



The world is surrounded by air. Air has a mass. The mass of the air, at 1g force (standard gravity) creates an ambient 1013,25 millibar) at sea level.

Isobars; they connect points of equal pressure. In nice weather, low pressure areas bring rain. As indicated in millibar (mbar) or Pascal (Pa): In the past, the units used were mmHg (mm of Hg) or 1,3 mbar.

1 litre of air has a weight of approx. 1 gram. A column of air 10 metres high and 1 cm² area (1 litre) creates a pressure of 1 g/cm² = approx. 1 mbar.

At 1000 m above sea level, the air pressure is approx. 900 mbar. The air pressure has decreased by 100 mbar. Altimeters in aircraft or used by mountain climbers are based on these changes of the atmospheric pressure. They always need correction for the variation of the atmospheric pressure. Mountain climbers correct the altimeter at a location of known altitude, pilots ask for the barometric pressure at runway level prior to landing.



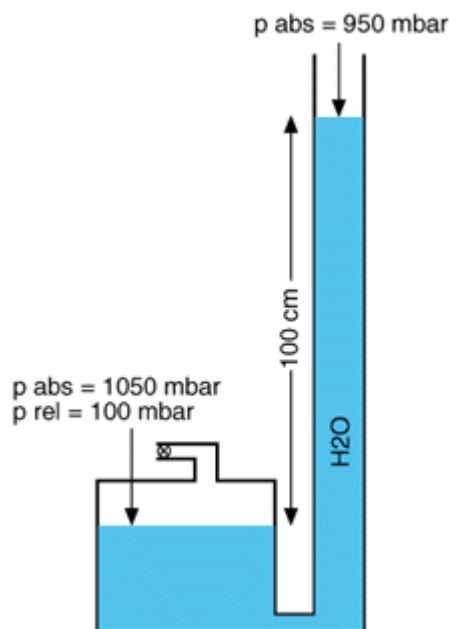
Water is about 1000 times heavier than air. 1 litre of water has a weight of 1 kg and a volume 1000 cm³. Again, if we produce a column 10 metres high and 1 cm² area, we will create at the bottom a water pressure of 1 kg/cm² (1 kg/cm² = approx. 1 bar).

The pressure in water increases by 1 bar for every 10 metres depth. At 100

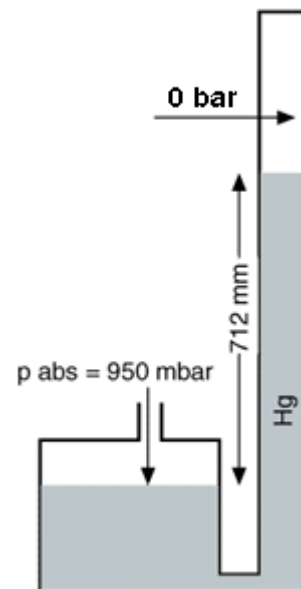
metres, the pressure is 10 bar relative to the surface. The absolute pressure is 11 bar (1 bar is the atmospheric pressure on the water surface, plus 10 bar water pressure).

Measuring Pressure with Weights

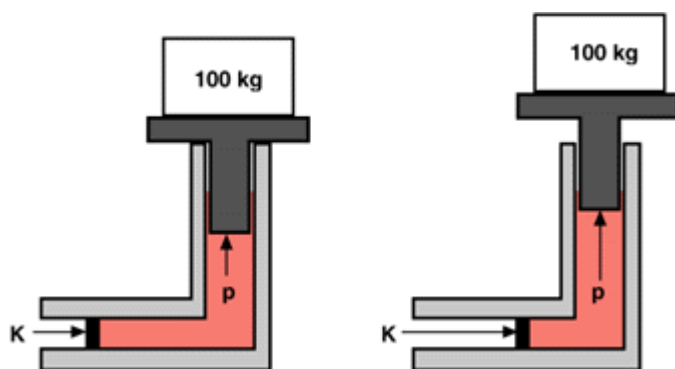
The first pressure measurements were made using fluid columns. The mercury column today still exists in many doctors' surgeries to measure blood pressure. Also in weather forecasting, the expression used to be: "The atmospheric pressure today is 712 mm of mercury". Meaning that the mercury column is 712 mm high.



(Relative Pressure Measurement)



(Absolute Pressure Measurement)



The Dead Weight Tester
(Pressure = Force per Area)

For higher pressures, fluid columns are impractical. The columns are substituted by dead weights on top of a piston in a cylinder. A

force "K" (generated by a ram) increases the pressure to the point where the weight is lifted and floats.

With a piston area of 1 cm² and a weight of 100 kg, the floating condition occurs at a pressure of 100 kg/cm² (approx. 98,1 bar), at 1g force (standard gravity).

Very accurate measurements of pressures can be realized this way.