

1.1 Definition and operation

The hydropneumatic accumulator is a device designed specifically for the storage of liquids under pressure. As liquids are, for all practical purposes, incompressible, the objective is achieved by utilising the compressibility of gases (fig. 1):

- A) A flexible separator bladder is fitted into a pressure vessel (accumulator shell).
- B) Through a special valve an inert gas (nitrogen) is introduced into the bladder with pressure P_0 . The bladder expands, filling the entire volume V_0 of the accumulator shell.
- C) When circuit pressure P_1 is higher than the gas precharge pressure P_0 , the liquid valve opens, and the bladder is compressed reducing the gas volume to V_1 .
- D) When the liquid pressure rise to P_2 , the volume of gas reduces to V_2 with an attendant rise in pressure, thus balancing the liquid pressure.

This means that the accumulator has been pressurised $\Delta V = V_1 - V_2$ and a potential energy has been created to be utilised as desired (refer to section 2).

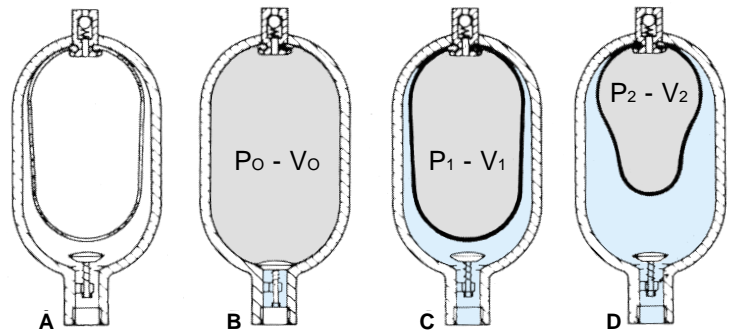


fig. 1

1.2 Construction features

The EPE Bladder Accumulator comprises a steel shell in which is fitted a bladder complete with a gas valve and fluid port with the poppet valve (fig. 2):

- **The shell** is a pressure vessel forged or fabricated from high grade steel designed and manufactured to meet the relevant international standards. For special applications various surface coatings are available as well as a stainless steel construction.
- **The bladder**, which separates the gas from the liquid, is made in nitrile rubber in the standard version. Bladders in butyl, neoprene, ethylene-propylene etc. are available for special uses. The main feature of the EPE bladder, which makes it unique, is the special manufacturing process thanks to which it is produced in one single piece without joints, even in the larger sizes, so as to avoid all the problems which poor gluing may involve. Another advantage of the EPE bladder is the gas valve which, not being vulcanised to the bladder, can be fit to it and removed simply and safely. For this reason the same bladder can be supplied with gas valve in different versions, or the valve can be reused, thus reducing the cost of spare parts.
- **The gas valve** is connected to the bladder by a rubber coated washer to ensure a gas tight joint and a non return valve is incorporated for bladder inflation. The bladder, complete with the gas valve, is fixed to the accumulator shell by a lock nut, and the assembly is protected by a cover.
- **The fluid port valve** prevents the bladder from extruding into the fluid port and, at the same time, allows the liquid to flow. In the high pressure range is used a poppet valve, while in the low pressure range is used a drilled disc. In the latter case the precharge pressure should not exceed 15 bar.

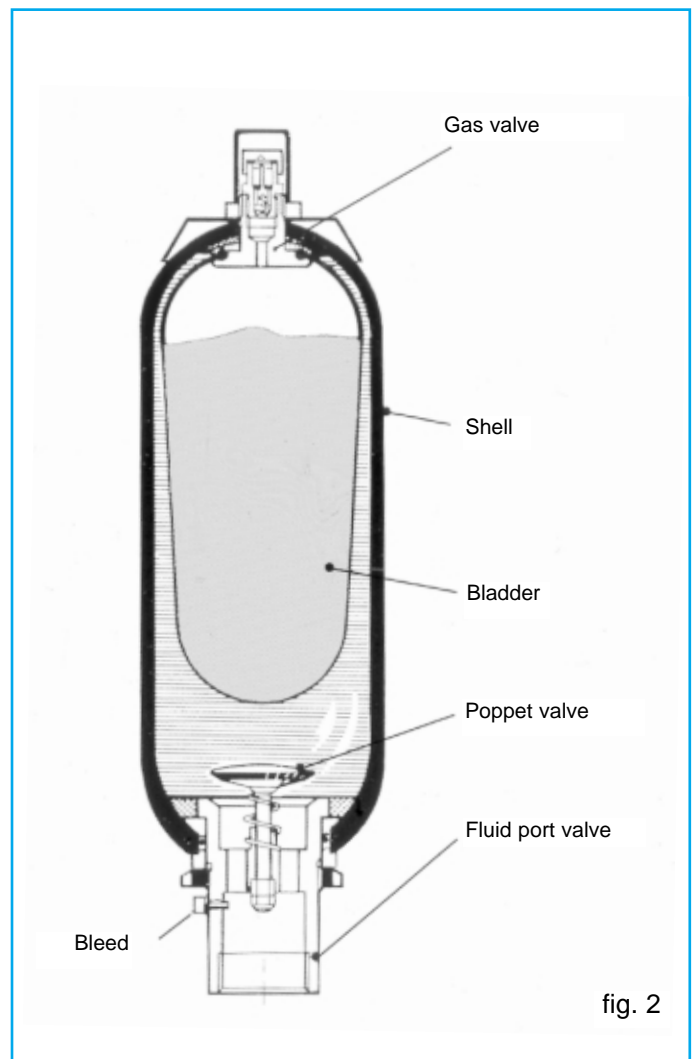


fig. 2