579	59,289	17787	35574	59289
4 x 8	6-1/8"	11.807	136,000	1,445,154	52,507	48,172	60,215	67,441	72,258	75,630	96,344	144,515	72,258	21677	43355	72258
4-1/4 x 8	6-1/2"	13.378	136,000	1,637,477	63,213	57,994	72,492	81,192	86,991	91,051	115,988	173,982	86,991	26097	52195	86991
4-1/2 x 8	6-7/8"	15.047	136,000	1,841,810	75,284	69,068	86,335	96,695	103,602	108,437	138,136	207,204	103,602	31081	62161	103602
4-3/4 x 8	7-1/4"	16.815	136,000	2,058,153	88,801	81,469	101,836	114,056	122,203	127,906	162,937	244,406	122,203	36661	73322	122203
5 x 8	7-5/8"	18.681	136,000	2,286,507	103,846	95,271	119,089	133,380	142,907	149,576	190,542	285,813	142,907	42872	85744	142907
5-1/4 x 8	8"	20.644	136,000	2,526,871	120,500	110,551	138,188	154,771	165,826	173,564	221,101	331,652	165,826	49748	99496	165826
5-1/2 x 8	8-3/8"	22.706	136,000	2,779,246	138,846	127,382	159,228	178,335	191,073	199,990	254,764	382,146	191,073	57322	114644	191073
5-3/4 x 8	8-3/4"	24.866	136,000	3,043,631	158,966	145,841	182,301	204,177	218,761	228,970	291,681	437,522	218,761	65628	131257	218761
6 x 8	9-1/8"	27.124	136,000	3,320,027	180,941	166,001	207,502	232,402	249,002	260,622	332,003	498,004	249,002	74701	149401	249002

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.

HYTORC

TORQUE GUIDE FOR ISO R898 GRADE 10.9 STUD					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 K=.300	CUSTOM (INSERT K) K=.300	0.15	30%	60%	100%			
3/4 x 10	1-1/4"	0.334	136,000	45,009	307	281	352	394	422	442	563	844	422	127	253	422				
7/8 x 9	1-7/16"	0.461	136,000	62,136	494	453	566	634	680	711	906	1,359	680	204	408	680				
1x 8	1-5/8"	0.605	136,000	81,516	740	679	849	951	1,019	1,067	1,359	2,038	1,019	306	611	1019				
1-1/8 x 8	1-13/16"	0.790	136,000	106,373	1,087	997	1,247	1,396	1,496	1,566	1,994	2,992	1,496	449	898	1496				
1-1/4 x 8	2"	0.999	136,000	134,532	1,527	1,401	1,752	1,962	2,102	2,200	2,803	4,204	2,102	631	1261	2102				
1-3/8 x 8	2-3/16"	1.233	136,000	165,994	2,073	1,902	2,378	2,663	2,853	2,986	3,804	5,706	2,853	856	1712	2853				
1-1/2 x 8	2-3/8"	1.491	136,000	200,760	2,735	2,509	3,137	3,513	3,764	3,940	5,019	7,528	3,764	1129	2259	3764				
1-5/8 x 8	2-9/16"	1.774	136,000	238,828	3,525	3,234	4,043	4,528	4,851	5,078	6,468	9,702	4,851	1455	2911	4851				
1-3/4 x 8	2-3/4"	2.081	136,000	280,199	4,454	4,086	5,108	5,721	6,129	6,415	8,172	12,259	6,129	1839	3678	6129				
1-7/8 x 8	2-15/16"	2.413	136,000	324,872	5,533	5,076	6,345	7,107	7,614	7,970	10,152	15,228	7,614	2284	4569	7614				
2 x 8	3-1/8"	2.769	136,000	372,849	6,773	6,214	7,768	8,700	9,321	9,756	12,428	18,642	9,321	2796	5593	9321				
2-1/8 x 8	3-5/16"	3.150	136,000	424,129	8,187	7,511	9,388	10,515	11,266	11,792	15,021	22,532	11,266	3380	6760	11266				
2-1/4 x 8	3-1/2"	3.555	136,000	478,711	9,784	8,976	11,220	12,566	13,464	14,092	17,952	26,928	13,464	4039	8078	13464				
2-3/8 x 8	3-11/16"	3.985	136,000	536,597	11,576	10,620	13,275	14,868	15,930	16,674	21,240	31,860	15,930	4779	9558	15930				
2-1/2 x 8	3-7/8"	4.440	136,000	597,785	13,575	12,454	15,567	17,435	18,681	19,553	24,908	37,362	18,681	5604	11208	18681				
2-3/4 x 8	4-1/4"	5.422	136,000	730,070	18,237	16,731	20,913	23,423	25,096	26,267	33,462	50,192	25,096	7529	15058	25096				
3 x 8	4-5/8"	6.503	136,000	875,567	23,859	21,889	27,361	30,645	32,834	34,366	43,778	65,668	32,834	9850	19700	32834				
3-1/4 x 8	5"	7.682	136,000	1,034,276	30,533	28,012	35,015	39,216	42,017	43,978	56,023	84,035	42,017	12605	25210	42017				
3-1/2 x 8	5-3/8"	8.959	136,000	1,206,195	38,347	35,181	43,976	49,253	52,771	55,234	70,361	105,542	52,771	15831	31663	52771				
3-3/4 x 8	5-3/4"	10.334	136,000	1,391,327	47,392	43,479	54,349	60,871	65,218	68,262	86,958	130,437	65,218	19566	39131	65218				
4 x 8	6-1/8"	11.807	136,000	1,589,670	57,758	52,989	66,236	74,185	79,483	83,193	105,978	158,967	79,483	23845	47690	79483				
4-1/4 x 8	6-1/2"	13.378	136,000	1,801,225	69,535	63,793	79,742	89,311	95,690	100,156	127,587	191,380	95,690	28707	57414	95690				
4-1/2 x 8	6-7/8"	15.047	136,000	2,025,991	82,812	75,975	94,968	106,365	113,962	119,280	151,949	227,924	113,962	34189	68377	113962				
4-3/4 x 8	7-1/4"	16.815	136,000	2,263,968	97,681	89,615	112,019	125,462	134,423	140,696	179,231	268,846	134,423	40327	80654	134423				
5 x 8	7-5/8"	18.681	136,000	2,515,158	114,230	104,798	130,998	146,718	157,197	164,533	209,596	314,395	157,197	47159	94318	157197				
5-1/4 x 8	8"	20.644	136,000	2,779,558	132,550	121,606	152,007	170,248	182,409	190,921	243,211	364,817	182,409	54723	109445	182409				
5-1/2 x 8	8-3/8"	22.706	136,000	3,057,171	152,731	140,120	175,150	196,168	210,180	219,989	280,241	420,361	210,180	63054	126108	210180				
5-3/4 x 8	8-3/4"	24.866	136,000	3,347,994	174,863	160,425	200,531	224,595	240,637	251,867	320,849	481,274	240,637	72191	144382	240637				
6 x 8	9-1/8"	27.124	136,000	3,652,030	199,036	182,601	228,252	255,642	273,902	286,684	365,203	547,804	273,902	82171	164341	273902				

Southwest Texas	West Texas	Main Office	Southeast Texas	Central & East Texas
4802 Baldwin Blvd.	3508 S County Rd 1290	12420 Texaco Rd	2484 W Cardinal #4	7900 Rodeo Trl. #500
Corpus Christi 78408	Odessa, TX 78765	Houston, TX 77013	Beaumont, TX 77705	Mansfield, TX 76063
361-888-5080	432-561-8481	713-453-6677	409-840-9699	682-334-2679

REV 7.31.09

This spread sheet is to be used as a guide. all results should be analyzed against actual field results to establish their validity.
 To use spread sheet click desired tab for B7 or B16 material
 Enter the desired percent yield in yellow field at top of form
 If 'K' factor is not listed, Enter appropriate value under Custom (insert K) , in yellow field only
 as always- after entering any value, click outside the field or hit enter to update calculations.
NOTICE: Spread sheet is active and unprotected. Any alterations to cells other than those shown in yellow could produce incorrect results.