

BOOSTER SELECTION CHART

Theoretical P.S.I. Output of Ram at Input Pressure of			Booster Ratio	Hydraulic Ram		Booster Piston			
80 P.S.I.	100 P.S.I.	250 P.S.I.		Dia.	Volume Cu. In. per In. of Stroke	Dia.	Area		
1	2	3	6	7	8	9	10		
846	1057	2642	10.57	1	.785	3 1/4	8.296		
447	559	1397	5.59	1 3/8	1.485				
276	345	862	3.45	1 3/4	2.405				
211	264	660	2.64	2	3.142				
1280	1600	4000	16.00	1	.785	4	12.566		
680	850	2125	8.50	1 3/8	1.485				
416	520	1300	5.20	1 3/4	2.405				
320	400	1000	4.00	2	3.142				
208	260	650	2.60	2 1/2	4.909				
2000	2500	2500	25.00	1	.785			5	19.635
1058	1322	3305	13.22	1 3/8	1.485				
653	816	2040	8.16	1 3/4	2.405				
500	625	1562	6.25	2	3.142				
320	400	1000	4.00	2 1/2	4.909				
222	278	695	2.78	3	7.069				
163	204	510	2.04	3 1/2	9.621				
1523	1904	4757	19.04	1 3/8	1.485	6	28.274		
941	1176	2940	11.76	1 3/4	2.405				
720	900	2250	9.00	2	3.142				
462	577	1442	5.77	2 1/2	4.909				
320	400	1000	4.00	3	7.069				
235	294	735	2.94	3 1/2	9.621				
180	225	562	2.25	4	12.566				
2073	2591	2591	25.91	1 3/8	1.485			7	38.485
1280	1600	4000	16.00	1 3/4	2.405				
980	1225	3062	12.25	2	3.142				
499	624	1560	6.24	2 1/2	4.909				
435	544	1360	5.44	3	7.069				
320	400	1000	4.00	3 1/2	9.621				
245	306	765	3.06	4	12.566				
194	242	605	2.42	4 1/2	15.904				
157	196	490	1.96	5	19.635				
130	162	405	1.62	5 1/2	23.758				
2708	3385	3385	33.85	1 3/8	1.485	8	50.265		
1672	2090	2090	20.90	1 3/4	2.405				
1280	1600	4000	16.00	2	3.142				
821	1026	2565	10.26	2 1/2	4.909				
569	711	1777	7.11	3	7.069				
418	522	1305	5.22	3 1/2	9.621				
320	400	1000	4.00	4	12.566				
253	316	790	3.16	4 1/2	15.904				
205	256	640	2.56	5	19.635				
170	212	530	2.12	5 1/2	23.758				
2613	3266	3266	32.66	1 3/4	2.405	10	78.540		
2000	2500	2500	25.00	2	3.142				
1282	1603	4007	16.03	2 1/2	4.909				
889	1111	2777	11.11	3	7.069				
653	816	2040	8.16	3 1/2	9.621				
500	625	1562	6.25	4	12.566				
395	494	1235	4.94	4 1/2	15.904				
320	400	1000	4.00	5	19.635				
265	331	827	3.31	5 1/2	23.758				
2880	3600	3600	36.00	2	3.142			12	113.10
1846	2308	2308	23.08	2 1/2	4.909				
1280	1600	4000	16.00	3	7.069				
940	1157	2937	11.57	3 1/2	9.621				
720	900	2250	9.00	4	12.566				
569	711	1777	7.11	4 1/2	15.904				
461	576	1440	5.76	5	19.635				
381	476	1190	4.76	5 1/2	23.758				
2514	3142	3142	31.42	2 1/2	4.909	14	153.94		
1742	2178	2178	21.78	3	7.069				
1280	1600	4000	16.00	3 1/2	9.621				
980	1225	3062	12.25	4	12.566				
774	968	2420	9.68	4 1/2	15.904				
627	784	1960	7.84	5	19.635				
518	648	1620	6.48	5 1/2	23.758				

SINGLE PRESSURE BOOSTER SELECTION

F =Required work cylinder force
 A₁ =Area of work cylinder piston (Col. 10)
 A₂ =Area of booster hydraulic ram (Col. 8)
 S₁=Stroke of work cylinder
 S₂=Stroke of booster
 P₁=Maximum shop line pressure
 P₂=Shop line pressure to be used
 R₁ =Exact booster ratio
 R₂ =Selected booster ratio (equal to or next higher than R₁) (Col. 6)

EXAMPLE: What bore, ratio and stroke booster will be required for a 4" bore, 6" stroke, 80 P.S.I. shop line pressure. Cylinder to have 3500 lbs. thrust.

$$R_1 = \frac{F}{P_1 \times A_1}, \quad R_1 = \frac{3500}{80 \times 12.6}, \quad R_1=3.47$$

$$R_2=4.00$$

$$P_2 = \frac{F}{R_2 \times A_1}, \quad P_2 = \frac{3500}{4.00 \times 12.6}, \quad P_2=70 \text{ P.S.I.}$$

Select smallest bore booster with required ratio, =4" bore, 2" hydraulic ram

$$S_2 = 1 + \frac{1.02 \times A_1 \times S_1}{A_2}, \quad S_2 = \frac{1.02 \times 12.6 \times 6}{3.14}, \quad S_2=26"$$

Required booster=4" bore, 4.00 to 1 ratio, 26" stroke at 70 P.S.I.

DUAL PRESSURE BOOSTER SELECTION

F =Required high pressure work cylinder force
 A₁ =Area of work cylinder piston (Col. 10)
 A₂ =Area of booster hydraulic ram (Col. 8)
 S₁ =Total stroke of work cylinder
 SH =High pressure work cylinder stroke
 S₂ =Stroke of Booster
 P₁ =Maximum shop line pressure
 P₂ =Shop line pressure to be used
 R₁ =Exact booster ratio
 R₂ =Selected booster ratio (equal to or next higher than R₁) (Col. 6)

EXAMPLE: What bore, ratio and stroke booster will be required for a 4" bore, 6" stroke, 1 1/2" high pressure work cylinder stroke, 80 P.S.I. shop line pressure, cylinder to have 3500 lbs. high pressure thrust.

$$R_1 = \frac{F}{P_1 \times A_1}, \quad R_1 = \frac{3500}{80 \times 12.6}, \quad R_1=3.47$$

$$R_2=4.00$$

$$P_2 = \frac{F}{R_2 \times A_1}, \quad P_2 = \frac{3500}{4.00 \times 12.6}, \quad P_2=70 \text{ P.S.I.}$$

Select smallest bore booster with required ratio, =4" bore, 2" hydraulic ram

$$S_2 = 2'' + \frac{(0.02 \times A_1 \times S_1) + (A_1 \times SH)}{A_2}$$

$$S_2 = 2'' + \frac{(0.02 \times 12.6 \times 6) + (12.6 \times 1.5)}{3.14}, \quad S_2 = 8''$$

Required booster=4" bore, 4.00 to 1 ratio, 8" stroke at 70 P.S.I.

In most cases the smallest diameter and longest stroke booster that will fit the installation will be the least expensive booster to use.