One must be careful when measuring temperature to ensure that the measuring instrument (thermometer, thermocouple, etc.) is really the same temperature as the material that is being measured. Under some conditions heat from the measuring instrument can cause a temperature gradient, so the measured temperature is different from the actual temperature of the system. The theoretical basis for thermometers is the zeroth law of thermodynamics which postulates that if you have three bodies, A, B and C, if A and B are at the same temperature, and B and C are at the same temperature then A and C are at . the same temperature. B, of course, is the thermometer

Pressure and its units 1.13

Pressure is defined as [force per unit area]

[2] or [KN/m2 P=F/A its units are [N/m

.atm1 Pascal=10^{5} =2N/m10^{5} Bar=

101325 Pascal=10^{5} x1.01325 bar=1.01325 Standard atmospheric pressure is equal to

2N/m

Volume (1.14

Volume of a matter is the size that had been occupied by it, a space also has one.

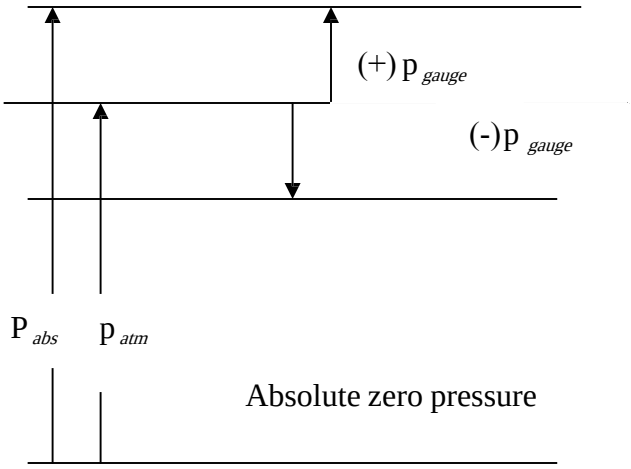
.and so on3 or cm3 It is a three dimension measure. its units is in m

Standard atmospheric pressure and measurement of (2 pressure

Many techniques have been developed for the measurement of pressure and vacuum. Instruments used to measure pressure are called **pressure gauges** or **vacuum** .**gauges**

Atopmsheric pressure is measured by a barometer , manometer could also refer to a pressure measuring instrument, usually limited to measuring pressures near to atmospheric. The term *manometer* is often used to refer specifically to liquid column hydrostatic instruments, a practical device usually used in system is the bourdan gauge

A **vacuum gauge** is used to measure the pressure in a vacuum—which is further divided into two subcategories, high and low vacuum (and sometimes ultra-high vacuum). The applicable pressure range of many of the techniques used to measure vacuums have an overlap. Hence, by combining several different types of gauge, it is possible to measure .mbar10^{-11} mbar down to 10 system pressure continuously from



$$p_{abs} = p_{atm} \pm p_{gauge}$$

1 atm = 760 mmHg
= 760 torr
= 14.7 psi
= 101325 Pa
= 1.01325 bar

Ex. If gauge pressure reading is 2 bar what s the absolute pressure assume the atmospheric pressure s 100000 N/m2.Determne the absolute pressure in N/m2,Bar and mm Hg.

Ans.

$$p_{abs} = p_{atm} + p_{gauge}$$

=100000+2*100000=300000 N/m2=3 bar

In mmHg

300000*760/101325=2250 mm Hg.

Law of conservation of energy(٣

be In the absence of nuclear reaction and black holes in space , energy can neither created nor destroyed but can only be changed in form.

The first law of thermodynamics (٤

Many experiments were run accompanied by measurement of work and heat .it found the net heat for the system was equal to network, so

$$Q_{in} + W_{in} = Q_{out} + w_{out}$$

$$Q_{in} - Q_{out} = W_{out} - W_{in}$$

$$\sum Q = \sum W$$