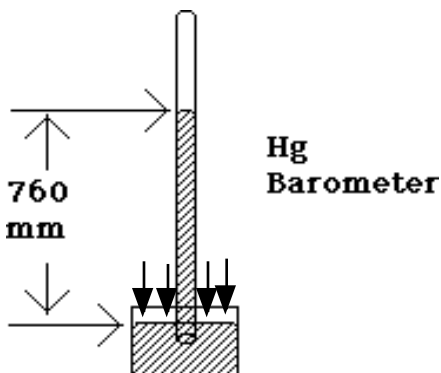


Atmospheric Pressure

The atmosphere, which is a mixture of gases, exerts pressure as the result of its weight and the kinetic energy of its gas molecules. You can think of yourself as living at the bottom of an ocean of air and subject to its pressure. This pressure is called

- atmospheric pressure
- air pressure
- barometric pressure

People are not conscious of pressure because it is exerted in all directions, both inside and outside the body. The instrument most often used for accurate measurement of air pressure is the mercury barometer. The pressure of the atmosphere varies with altitude. It decreases at higher altitudes because the weight of the overlying atmosphere is less. On the average the air pressure at sea level can support a column of mercury 760 mm tall. This average sea-level pressure is called 1 atmosphere or standard atmosphere. Expressed in Pascals 1 atmosphere is 101,300 Pa or 101.3 kPa. Because of the convenience of measuring gas pressure directly, the mm of Hg is still often used as the unit of pressure instead of the Pa or KPa.



The line of equalities that enables you to convert from one unit of pressure to another is:

$$1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ torr} = 101.3 \text{ kPa} = 101,300 \text{ Pa} = 101,300 \text{ N/m}^2 = 29.92 \text{ in Hg} = 14.7 \text{ lb/in}^2$$

PRACTICE PROBLEMS

- 1) How many mm of Hg is 1.5 atmospheres?
- 2) How many pascals is equal to a pressure of 1.00 mm Hg?
- 3) Convert 950 mm Hg to its equivalent in each of the following units:
 - a) atmospheres
 - b) kilopascals
 - c) pascals
 - d) N/m^2
 - e) inches Hg
- 4) Convert 5 atm to mm of Hg.
- 5) Convert 385 mm Hg to kPa