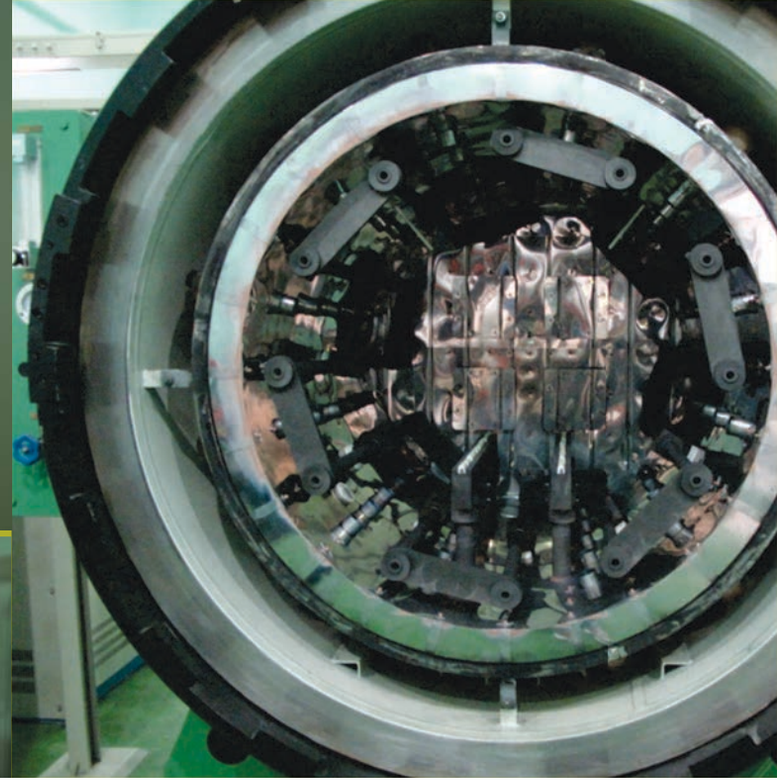
Discussion of vacuum heat treatment furnace operations

Charging of D2 Tool Steels in the VHT Furnace for hardening heat treatment.

Hardness testing on heat treated samples to confirm change in physical property.



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VACUUM HEAT TREATMENT FACILITY

for more information, please write, fax, call, or email:

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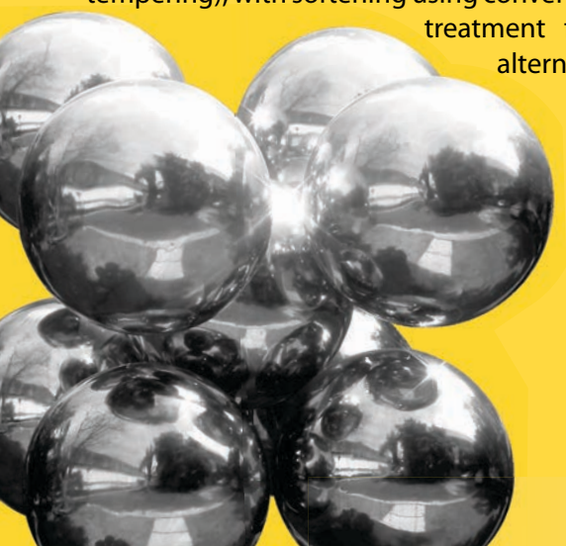
VACUUM HEAT TREATMENT

-controlled heating and cooling of metals to alter characteristics of their microstructures in order to achieve desired changes in the physical and mechanical properties, performed in a space relatively devoid of matter.

Metals are heat treated for one of the following general reasons: softening, hardening and material modification. The vacuum heat treatment furnace (VHTF1) at Surface Engineering Building of MIRDC is utilized for direct hardening and softening (e.g., tempering), with softening using conventional heat treatment furnace as alternative.



TECHNICAL SPECIFICATIONS AND OPERATING PARAMETERS

Furnace Type
- Batch type horizontal internally heated, horizontal loading and unloading

Loading Capacity
- 200kg/ batch (including the weight of charging tray and jig)

Soaking zone size
- 600mm (L) x 400mm (W) x 400mm

Highest temperature 1300°C

Working temperature 550°C ~ 1250°C

Cooling water
- Pressure: 0.1~0.2 MPaG
- Temperature: 15 °C - 30 °C

Compressed air
- Pressure: 0.5~0.6MPaG

Nitrogen Gas Requirements
- Protective Gas
  - Pressure: 0.2MPaG
  - Purity: 99.999%
  - Flowrate: 0.6~3Nm^3/hr
- Cooling Gas
  - Pressure: 0.2MPaG
  - Purity: 99.999%
  - Flowrate: 4Nm^3/hr

Electrical Capacity and Load
- AC 440V three phase 60Hz
- 135kVa total load

Accepted materials for heat treatment
- Tool Steels,
- High Alloy Steels

ADVANTAGES OF VACUUM SYSTEMS IN HEAT TREATMENT OF METALS

- Vacuum acts as “protective atmosphere” preventing contamination of metal surfaces.
- Heat treated metals are free from surface oxidation and decarburization, with bright, metallic and shiny surface.
- Clean, dry parts after hardening.
- Homogeneous quenching using inert gas.
- Reduced distortion.