



HIDRACAR S.A.

ADVICE ON THE ELECTION AND PROPER USE OF AN OLEO-PNEUMATIC ACCUMULATOR

- 1) Use removable bladder type accumulators. If the bladder bursts, the shape of the burst will lead the manufacturer towards an accurate diagnosis and therefore will prevent further damage to the circuit of the machine it was installed in.
- 2) The pre-charge or gas filling of the accumulator must be always adjusted to the specific application or machine.

An improper pre-charge or filling of the accumulator could cause a premature burst of the accumulator's bladder and also may be a sign that you might be overpaying for a bigger accumulator that, in practice, you don't need.

- 3) Don't assume the responsibility of dealing with the gas pre-charge of the accumulator; as this task, in the hands of an unskilled person can be hazardous.
- 4) Ask the supplier of the accumulator to take care of:
 - Calculating both size and pre-charge of the accumulator.
 - Advising you anytime about all potential applications of oleo-pneumatic accumulators.
- 5) Contact the manufacturer directly to give you solutions for all applications and to solve any doubt you might have about oleo-pneumatic accumulators.
- 6) **NEVER!** ever weld anything to the body of the accumulator.

EXAMPLE OF USE OF A CORRECT GAS PRE-CHARGE

Let's suppose you have acquired an accumulator with a total volume $V_0 = 1$ litre supplied with a preset gas pressure of $P_0 = 30$ bar.

$$P_0 \times V_0 = 30 \times 1 = 30 \text{ bar} \times \text{litre}$$

If your machine requires the accumulator to store 0.2 litres when the minimum pressure in the oil circuit is 60 bar, then at 60 bar, the gas will span a volume of:

$$P \times V = 30 \times 1 = 60 \times V_1 \rightarrow V_1 = 30/60 = 0.5 \text{ litres}$$

and the accumulator will take 0.5 litres of oil inside.

If from 60 bar onwards the accumulator must still store 0.2 litres, the final pressure, P_2 , to which the gas must be compressed will be:

$$P \times V = 30 = (V_1 - 0.2) \times P_2 = (0.5 - 0.2) \times P_2$$

$$P_2 = 30 / (0.5 - 0.2) = 30 / 0.3 = 100 \text{ bar}$$

If you decide that the accumulator must be charged with gas at a pressure of 60 bar, while keeping the required 0.2 litres oil volume:

$$P_0 \times V_0 = V_0 \times 60 = (V_0 - 0.2) \times P_2$$

If we accept the same value $P_2 = 100$ obtained before, we will have that:

$$V_0 \times 60 = (V_0 - 0.2) \times 100 \rightarrow \boxed{V_0 \times 60 = (V_0 \times 100) - 20}$$

$$(V_0 \times 100) - (V_0 \times 60) = 20 \quad \text{and} \quad V_0 = 20 / 40 = 0.5 \text{ litres}$$

THE SIZE OF THE ACCUMULATOR HAS BEEN HALVED!!

Therefore, instead of a 1 litre accumulator, the volume actually needed is just 0,5 litres; and, the smaller the volume or size of the accumulator, the lower its cost.

*NOTE: This example has been simplified in order to make for an easier comprehension, as the equality $P \times V = \text{constant}$ does not comply in practice; neither it is appropriate to equate the pre-charge pressure to the minimum pressure required by the circuit. For practical calculations, please, consult **HIDRACAR, S.A.** technical department.*

If all the proposed recommendations are followed, we can give **A TWO-YEAR WARRANTY** in all of our accumulators.