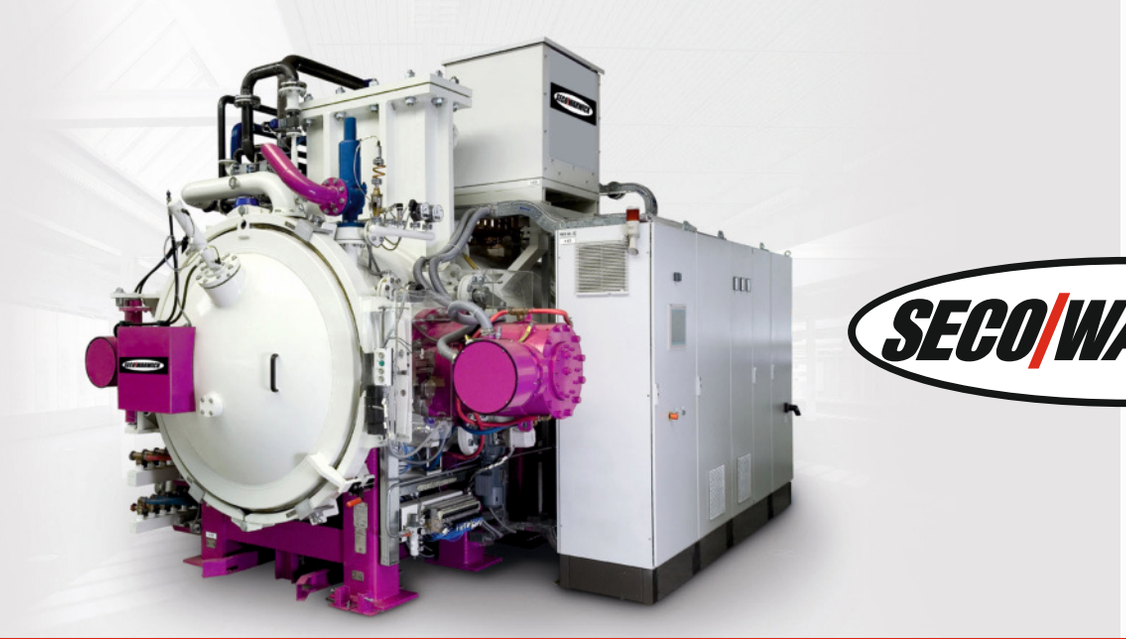


Vacuum Carburizing FineCarb®

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

- Highly efficient and economic carburizing
- Precision and uniform carburized layer
- Reducted 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 0,1mm 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

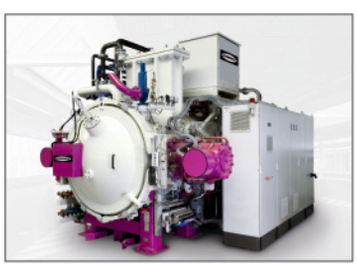
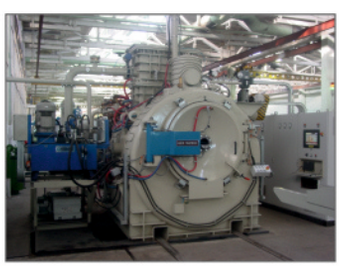
400x400x600mm
200/300kg

600x600x900mm
600/1000kg

900x800x1200mm
1200/1500kg



Double chamber furnaces


Gas quenching – 20bar

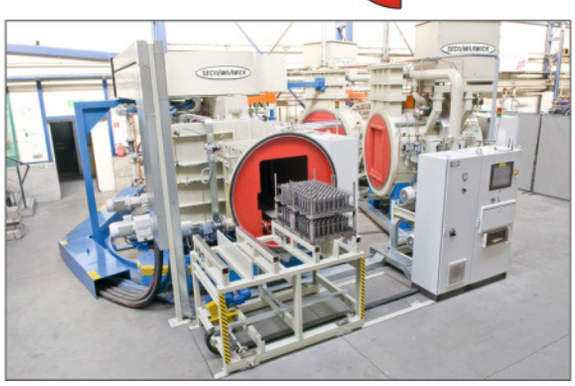
Oil quenching

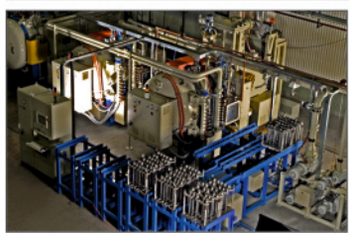
Rotary and Linear Modular Systems

- 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.





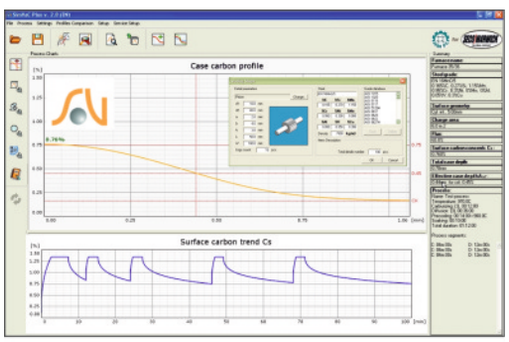
Gas Quenching

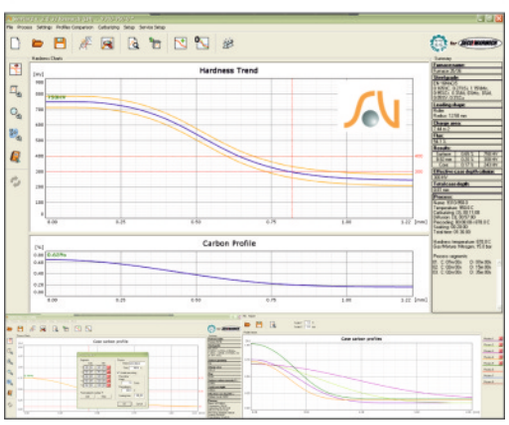
- Easy control of cooling speed by software modification of gas pressure and blower speed in appropriate cycle stage.
- Suitable for various cooling gases including N_2, He, or H_2 with pressures up to 25 bar.
- High capacity of quenching in Helium, close to quenching in oil.
- Separate cooling chamber 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 reducting 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

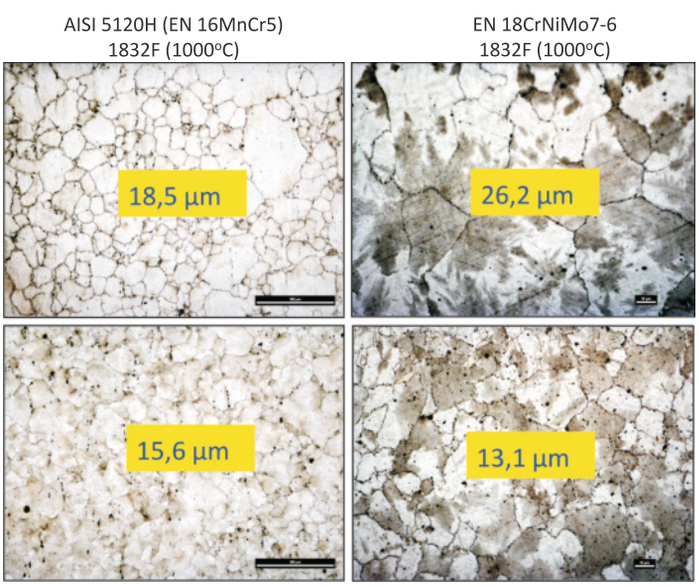
- Optimal segment planning of carburizing process split to boost and diffusion (holding) phases.
- Calculations based on steel grade, size and shape of parts, as well as cooling profile for hardening.
- Manual or automatic simulation mode.
- Carburizing cost reduction.
- Intuitive users interface.
-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



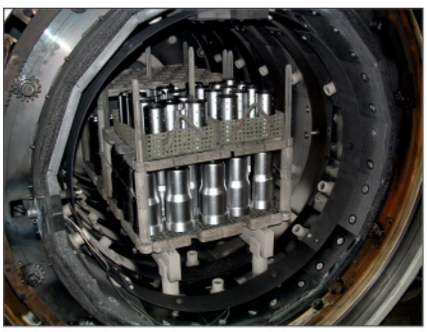
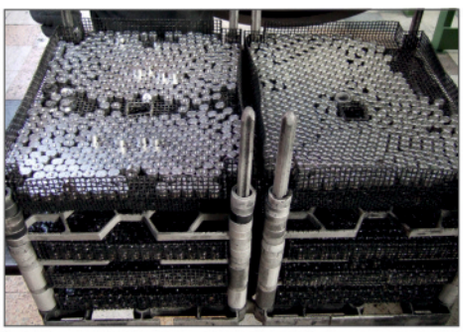
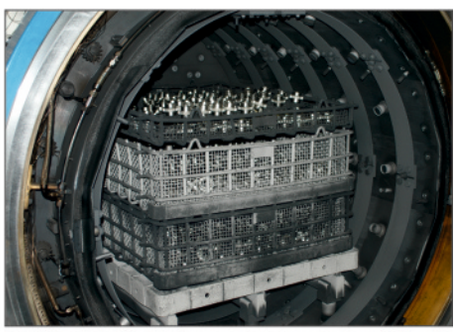
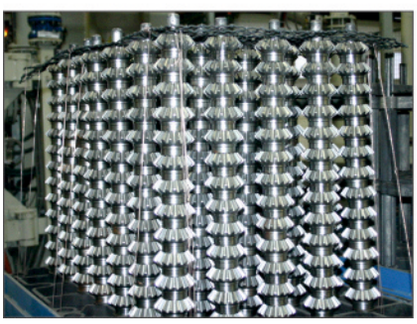
PreNitLPC® - grain growth

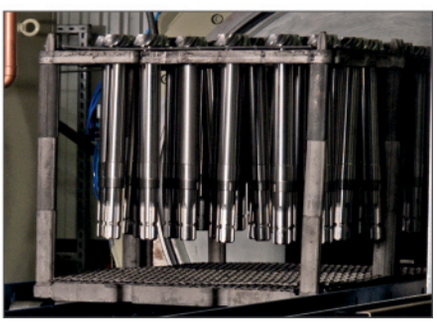
PreNitLPC® technology

- 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.

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.



SECO/WARWICK Group

POLAND
SECO/WARWICK S.A.
Sobieskiego 8
66-200 Świebodzin, Poland
tel. +48 68 3820 500
fax +48 68 3820 555
info@secowarwick.com.pl
www.secowarwick.com

POLAND
SECO/WARWICK Europe Sp. z o.o.
Świerczewskiego 76
66-200 Świebodzin, Poland
tel. +48 68 3819 800
fax +48 68 3819 805
europe@secowarwick.com.pl
www.secowarwick.com

USA
SECO/WARWICK Corp.
P.O. Box 908
Meadville, PA 16335-6908, USA
tel. +1 814 332 8400
fax +1 814 724 1407
info@secowarwick.com
www.secowarwick.com

USA
RETECH SYSTEMS LLC
100 Henry Station Rd.
Ukiah, CA 95482, USA
tel. +1 707 462 6522
fax +1 707 462 4103
leroy.b.leland@retechsystemsllc.com
www.retechsystemsllc.com

GERMANY
SECO/WARWICK Service GmbH
An der Molkerei 15
D-47551 Bedburg-Hau, Germany
tel. +49 (2821) 713 100
fax +49 (2821) 713 10-29
service@secowarwick.com
www.secowarwick.com

CHINA
SECO/WARWICK RETECH
Thermal Equipment Manufacturing
(Tianjin) Co., Ltd.
7B Second Xeda Road
Tianjin, China 300385
tel. +86 22 238 28 300
fax +86 22 238 28 305
china@secowarwick.com
www.swretech.com.cn

INDIA
SECO WARWICK Allied Pvt. Ltd.
5th Floor, Amfotech It Park
Road No. 8, Wagle Estate
Thane (W) - 400 604, India
tel. +91 22 6730 1400
fax +91 22 6730 1488
swa-info@secowarwick.com
www.secowarwick.com

BRAZIL
SECO/WARWICK do Brasil Industria
de Fornos Ltda.
Parque Industrial II
Jundiai, SP - Brasil
CEP: 13213-170
tel. +55 (11) 3109-5900
fax +55 11 4525-1047
vendas@secowarwick.com
www.secowarwick.com

RUSSIA
SECO/WARWICK Rus Office
Pyzhevskiy pereulok, bld 5/1,
office № 400
119017 Moscow, Russia
tel. +7 499 788 9721
moscow@secowarwick.com.pl
www.secowarwick.com

BELARUS
SECO/WARWICK OOO Minsk Office
8 Mielnikajte str., office 26
220004 Mińsk, Belarus
tel./fax: + 375 17306 23 71
secom@infonet.by
www.secowarwick.com