Vacuum Furnaces
Batch Heat Treatments

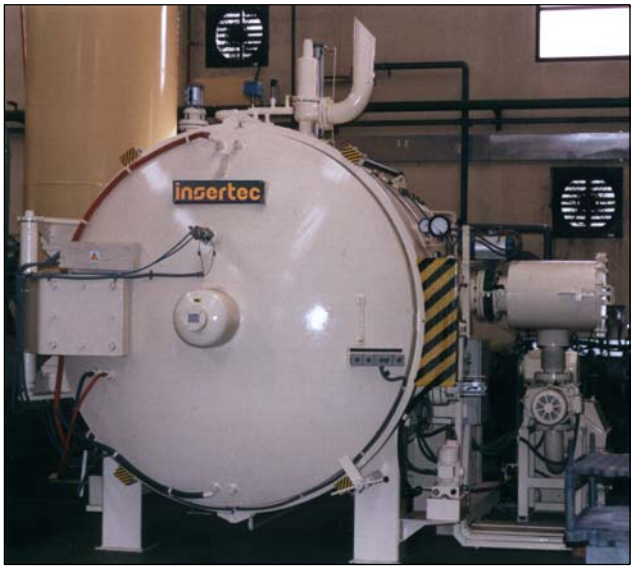
insertec
Furnaces & Refractories

Vacuum Furnaces - En

INSERTEC manufactures and supplies Vacuum Furnaces for batch heat treatment, specially aimed at industrial sectors which usually require highly value-added products, being combined with our professional Technical Assistance on site.

Vacuum Furnaces can be mainly divided into the following series:

- **TVCT** Series for Hardening and other heat treatments over 800ºC.
- **TVCR** Series for Tempering and other



Horizontal-loaded Vacuum Furnace for Annealing and Tempering.

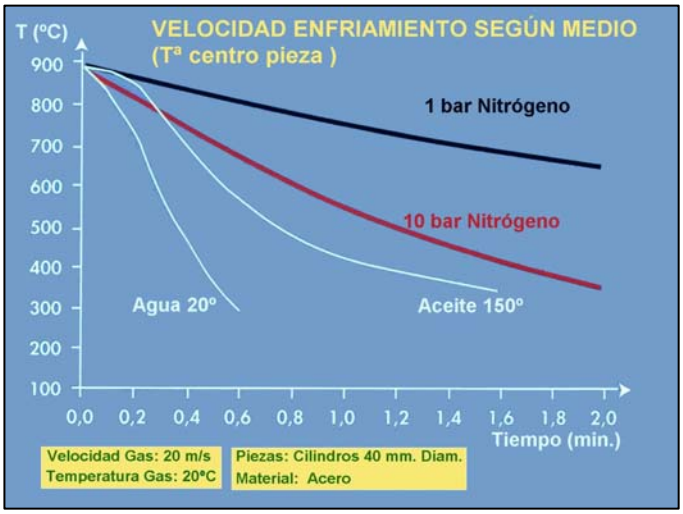
Available Heat Treatments:

- Hardening.
- Tempering at low and high temperature.
- Annealing.
- Quick nitriding.
- Nitrocarburising.
- Bright annealing.
- Stress relieving.
- Degasification and recrystallization.
- Welding at high temperature.
- Sintering of Cr-Ni alloys.
- Brazing.

Horizontal-loaded Vacuum Furnace for Hardening under N_2 atmosphere up to 10 bar.

Advantages of Convective Heat Transfer:

- Shortening of heat treatment cycle time.
- Possibility of accomplishing tempering at low temperature.
- Isothermal simulation.
- Higher cooling velocity.
- Optimal heat transfer efficiency during heating and quenching processes, due to a well thought out design of Furnace hot zone.



Technical comparison of quenching velocities depending on used different medias during process (Pressurized N_2 gas vs. Oil / Water).

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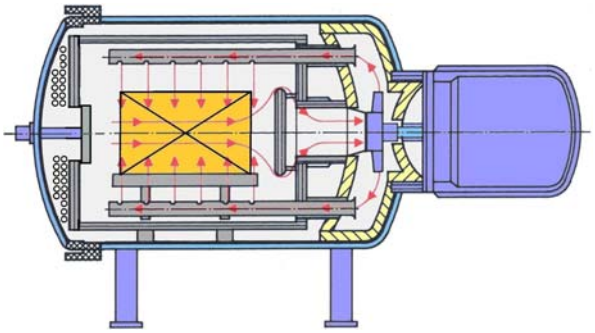
1. VACUUM FURNACES FOR HARDENING:

Main tecnnical features:

- Operating temperature: 1350ºC Max.
- Heating elements: Graphite resistances
- Vacuum level: 5 x 10^{-2} mbar abs. (10^{-4} mbar *as an optional extra by request*)
- Quenching gas pressure: 10 bar abs. Max.
- Protective gas: Nitrogen (N_2)
- Water cooled double wall construction Furnace chamber.
- Internal heat insulation and graphite cooling pipes.

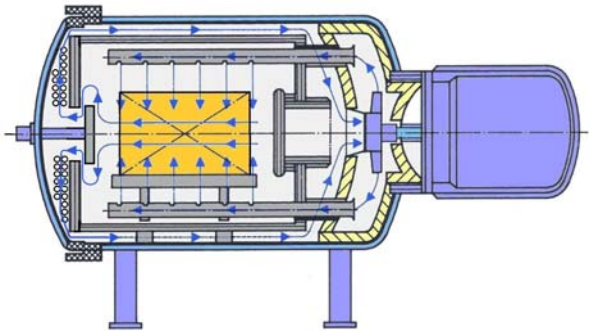
Horizontal-loaded Vacuum Furnace being preassembled at INSERTEC workshop.



TVCT Serie Vacuum Furnace cross section.

HEATING BY FORCED INTERNAL RECIRCULATION.

- Gas is heated up to approx. 750ºC by convective heat transfer process.
- Forced recirculation gas flow is achieved by means of a motor-driven centrifugal impeller mounted on rear side.



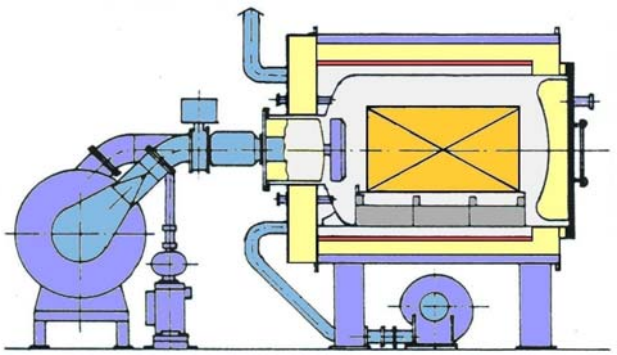
COOLING UNDER PRESSURIZED GAS (<10 bar abs.).

- Gas is cooled by convective heat transfer process while passing through the water-cooled tubular type heat exchanger mounted inside the Furnace front door.
- Forced recirculation gas flow is achieved by means of a motor-driven centrifugal impeller mounted on rear side, under operating pressure of 10 bar abs. as maximum, so cooling process time can be shortened.

2. VACUUM FURNACES FOR ANNEALING AND TEMPERING:

Main technical features:

- Operating temperature: 150÷850ºC
- Heating elements: Wire resistances
- Vacuum level: 5 x 10^{-2} mbar abs.
- Protective gas: Nitrogen (N_2), Argon (Ar) or N_2-H_2 mixture.
- Internal muffle ambient air cooling system.
- Load forced gas cooling system (*as an optional extra by request*).



TVCR Serie Vacuum Furnace cross section.

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