

Using the Accumulator Selection Chart.

Figures in the body of this chart are the number of cubic inches of oil delivered by a "1 gallon" accumulator starting from a fully charged pressure (first column) and ending at a lower pressure (top line of chart). A "3-gallon" accumulator would deliver three times this amount at the same pressure drop, etc. The chart is based on a nitrogen pre-charge of 1/2 the maximum hydraulic system pressure.

Instructions: Find your maximum system (fully charged) pressure in the first column. The nitrogen pre-charge should be 1/2 this amount. Follow this line to the figure in the column headed by the minimum PSI which will give the necessary cylinder force. This figure is the cubic inch discharge of a 1-gallon accumulator. From this, determine the number of gallons of accumulator capacity that will be needed.

TABLE 6-A. Discharge Capacity of a One-Gallon Accumulator

Maximum System Pressure With Accumulator Fully Charged (Pre-Charge to Half This Amount)	Minimum Hydraulic PSI Remaining After Oil Discharge of Amount Shown in Table											
	2600	2500	2300	2100	2000	1800	1600	1500	1300	1200	1000	
3000 PSI	17	22	33	46	55	74	96	110	---	---	---	
2750 PSI	---	11	21	33	41	58	79	91	---	---	---	
2500 PSI	---	---	9	22	28	44	62	73	100	---	---	
2250 PSI	---	---	---	9	15	27	45	55	81	96	---	
2000 PSI	---	---	---	---	---	12	27	37	59	73	---	
1750 PSI	---	<i>Cubic Inches of Oil Delivered</i>					---	10	18	38	50	83
1500 PSI	---	<i>by a "1-Gallon" Accumulator.</i>					---	---	---	18	28	55
1250 PSI	---	---	---	---	---	---	---	---	---	---	28	

Note: The above chart is calculated for approximate discharge based on average rate of cycling. It is always wise to provide about 10% to 15% more accumulator capacity than figured from the chart to take care of unusual conditions such as rapid cycling where heat does not have time to dissipate.

a. **Pre-charge Level.** The actual PSI value of the nitrogen pre-charge pressure is not highly critical except on very special applications. The range of 1/3 to 1/2 the maximum hydraulic pressure as indicated by the rule-of-thumb will give good results on practically all the usual applications. Very little difference in circuit performance will be noticed within this range. Suggested procedure is to pre-charge initially to the higher value, then do not add more gas until pressure falls to the lower value.

Rule-of-thumb

Pre-charge pressures within this range will work for nearly all industrial accumulator applications.

ACCUMULATOR PRE-CHARGE

Pre-charge Gas Pressure Should be from 1/3 to 1/2 the Maximum Hydraulic Pressure.



Caution: Do not use oxygen nor any gas mixture containing oxygen, such as compressed air, for pre-charging accumulators which have rubber seals or separators. In the first place, oxygen deteriorates rubber by oxidation. In the second place, the use of oxygen always creates a possible fire or explosion hazard in any situation, and this is especially dangerous in the vicinity of hydrocarbons such as petroleum oil.



ACCUMULATOR CAPACITY

For Every 1% an Accumulator is Oil-charged Above Minimum System Pressure, it Will Deliver 1 Cubic Inch of Oil for Each 1 Gallon of Its Rated Size.

Rule-of-thumb

This is a good approximation for accumulators with a pre-charge of about 1/2 the maximum system hydraulic pressure.

Example of Use of Rule-of-thumb: Assume a hydraulic system where the accumulators are to be charged to a maximum pressure of 3000 PSI. System pressure will be permitted to fall to 2000 PSI after the accumulator has delivered its oil.

From 2000 to 3000 PSI represents an increase of 50% that the accumulator will be charged above minimum pressure. According to the rule-of-thumb, a 1-gallon accumulator would give out 50 cubic inches of oil under these conditions. If the circuit required 250 cubic inches of oil, you would select a 5-gallon size accumulator.