

**TABLE A — TIE ROD TORQUE CHART
CLASS P-6 AIR AND H-6 HYD. CYL.**

Cylinder Diameter	No. of Tie Rods	Tie Rod Size	P-6 Cylinder Torque Ft. Lbs.	H-6 Cylinder Torque Ft. Lbs.
1½	4	¼	3	7
2	4	5/16	7	14
2½	4	5/16	7	14
3¼	4	¾	15	30
4	4	¾	15	30
5	4	½	30	60
6	4	½	30	60
8	4	5/8	60	150
10	4	¾	100	260
12	4	¾	100	260
14	4	7/8	170	400
16	8	1	260	600
18	8	1½	300	850
20	8	1¼	450	1000

TABLE B — VOLUME OF OIL PER 12" OF STROKE

Cyl. Bore	BLIND END DISPLACEMENT		ROD END DISPLACEMENT			
	Area (Sq. In.)	Gals./Foot of Stroke	Net Area (Sq. In.) with R Rod	Gals./Foot of Stroke	Net Area (Sq. In.) with HR Rod	Gals./Foot of Stroke
1½	1.767	.0918	1.460	.0758	.982	.0510
2	3.142	.1632	2.835	.1473	1.656	.0852
2½	4.909	.2550	4.602	.2390	2.503	.1301
3¼	8.296	.4309	7.511	.3902	5.154	.2700
4	12.566	.6528	11.781	.6120	7.658	.4010
5	19.635	1.020	18.850	.9792	10.014	.5210
6	28.274	1.468	26.789	1.392	15.708	.8201
8	50.266	2.611	48.781	2.534	26.507	1.380
10	78.540	4.080	76.135	3.956	54.780	2.850
12	113.10	5.918	109.96	5.712	89.337	4.640
14	153.94	7.997	149.04	7.309	130.178	6.760
16	201.06	10.444	196.16	10.190	178.302	9.260
18	254.47	13.219	244.85	12.715	230.709	11.980
20	314.16	16.320	301.60	15.667	291.400	15.140

TABLE B chart covers the smallest and the largest rod available per cylinder diameter. Intermediate rod end displacements can be calculated.

TABLE C — CYLINDER PUSH AND PULL FORCES

BORE	ROD	THEORETICAL FORCE @ FLUID PRESSURE									
		100	250	300	500	800	1000	1200	1500	2250	2500
1½	PUSH	176.7	441.8	530.1	883.5	1414	1767	2120	2650	3976	4418
	PULL — ¾ ROD	146.0	365.0	438.0	730.0	1168	1460	1752	2190	3285	3650
	PULL — 1 ROD	98.0	245	294	490	783	980	1175	1470	2200	2450
2	PUSH	314.2	785.5	942.6	1571	2514	3142	3770	4713	7070	7855
	PULL — ¾ ROD	283.5	708.7	850.5	1417	2268	2835	3402	4252	6379	7087
	PULL — 1 ROD	165.6	414	496.8	828	1324.8	1656	1987.2	2484	3726	4140
2½	PUSH	490.9	1227	1473	2454	3927	4909	5891	7364	—	—
	PULL — ¾ ROD	460.2	1150	1381	2301	3682	4602	5522	6903	—	—
	PULL — 1 ROD	250.3	625.8	751	1251	2002	2503	3004	3755	—	—
3¼	PUSH	829.6	2074	2489	4148	6637	8296	9955	12444	18670	—
	PULL — 1 ROD	751.1	1878	2253	3756	6009	7511	9013	11270	16900	—
	PULL — 2 ROD	515.4	1288	1546	2577	4123	5154	6185	7731	11596	—
4	PUSH	1257	3142	3770	6283	10050	12566	15079	18850	—	—
	PULL — 1 ROD	1178	2945	3534	5890	9425	11781	14137	17671	—	—
	PULL — 2½ ROD	765.7	1914	2297	3828	6126	7657	9189	11486	—	—
5	PUSH	1963	4908	5890	9817	15708	19635	23562	—	—	—
	PULL — 1 ROD	1885	4712	5655	9425	15080	18850	22620	—	—	—
	PULL — 3½ ROD	1001	2503	3004	5006	8011	10013	12016	—	—	—
6	PUSH	2827	7078	8482	14137	22619	28274	33928	—	—	—
	PULL — 1¾ ROD	2679	6697	8037	13394	21431	26789	32147	—	—	—
	PULL — 4 ROD	1570	3926	4712	7853	12566	15707	18850	—	—	—
8	PUSH	5027	12566	15079	25133	40213	50266	—	—	—	—
	PULL — 1¾ ROD	4878	12195	14634	24390	39025	48781	—	—	—	—
	PULL — 5½ ROD	2650	6626	7952	13253	21205	26507	—	—	—	—
10	PUSH	7854	19635	23562	39270	62832	—	—	—	—	—
	PULL — 1¾ ROD	7614	19034	22840	38068	60908	—	—	—	—	—
	PULL — 5½ ROD	5478	13695	16434	27390	43825	—	—	—	—	—
12	PUSH	11130	28275	33930	56550	90480	—	—	—	—	—
	PULL — 2 ROD	10995	27486	32985	54975	87948	—	—	—	—	—
	PULL — 5½ ROD	8933	22334	26801	44670	71471	—	—	—	—	—
14	PUSH	15394	38485	46182	76970	123152	—	—	—	—	—
	PULL — 2½ ROD	14900	37250	44700	74500	119232	—	—	—	—	—
	PULL — 5½ ROD	13018	32545	39054	65090	104152	—	—	—	—	—
16	PUSH	20106	50265	60318	100530	—	—	—	—	—	—
	PULL — 2½ ROD	19616	49040	58480	98080	—	—	—	—	—	—
	PULL — 5½ ROD	17730	44325	53190	88650	—	—	—	—	—	—
18	PUSH	25447	63617	76341	127235	—	—	—	—	—	—
	PULL — 3¾ ROD	24485	61213	73445	122425	—	—	—	—	—	—
	PULL — 5½ ROD	23072	57680	69216	115360	—	—	—	—	—	—
20	PUSH	31416	78640	94248	157080	—	—	—	—	—	—
	PULL — 4 ROD	30160	75400	90480	150800	—	—	—	—	—	—
	PULL — 5½ ROD	29041	72603	87123	145205	—	—	—	—	—	—

TABLE C chart covers the smallest and the largest rod available per cylinder diameter. Intermediate rod pull force can be calculated.