

Vacuum Technology

1. Introduction:-

- 1-1 The Vacuum property of gases .
- 1-2 Field of application and in protance .
- 1-3 Main stages in the history of Vacuum technologies .

2. Conductance and pump speed:-

- 2-1 The concept of conductance .
- 2-2 Conductance in series .
- 2-3 The effect of pressure on flow region and conductance .
- 2-4 The conductance of an aperture .
- 2-5 The conductance channel .
- 2-6 The conductance of cold trap .
- 2-7 The speed of a pump .
- 2-8 Pump down time .

3. Production of low pressure (vacuum pumps):-

- 3-1 Mechanical pumps .
- 3-2 Vapor pumps (diffusion pumps) .
- 3-3 Chemical pumps . Sputter ion pumps . Titanium sublimation pumps .
other chemical pumps
- 3-4 Sorption pumps .
- 3-5 Cryo pumps .

4. Measurement of pressure:-

- 4-1 Introduction
- 4-2 Survey of types of gauge measuring total pressure
- 4-3 The McLeod gauge
- 4-4 Thermal conductivity gauges
- 4-5 Hot cathode ionization gauge
- 4-6 Cold cathode ionization gauges
- 4-7 The Knudsen gauge
- 4-8 The Viscosity gauge
- 4-9 The Gauge Calibration
- 4-10 Thermal Trans privation and pressure measurement
- 4-11 The determination of partial pressures.

5- Material and design of apparatus:-

- 5-1 Material properties and design requirements
- 5-2 Class and class-to-metal seals
- 5-3 Metals
- 5-4 plastics
- 5-5 Waxes and greases
- 5-6 Demountable coupling and motion in Vacuum
- 5-7 Vacuum taps and Valves
- 5-8 Outgassing
- 5-9 Design procedure
- 5-10 Leak detection.

6-Ultra-high vacuum:-

- 6-1 General
- 6-2 pumps
- 6-3 Methods of pressures measurement
- 6-4 Construction and material of ultra-high vacuum systems.

7-Techniques of vacuum coating:-

- 7-1 Thermal evaporation
- 7-2 Eddy current
- 7-3 Electron beam evaporation
- 7-4 Sputtering (D.C.r.f...)
- 7-5 Ion plation.

8-Application of vacuum technology:-

- 8-1 General
- 8-2 High vacuum as an electrical insulator
- 8-3 Separation by vacuum distillation
- 8-4 Freeze drying
- 8-5 Manufacture of lamps and thermoionic devices
- 8-6 Vacuum metallurgy
- 8-7 Coating by Vacuum evaporation
- 8-8 Vacuum as thermal insulation