Introduction

1 What is intensive and extensive property? Give the example of intensive and extensive property.

-> Intensive Property:

If the property is independent of mass and size of system then property is called intensive property.

The ratio of two extensive property gives Intensive property.

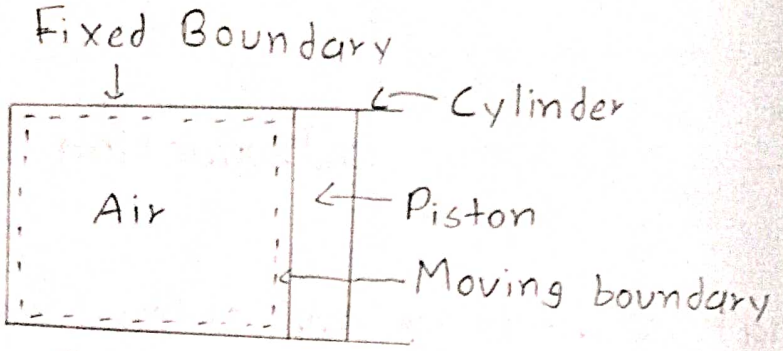
Specific property are always intensive property.

Ex. Density, Temperature, Pressure, All Specific forms.

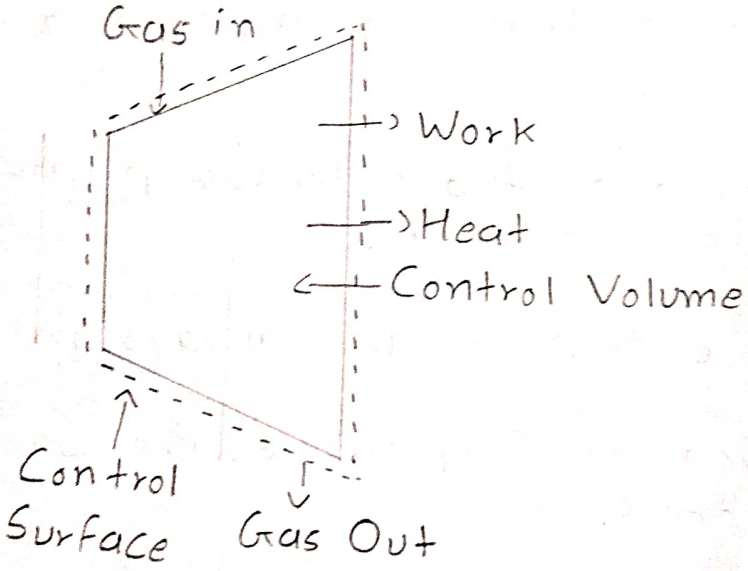
-> Extensive Property:

If the property is dependent of mass and size of system then property is called extensive property.

Divide the size of the system without any external ineraction if property change then



Close System



Open System

Property is called extensive property.

Ex. Volume, Energy, Entropy, Entholpy.

2 Explain with neat sketch : Open, Close and Isolated system.

→ Close System:

In the close system there is no mass transfer across the boundary of the system thus mass is fixed in the system.

Energy interacation is across the boundary of the system.

Ex. Air trapped in piston-cylinder arrangement.

→ Open System:

In the Open system mass cross the boundary of the system.

Energy interacation is cross the boundary of the system.

Most of the Engineering Applications are open system.

Ex. Gas Turbine, Pump, Nozzel, Air Compressor.

In Gas Turbine Gas Enters at High pressure and temperature and leves at lower pressure and temperature.

Open System volume is called 'Control Volume', and bounded surface is called 'Control Surface'.

In Open System Mass and Energy both are cross Control Surface. That's why there is no difference between open system and a control volume.

→ Isolated System:

In the Isolated system mass neither cross the boundary of System.

Energy neither cross the boundary of System.

3 Define : Specific Heat capacity, High grade energy, Law grade energy.

-> Specific Heat Capacity :

The amount of heat required to raise the temperature of 1 kg of mass by 1°C.

If Q is amount of heat required in J to raise the temperature of m kg of mass by Δt

Specific Heat capacity $C = \frac{Q}{m \cdot \Delta t}$ J/kgK

Specific Heat at Constant pressure (C_p) and Specific Heat at Constant volume (C_v).

-> High grade Energy :

In High grade Energy it can be completely transformed into work without any loss.

High grade Energy are expensive.

Ex. Mechanical Work, Electrical Work, Water power, Work, Wind power

→ Low grade Energy:

In low grade energy it can not be Completely transformed into work.

It is available ~~of~~ at cheaper rate.

Ex. Thermal Energy, Heat derived from nuclear fusion.

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