



Vacuum Carburizing FineCarb®

HPGQ or oil quench
single- and double-chamber vacuum furnaces
Rotary Modular Systems

- Highly efficient and economic carburizing
- Precision and uniform carburized layer
- Reduced distortions
- Environmentally friendly process
- Proven FineCarb® Low Pressure Carburizing (LPC) technology
- PreNitLPC® - fast, high temperature carburizing
- SimVac Plus™ carburizing and quenching process simulator
- Optional Oil Quench

FineCarb® Vacuum Carburizing

- Guarantee of carburizing repeatability and uniformity of the case from 0,1 mm to 5mm.
- Unique carburizing gas mixture.
- Total elimination of process by-products, like soot and tar, green manufacturing process.
- Automatic control of carburizing atmosphere flow, depending on charge size.
- Reduction of cycle time by increasing the carburizing temperature to 1150°C.
- Grains growth limitation in high-temperature carburizing by PreNitLPC® technology.

Single-chamber furnaces

- 10, 12, 16, 25bar

400x400x600mm
200/300kg

600x600x900mm
600/1000kg

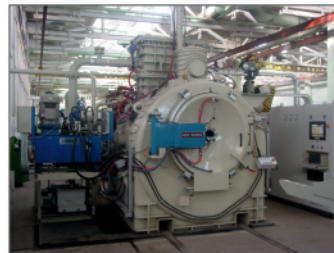
900x800x1200mm
1200/1500kg



Double chamber furnaces



Gas quenching – 20bar



Oil quenching



Rotary and Linear Modular Systems

- 600x660x1000mm 600/1000kg
- 900x800x1200mm 1200kg

Rotary Modular Systems

- Compact structure.
- Up to 10 processes chambers.
- Easy operation and maintenance, high efficiency.
- Perfect for medium-series production.
- Flexibility and variety of processes.



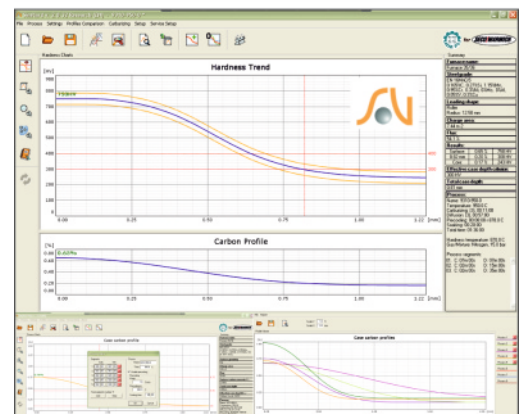
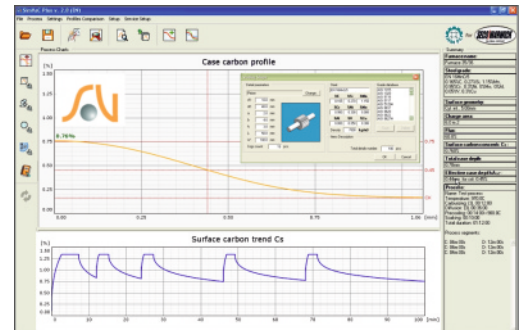
Gas Quenching

- Easy control of cooling speed by software modification of gas pressure and blower speed in appropriate cycle stage.
- Suitable for various cooling gases including N₂, He, or H₂ with pressures up to 25 bar.
- High capacity of quenching in Helium, close to quenching in oil.
- Separate cooling chamber in double-chamber furnaces or modular systems increases the application for 16MnCr5/8620 steels (range MQ1/2 DIN 3990).
- Uniform cooling and repeatable of distortion field.
- Innovative SECO/WARWICK circular cooling system allowing for fast cooling with use of reversible top/bottom gas flow.
- The ConFlap convective heating system in single-chamber VPT furnaces allowing for hardening with shorter cycle times before M_s transformations significantly reducing part distortions.

SimVac™ Process Simulator

SimCarb™ module enables designing of vacuum carburizing processes prior to running trials saving actual process time and reducing number of scrapped

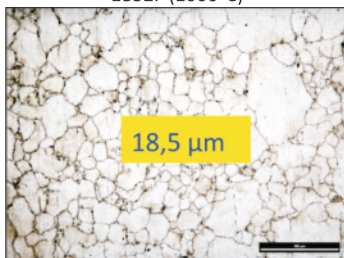
- Optimal segment planning of carburizing process split to boost and diffusion (holding) phases.
- Calculations based on steel grade, size and shape of parts, as well as cooling profile for hardening.
- Manual or automatic simulation mode.
- Carburizing cost reduction.
- Intuitive users interface.
- Fully compatible with furnace control system SecoVac.



SimHard™ module – gas hardening simulator is an additional technology support that enables:

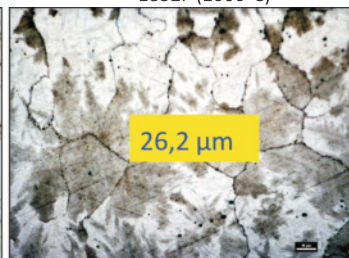
- Simulation of hardness distribution upon the basis of achieved carbon profile.
- Including the cooling characteristics of SECO/WARWICK furnaces into the calculations.
- Designing of carburizing process for required mechanical properties TWV.
- Detailed calculation of carbon profile considering charge configuration and geometry.
- Manual or automatic simulation mode.

AISI 5120H (EN 16MnCr5)
1832F (1000°C)



18,5 μm

EN 18CrNiMo7-6
1832F (1000°C)



26,2 μm

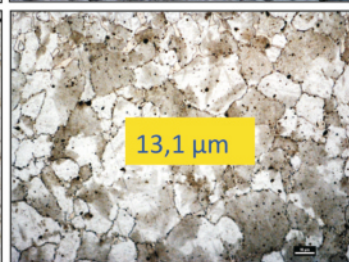
LPC

PreNitLPC® technology

- Limitation of grain growth in high-temperature processes (above 1000°C).
- Acceleration of case creation.
- Reduction of retain austenite and carbides formation.
- Shortening of process duration.



15,6 μm



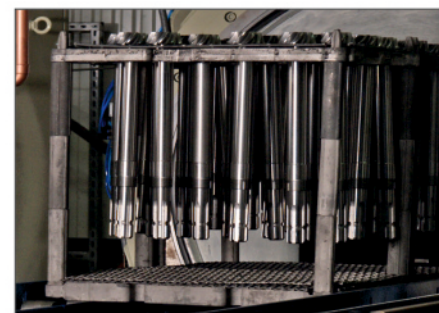
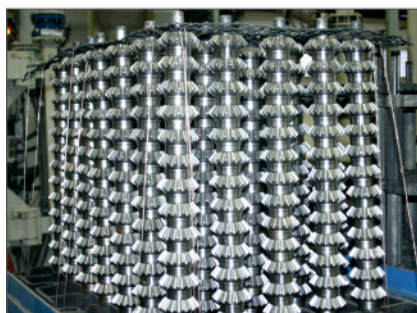
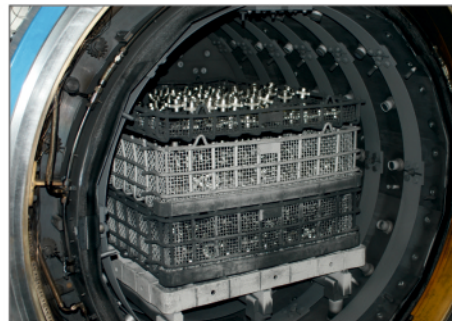
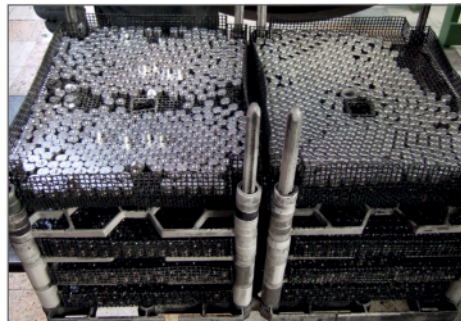
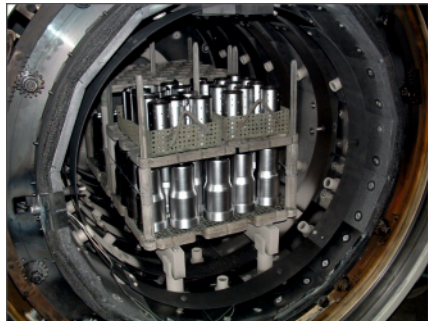
13,1 μm

PreNitLPC

PreNitLPC® - grain growth

Design Features of SECO/WARWICK furnaces

- Compact design, easy operation, low consumption of energy and process gas, high efficiency with low operating and maintenance costs.
- Heating chambers equipped with curved, wide heating elements, providing efficient heating and high uniformity.
- Suitable for wide range of carburizing technologies and gas quenching.
- Seco Vac control system facilitating operation, programming of new tasks, device operation optimization, including queuing for modular lines, reporting functions, etc.



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