

PUSH AND PULL FORCES FOR PNEUMATIC CYLINDERS
SERIES JHD, LSSL AND VAC

BORE	PISTON AREA SQ. IN.	PUSH FORCE IN LBS OBTAINED AT FOLLOWING PRESSURES						CU. FT. FREE AIR @ 80 PSI REQ'D TO MOVE MAX. LOAD 1 INCH	CU. FT. DISPLACED PER INCH OF STROKE
		60 PSI	80 PSI	100 PSI	150 PSI	200 PSI	250 PSI		
1 1/2	1.77	106	142	177	266	354	443	.007	.0010
2	3.14	188	251	314	471	628	785	.012	.0018
2 1/2	4.91	295	393	491	736	982	1228	.018	.0028
3 1/4	8.30	498	664	830	1245	1660	2075	.031	.0048
4	12.57	754	1006	1257	1886	2514	3143	.047	.0073
5	19.64	1178	1571	1964	2946	3925	4910	.073	.0114
6	28.27	1696	2262	2827	4241	5654	7068	.105	.0164
8	50.27	3016	4022	5027	7541	10053	12568	.187	.0291
10	78.54	4712	6283	7854	11781	15708	19635	.293	.0455
12	113.10	6786	9048	11310	16965	22620	28275	.422	.0655
14	153.94	9236	12315	15394	23091	30788	38485	.574	.0891
16	201.06	12064	16085	20106	30159	40212	50265	.750	.1164
18	254.47	15268	20358	25447	38171	50894	63618	.949	.1473
20	314.16	18850	25133	31416	47124	62832	78540	1.171	.1818

This table lists full piston areas and push force values on the extend stroke at various input pressures. The formula used is: $F = PA$ (Force = Pressure x Area). Also listed are displacement values in cubic feet by bore size and the corresponding value of cubic feet of free air required to move the piston one inch.

DEDUCTIONS FOR PULL FORCE, IN POUNDS, PER ROD DIAMETER

PISTON ROD DIA.	PISTON ROD AREA SQ. IN.	FOR PULL STROKE FORCE, DEDUCT FROM THE PUSH FORCE THE FORCE CORRESPONDING TO ROD SIZE AND PRESSURE						CU. FT. FREE AIR @ 80 PSI REQ'D TO MOVE MAX. LOAD 1 INCH	CU. FT. DISPLACED PER INCH OF STROKE
		60 PSI	80 PSI	100 PSI	150 PSI	200 PSI	250 PSI		
5/8	.306	18	24	31	46	61	77	.001	.0002
1	.785	47	63	79	118	157	196	.003	.0005
1 3/8	1.485	89	119	149	223	297	371	.006	.0009
1 3/4	2.405	144	192	241	361	481	601	.009	.0014
2	3.142	188	251	314	471	628	786	.012	.0018
2 1/2	4.909	295	393	491	736	982	1227	.018	.0028
3	7.069	424	566	707	1060	1414	1767	.026	.0041
3 1/2	9.621	577	770	962	1443	1924	2405	.036	.0056
4	12.566	754	1005	1257	1885	2513	3142	.047	.0073
4 1/2	15.904	954	1272	1590	2386	3181	3976	.059	.0092
5	19.635	1178	1571	1964	2945	3927	4909	.073	.0114
5 1/2	23.758	1425	1901	2376	3564	4752	5940	.087	.0138

This table lists the rod areas and the corresponding force and displacement values calculated in the same manner as those for pistons in the top table. To determine the values of the pull force and the cubic feet of free air on the retract stroke, deduct those values in the table for the rod size of your cylinder.

*Example: Assume a 4" bore cylinder with a 2" diameter rod operating at 80 PSI. Using the charts, the following theoretical values are obtained:
Push (or Extend) Force = 1,006 lbs.
Pull (or Retract) Force = 755 lbs (1,006 lbs from the top table, less 251 lbs from the bottom table)*