SECO/WARWICK

Heat Processing Equipment

Paweł Wyrzykowski
CEO

Thank you for your interest in SECO/WARWICK. We are an integrated global company providing heat transfer equipment and services with exceptional quality and value. SECO/WARWICK is a complete solution supplier, providing initial support services, design, manufacturing, system installation, start up and operator training.

Our company is committed to continuously advancing our technology, improving our products, reducing our costs and satisfying our customers. Our strategy is to provide global engineered products manufactured and serviced locally. We look forward to working with you to develop system solutions for your company.

SECO/WARWICK will pursue market leadership by being an innovative, customer focused global company delivering heat transfer equipment and services with exceptional quality and value. Our mission is to create value for our customers by offering them tailor-made solutions which make them highly competitive in their industries.

SECO/WARWICK has proven thousands of times its commitment to high quality products that provide a superior performance to our customers. We have always placed a great emphasis to deliver state of the art equipment and innovative technology. Our Global Research and Development Center, equipped with industrial furnaces gives you an edge over the competition by delivering new, efficient and environment friendly technologies.

Our experts are at your disposal to solve any problems you may have with existing process and are ready to set up new technologies at your facility. We are one of very few companies, that can provide our customers with a complete range of the heat treating equipment and technologies, as well. With facilities in the USA, Europe, India and China we can produce equipment in the key strategic locations that provides the best total value to our customers in terms of price and delivery. Having the plants in major world industrial hubs, we can follow your global expansion with proven, reliable equipment. Local service and spare parts support will assure smooth operation of the plant giving you a peace of mind.

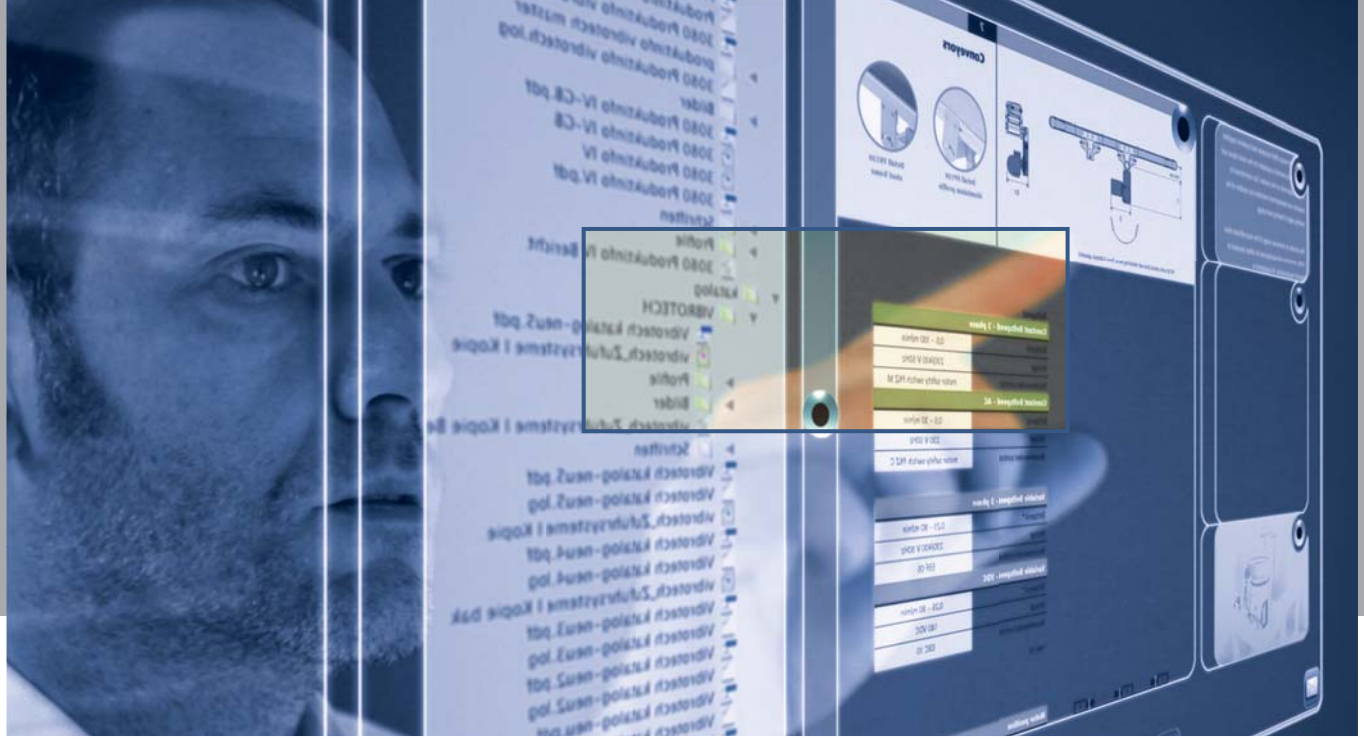
SECO/WARWICK Group offers complex customer service in supply of variety equipment and services:

- Standard and special furnaces built according to customer requirements
- Supply of equipment with technology
- Supply of associated equipment
- Installation and commissioning „Turn-key solutions"
- Performance in European and American standards
- Compatibility with NADCAP system and worldwide aviation norms
- Service Support
- Technical and Technology Training
- Trials and research in industrial and laboratory conditions
- Analysis and simulations
- Co-operation with specialized technological and scientific centers

Types of industries and scientific fields:

- Aviation
- Automotive
- Machine
- Tool
- Medical
- Electronic
- Energy
- Nuclear
- Special
- Metallurgy
- Foundry
- Wind Power
- Agricultural
- Commercial Heat Treatment Centers

Research & Development



SECO/WARWICK R&D team performs the company's current and strategic tasks within research and technology development of heat treatment equipment. It's activities are focused on modern technologies and equipment for their implementation that ensures quality, efficiency, effectiveness and cost reduction, while maintaining the highest level of natural environment protection (green technology).

R&D is equipped with industrial size heat treatment equipment which is used for technical research and technological tests. R&D team also conducts technological cycles and tests according to customers' requirements, and operations within development of new technologies and optimization of processes.

Results of tests and research are verified in a laboratory, which is equipped with high-tech devices for quality and quantity analyses and metallographic research.

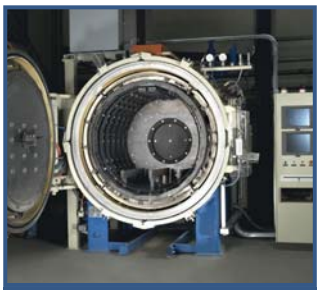
R&D works directly with several national key research centers, which significantly expands the range of testing possibilities and research methods including computer-supported simulations of processes and outcomes.

Laboratory equipment

Heat treatment center

Vacuum Furnaces

SECO/WARWICK's experience in building vacuum heat treatment furnaces dates back to the 1970's when vacuum technology appeared in the aircraft, automotive, defense, metalworking, medical, nuclear and toolmaking industries, as well as in the scientific research sector. Always a dynamically developing company, SECO/WARWICK is active on the world market and has placed over 500 complete vacuum furnace systems in over 40 countries in the past 20 years. The knowledge and experience we have acquired is enough to meet the most stringent requirements of the world's most well-known companies and the most challenging technological and technical tasks. The SECO/WARWICK success story, which is borne out by the testimonials of our renowned customers, has made the company a world leader in the manufacturing of vacuum heat treatment equipment.



Standard – radial type heating and dynamic quenching

Axial system

The key developmental directions for vacuum furnaces are the cutting edge ecological and thermo-chemical technologies behind vacuum carburizing and nitriding (LPC, LPN) and high performance gas hardening systems (HPGQ). SECO/WARWICK offers two unique low vacuum carburizing technologies FineCarb® and high temperature carburizing PreNitLPC®. Together with our SimVac simulation program, SECO/WARWICK technologies provide precise and efficient carburizing that is faster and more cost effective. Developments in gas high pressure quench furnace (HPGQ) technology, which is close to that of oil quenching, enable an ever wider range of steels and larger production loads to be hardened effectively.

Unique features of vacuum furnaces:

- A dynamic and efficient heating system, ensuring precise temperature control and perfect temperature distribution in the workspace zone
- Effective convection heating at low temperatures
- Effective and uniform gas quenching in a closed system with surrounding nozzle distribution
- Even and efficient oil quenching, thanks to the specially designed oil diffuser and variable speed agitators
- Fast load transfer to the quenching chamber

Application technology:

- Bright hardening and tempering
- Solution heat treatment
- High Pressure Gas Quench (HPGQ) and oil quenching
- Brazing and high temperature brazing
- Low Pressure Carburizing (LPC) FineCarb® and PreNitLPC®
- Gas Nitriding ZeroFlow® and Low Pressure Nitriding (LPN)
- Degassing
- Vacuum sintering (WC, MIM, ceramic, etc.) and SinterHIP
- PAC-Slurry coating, Chemical Vapour Deposition (CVD), Fluoride Ion Cleaning (FIC)
- Diffusion bonding
- Graphitization and graphite materials purification process


Furnace with horizontal loading


Furnace with vertical loading

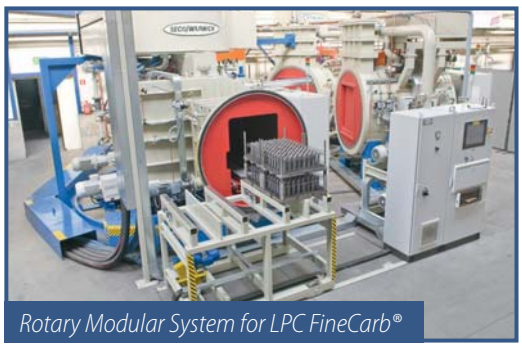

High vacuum $10^{-5}/10^{-6}$ mbar


Retort vacuum purge furnace

Range of furnaces and their technical parameters:

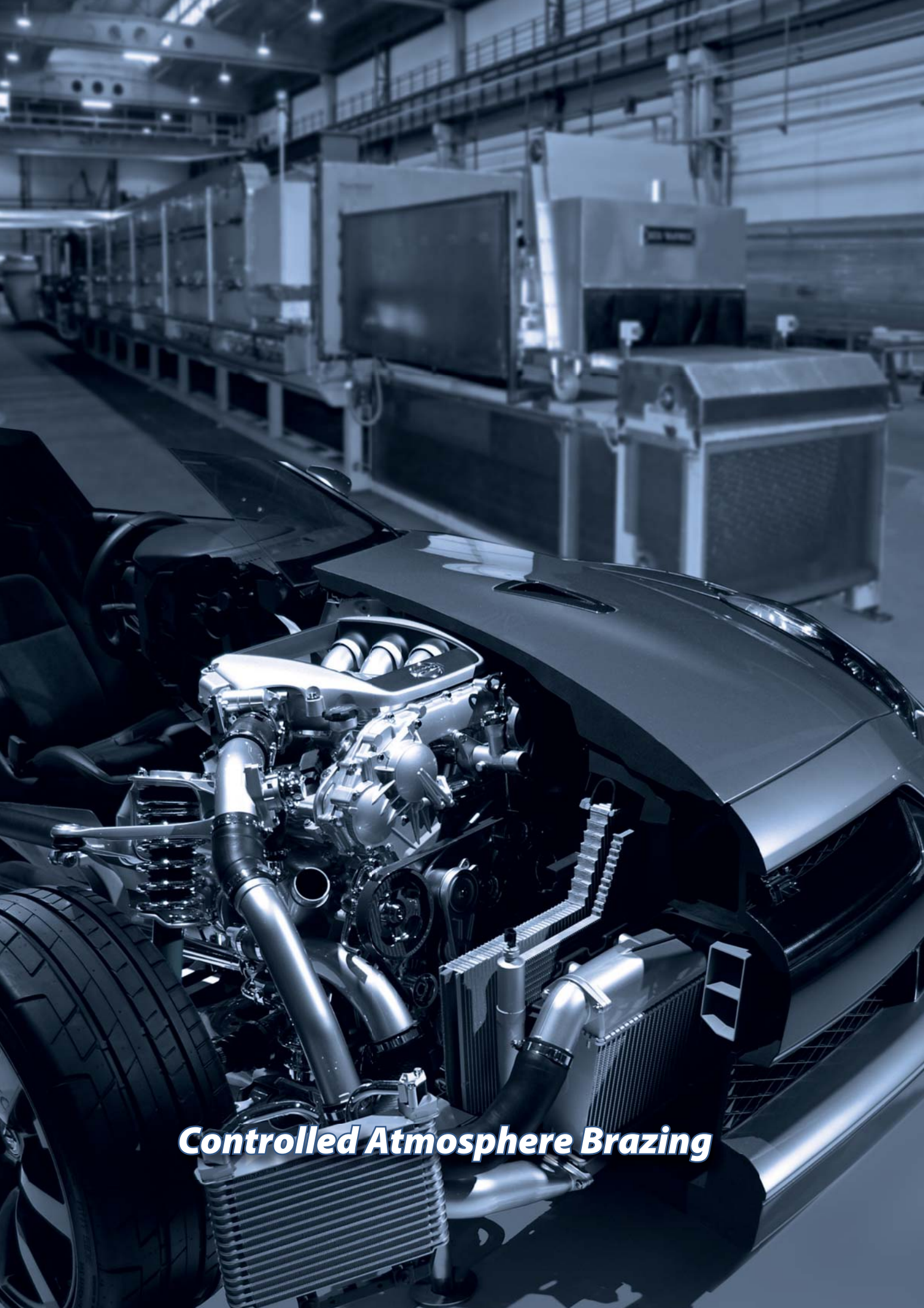
- Single-, double- and multi-chamber for batch and mass production
- Furnaces with horizontal and vertical loading configurations
- Load mass from 50 to 5,000 kg
- Graphite, ceramic or metal shield insulation with vacuum level of 10^{-2} - 10^{-7} mbar
- Operating temperatures up to 2500°C
- Temperature uniformity within ±5°C to ±3°C
- Oil quenching double-chamber furnaces with semi-continuous charge flow, or three-chamber constructions with continuous charge flow
- Low and high pressure gas quench (HPGQ) 2, 6, 10, 12, 15, 20 and 25 bar
- Gas quenching type: nitrogen, argon, helium
- First-class operational features, including uniform heating and quenching and the facility to harden a wide range of materials and cross-sections
- Radial-type standard dynamic quenching (360°) and axial system
- Ability to build a radial/axial flow pattern in one furnace, as required for programming directional cooling
- Integrated Power Control System installed in HPGQ furnaces (high power factor)
- One and multi-stage pumping systems, build based on oil and dry pumps
- High vacuum pumps: diffusion, cryogenic or turbo molecular type
- Conforms to CE and NFPA standards
- User-friendly computer control system, enabling NADCAP procedures
- Compact installation reduces space requirements

Single-chamber furnace HPGQ for LPC FineCarb® + PreNitLPC®



Rotary Modular System for LPC FineCarb®

CaseMaster Evolution, double chamber oil quench furnace



Controlled Atmosphere Brazing

Controlled atmosphere brazing of aluminum (CAB), using a noncorrosive flux, is the preferred process for manufacturing aluminum heat exchangers. Since entering this field in 1983, SECO/WARWICK has led the development of advanced technology in the continuous flow brazing process. Capitalizing on the long furnace design experience, SECO/WARWICK has driven innovations such as:

vacuum purged vertical loaded furnace

- Improved muffle design
- Convection heating technology
- Continuous atmosphere control systems
- ACCUBRAZE® PC/PLC controls
- Prioritized heating control systems including sinuous loop and gas fired systems
- Energy saving and environmental friendly designs
- System rebuilds and upgrades
- Feasibility studies

The main CAB equipment's customers were the representative of the automotive industry. But also HVACR - (Heating, Ventilation, Air-Conditioning, Refrigeration and Electric Power Plant) industry are the rising, promising markets for a CAB process.

The innovations, have led to the design of a variety of brazing furnace systems to meet the growing demand for aluminum brazing.

We offer optimal solutions for all types of industrial heat exchangers manufactured in long-run, medium-run or individual short run production.

Controlled Atmosphere Brazing Process

The controlled atmosphere brazing process heats a product to brazing temperatures while maintaining uniform temperatures within the product in an oxygen-free nitrogen atmosphere.

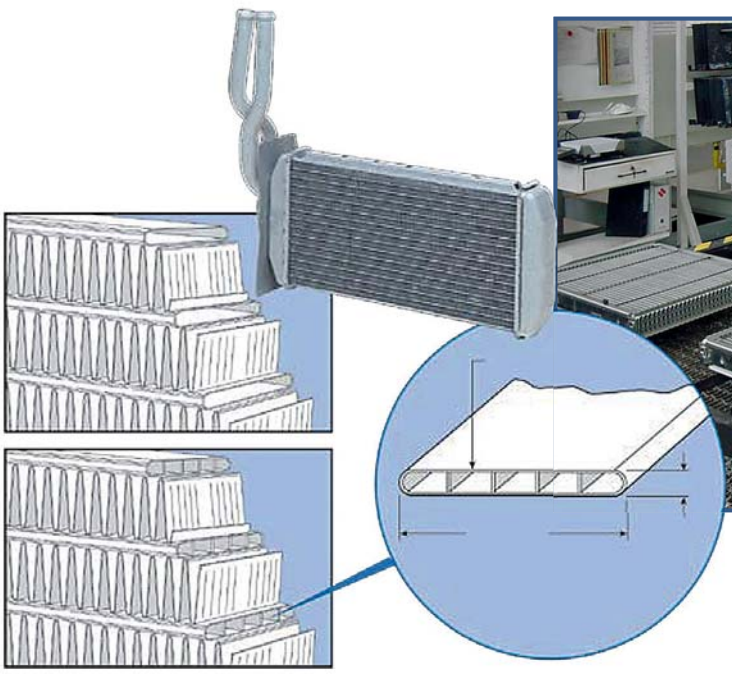
The controlled atmosphere brazing process uses a noncorrosive flux to reduce the tenacious aluminum oxide over layer that forms on the heat exchanger aluminum surface. SECO/WARWICK CAB furnaces provide the pure nitrogen atmosphere and temperature profile necessary to promote the formation of braze fillets between the fin and tubes and the tube to header joints of aluminum heat exchangers.

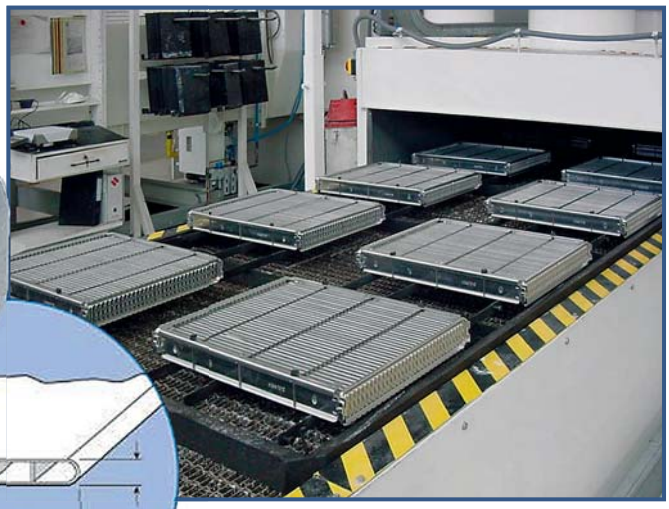
Controlled atmosphere brazing's advantages include:

- Accepts a less demanding dimensional fit-up
- Flux is noncorrosive, requiring no post braze cleaning
- Less capital intensive compared to vacuum brazing
- Continuous flow for high volume throughput

Although heat exchangers such as radiators, condensers, oil coolers, evaporators, heaters, and charge air coolers for the automotive industry dominate current demand, other applications continue to lend themselves to aluminum brazing.

We are committed to ongoing improvement of equipment design, and work closely with major users to help them achieve more economic operation and implement efficient technology.





CAB equipment

A fully configured CAB furnace system includes thermal degreaser, a fluxer unit, a dry off oven, and the CAB furnace. These systems can be configured in an in-line, a continuous rectangular line, or a U-shaped line to meet your plant's installation space requirements.

The following furnace designs are available to produce a variety of parts in large or small volume production runs:

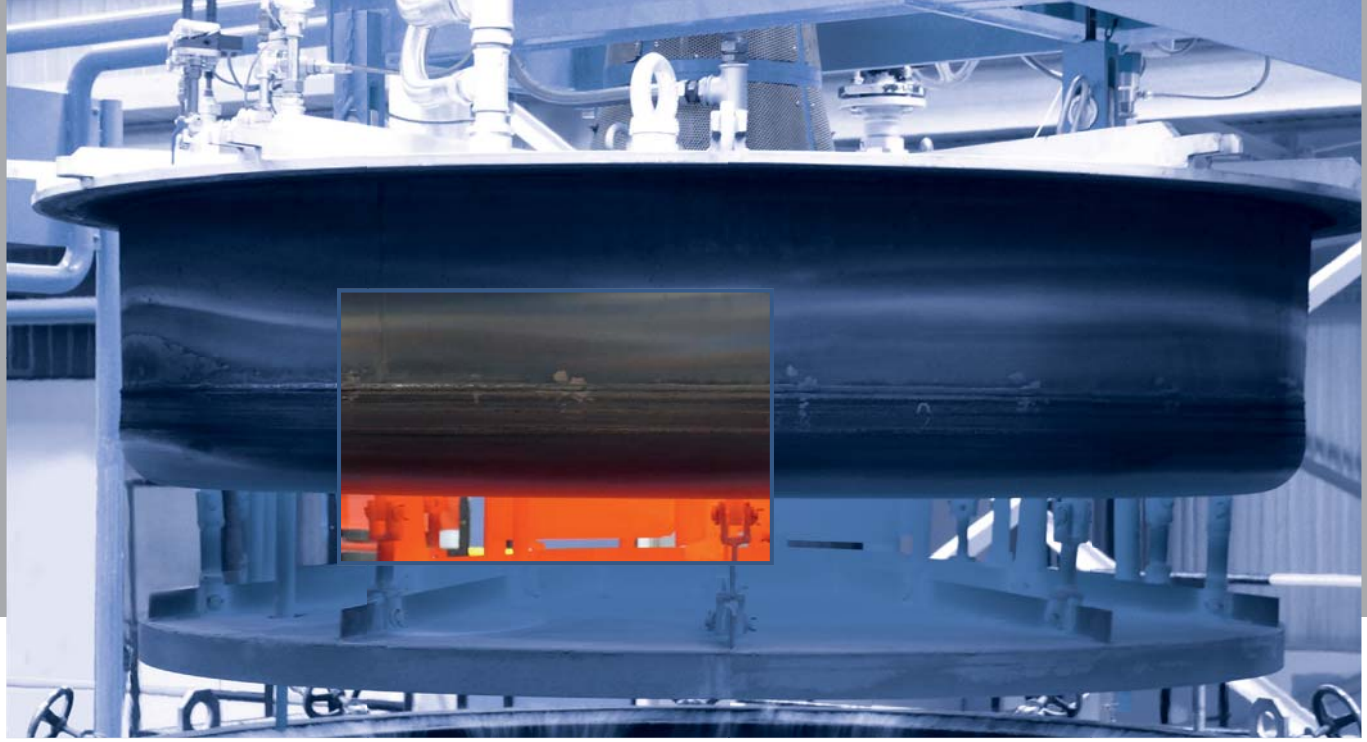
- Radiation CAB furnace
- Convection/Radiation CAB furnace
- Convection CAB furnace
- Active Only® CAB furnace
- Vacuum purged vertical loaded furnace

Spraying Fluxer

Whether you need a small quantity of prototype parts or your business demands high volume production of various sizes and types of aluminum parts, SECO/WARWICK will custom engineer your controlled atmosphere brazing furnace system.

Complete Continuous CAB Line

Atmosphere Heat Treatment Furnaces and Systems



SECO/WARWICK Group is the major, customer focused manufacturer of **atmosphere heat treatment furnaces and systems**. Our over 60-year experience in atmosphere heat treatment has led us into position of the premier, full service and trustworthy supplier of advanced technology.

Our products operate worldwide in all branches of industry. As a reliable partner, we deliver comprehensive services and equipment at competitive prices. We create innovative technical solutions according to the growing needs of each customer.

We develop modern technology for improving furnace performance and providing excellent efficiency of our products.

Application technology:

- Gas carburizing
- Carbonitriding
- Nitriding using ZeroFlow® method
- Brazing
- Hardening (quenching)
- Tempering
- Annealing
- Bright annealing
- Normalizing
- Preheating
- Austenitizing

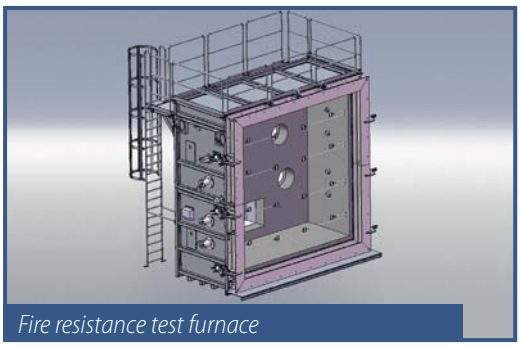
Walking beam furnace for springs

CaseMaster® Sealed Quench chamber furnace

SECO/WARWICK provides selection of standard and custom designed furnaces dedicated for batch or semi-continuous process requirements.

Variety of furnaces:

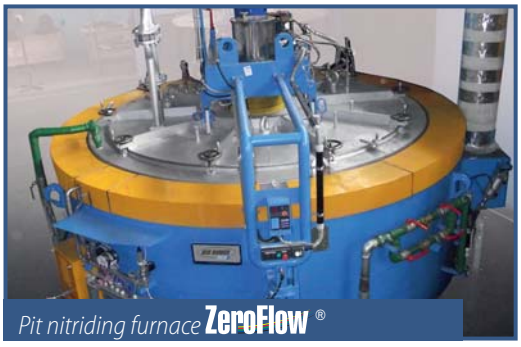
- Pit furnaces
- Sealed Quench CaseMasters® furnaces lines
- Rotary Hearth furnaces,
- Rotary Retort furnaces
- Hydrogen Bell Annealing furnaces
- Roller Hearth furnaces
- Mesh Belt furnaces
- Walking Beam furnaces
- Pusher furnaces
- Boogie Hearth furnaces
- Cast Link furnaces
- Batch furnaces
- Furnaces for Glass
- Generators:
  - Endo
  - Exo
- Ammonia Dissociators
- Washing Machines
- Auxiliary Equipment



Fire resistance test furnace

Rotary hearth furnace for heating before forging

Pit carburizing furnace - PEGat type



Pit nitriding furnace ZeroFlow ®

Furnaces and devices for heat treatment with protective atmosphere are widely used in the automotive, aircraft, power, bearing and machine-building industries. They are typically used for heat treatment of gear-wheels, shafts, jointed components, bearings and forgings.

SECO/WARWICK provides technological equipment in accordance with the customer's specification and operates in line with the full circle of manufacturing process including: know-how, engineering, technology, logistics, installation, service and training.

SECO/WARWICK is committed to live in harmony with the natural environment. Our products can be applied to the protection of the environment by the exploitation of renewable energy sources.

Mesh belt furnace lines for nitrocarburizing, hardening and tempering of small hydraulic components

Roller hearth furnace line for heating-up before quenching on press, washing and tempering of bearing rings

Rotary retort line for hardening and tempering

Pusher furnaces

Hydrogen Bell Annealing

Technological line for bending car windscreens

SECO/WARWICK produces advanced bell type furnaces for cold rolling applications. We offer bell furnaces operating with hydrogen / cracked ammonia / nitrogen gas as protective atmosphere.

Our bell furnaces are equipped with highly-efficient extended shaft motor assemblies resulting in high convection rates. This ensures close temperature uniformity and homogeneous physical properties of the annealed material. Also greatly improving the crystallised structure and reduces decarburization of the annealed material.

Additionally we offer Polykath package dehumidification / coil cooling and storage systems.

We produces furnaces for the tube industry, for ferrous as well as non-ferrous applications. Our furnaces have fool-proof sealing, resulting in an excellent bright finish to the annealed tubes. Our control systems are optimised to achieve the best possible results.

We also offer rapid cooling arrangement with sealed blowers for stainless steel tube applications, and furnaces for various tube heat treatment processes.

Variety of furnaces:

- Bell furnaces for steel strip coils, using hydrogen gas as protective atmosphere
- Bell furnaces for bright charge after annealing
- Roller hearth furnaces for annealing copper tube coils or steel tubes
- Conveyor furnaces for stainless steel tubes annealing
- Pusher furnaces
- Walking hearth and walking beam furnaces
- Reheating furnaces for hot rolling applications
- Bogie hearth furnace

Bright charge after annealing in Bell furnaces using hydrogen gas as protective atmosphere

Roller hearth furnace for steel tube annealing

SECO/WARWICK Group offers a variety of reheating furnaces for hot rolling applications – pusher type, top-and-bottom-fired, walking hearth, walking beam, soaking pits and steckel mill coiler furnaces. Our furnaces are highly energy-efficient, with high automation levels, and are suitable for a wide variety of charge grades and sizes.

Our control systems are optimized to achieve the best results. With our extensive experience, we guarantee the performance of our furnaces on par with all international standards.

Variety of furnaces:

- Pusher-type furnaces for reheating of steel billets
- Hydraulic charging pusher
- Top-and-bottom fired Pusher-type furnaces for reheating of steel slabs, blooms and ingots
- Walking hearth furnaces for reheating of steel billets or rounds

Bogie hearth furnace for stress relieving

Top and bottom fired Pusher tupe furnace for reheating of steel slabs, blooms and ingots

Processes

The purpose of heat treating steel is to change its mechanical properties, such as ductility, hardness, yield strength and impact resistance. SECO/WARWICK offers a range of furnaces to meet such industry demands.

Our furnaces are suitable for various heat treatment processes, such as:

- normalising
- stress relieving
- annealing
- spherodizing
- austenitizing
- tempering
- solution annealing applications
- and are capable of handling various kinds of charge material in different shapes and sizes. Furnaces are custom-designed to suit the customer's needs, and are equipped with a high level of automation

Aluminium Process Technology

Our five basic product groups include coil/foil annealing, solution heat treatment & ageing, billet and ingot log homogenizing including continuous billet homogenizing, ingot heating and melting & holding furnace systems. We offer advanced technology to reduce cycle times, conserve energy and improve cooling rates. Our control and material handling systems are designed for each unique production environment. With our experience, we are the single source for all your aluminium process furnace system needs and we guarantee the performance of our equipment.

Sheet and profile solution & ageing furnaces

These high efficiency furnaces provide a competitive edge to producers of aircraft and automotive components, while meeting the most rigid cost and production specifications.

- Batch and semi continuous design
- Various designs for recirculating airflow
- Patented insulation system “mesh and mortar”
- Up to ±1,5°C temperature uniformity during soaking time
- Load over temperature protection
- AMS 2750D compliance
- Ability to cool down the charge in the furnace
- Heating time and Energy consumption minimization

Aluminium coil and foil annealing furnaces

SECO/WARWICK provides custom engineered aluminium coil and foil annealing furnaces with capacities ranging from single coil modular furnaces to multi-zone furnaces with tight zone control.

We continue to develop technologies to improve equipment performance and efficiency. Two significant improvements for coil/foil processing include:

- **Mass Flow** design to protect load surfaces that are vulnerable to damage during high atmosphere flow. Dedicated for foil heat treatment.
  - ±5°C guaranteed uniformity in the load area
  - gas or electric heated
  - various types of atmosphere can be used – Air/Nitrogen/Exo
  - provides for fast heating times
  - enables charge loading in levels
- **Vortex® Flow Jet Heating System** – nozzle system that reduces cycle time by taking advantage of the high heat transfer produced through convection heating. Mainly dedicated for aluminium sheet
  - fast and uniform heating of the load
  - heating time reduction in comparison to other systems
  - lack of overheated points
  - ±3°C guaranteed uniformity for soaking time

Casted aluminium parts; solution and ageing furnaces

Many factors contribute to the overall efficiency of solution heat treating systems. Convection heating using high velocity air distributes heat evenly and efficiently, producing close temperature uniformity. Our time-tested insulation system further enhances efficiency, and has proven to be one of the most durable linings on the market today. A variety of circulated airflow patterns add further efficiencies to our furnace designs.

- patented Jet Impingement Air Flow Technology
- roller hearth furnaces
- ±5°C guaranteed uniformity for solution
- ±3°C guaranteed uniformity for ageing

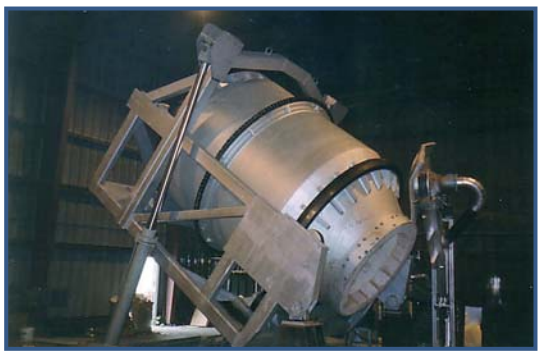
Log, billet, ingot, slab homogenization furnaces

Equipment designs include batch types (both car and tray designs), travelling styles and continuous styles, complete with material handling systems and load cooling equipment. Unique reversing airflow designs and temperature control systems produce fast heating rates with close temperature uniformity throughout the entire load.

- Batch furnaces
- Patented baffle design
- Patented reversing airflow design
- By-pass coolers for cooling inside the furnace
- Great temperature uniformity
- Lack of overheated points
- Also available **Ingot pusher design for slabs and ingots, continuous billet homogenizing**

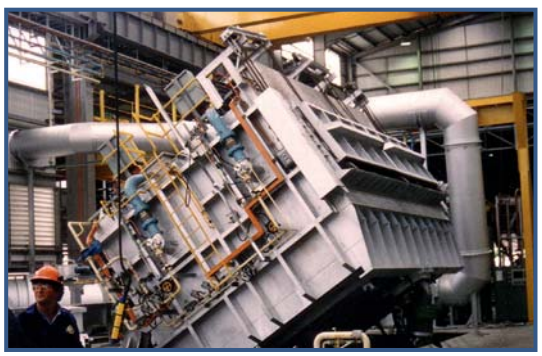
Melting and holding furnaces

Whether your application involves melting sows, solids and scrap, or cleaning the molten metal before casting into usable forms, our melt furnaces, or reverbs, are designed and built to provide years of efficient service.



Tilting melting and tilting holding furnaces

- Volume from 5t to 120t
- Furnaces can be rectangular or circular in shape, depending on the customer requirements
- Proprietary pour spout
- Reduction in overall furnace components for quicker field installation
- Cylinder assisted door sealing and closure system



Vacuum Metallurgical Equipment

According to the fast growth of metal heat processing market, SECO/WARWICK, Heat Treatment Equipment supplier and RETECH SYSTEMS LLC, Metallurgical Furnaces manufacturer decided to merge their best values. This alliance benefits for Customers with full, complex service on many fields: new equipment supplying, maintenance on pre-owned furnaces, unified spare parts availability and united service support for a wide range of Heat Processing Equipment.

Plasma Melting

Induction Skull Melting

Process applications:

- Equiaxed casting
- Directional Solidification/Single crystal casting
- Electrode casting
- Ingots, Slabs, Metallurgical Powder Production
- Scrap Consolidation
- Cold Hearth Melting
- Drip melting
- Plasma Welding
- Utilization of hazardous and radioactive waste
- Aerospace materials production

We produce the following equipment types:

- Vacuum Induction Melting (VIM) furnaces for casting processed of: equiaxed, directionally solidified and single crystal parts for variety applications including aircraft and power generation turbine elements
- Vacuum Arc Remelting (VAR) furnaces typically utilized for the production of Titanium, Nickel and Stainless Steel ingots. Other materials that can be processed are: Zirconium, Tantalum, Niobium, Titanium Aluminides, super alloys, reactive and refractory metals
- Plasma Arc Melting (PAM) furnaces which utilize an arc in a non-reactive gas, as a heat source and are applied to the melting of reactive and refractory metals. It is also qualified for the production of rotating grade Titanium
- Electron Beam (EB) furnaces dedicated for Drip or Cold Hearth melting/refining technologies of reactive and refractory metals. Our EB furnaces are qualified for the production of CP and rotating grade Titanium alloys for aircraft engine parts
- The Plasma Arc Centrifugal Treatment (PACT™) furnaces dedicated for superior destruction of hazardous waste and accepting a wide variety of lightly characterized, heterogeneous waste products
- Powder Production Equipment which utilizes a variety of melting techniques in conjunction with three metal powder production technologies: gas atomization, centrifugal atomization and spinning wheel casting


Vacuum Induction Melting Furnace


Electron Beam Furnace


Plasma Welding Equipment

Material applications:

- CP Titanium & Titanium alloys
- Ni & Co based alloys
- Tantalum
- Tungsten
- Niobium
- Zirconium
- Precious metals
- Silicon
- Rare earth metals

Advantages:

- State-of-the-art controls with sophisticated algorithms and controls capabilities for any process parameters monitoring.
- Furnace design which minimizes facility space requirements
- EB and Plasma cold hearth melting proven to eliminate high-density and low- density inclusions in Titanium alloys
- Possibility of combination Equiax/DS/SC technologies within one VIM furnace provides industry's fastest process conversion
- Feeding any configuration of material for melting process: scrap, chips, briquettes, bars, lose material, alloy additions, etc.
- Very precise and customized feeding systems: horizontal, vertical, with rotation, includes X-Y motion control, etc.
- Laboratory to production-scale units available

Consumable Electrode Casting Furnace

Vacuum Arc Remelting Furnace


OPERATIONS MANAGEMENT
OPERATOR
TOP MANAGEMENT
HEAD ENGINEER
Control Systems

SECO/WARWICK designs control systems that are both intuitive and easy to operate in any industry segment.

- Collection and safety of batch data;
- Functionality is provided to facilitate maintenance and manufacturing control
- The system allows adjustments to the heating control with measurement error monitoring to meet the NADCAP standard requirement;

For the operator

- Functionality and simple operation
- Comprehensive management in emergency
- Intuitive interface operable for an inexperienced operator
- Custom setup of all data analysis charts and printouts
- Full integration with SCADA software – no need of extra software the operator needs only one interface

For the operations management

- Full history of operation
- Operation time counters, advance announcements of the planned servicing
- Thermocouple durability monitor
- Utility usage monitoring
- Broad but easy manual mode of devices' setup helping in repairs and maintenance
- System backups of entire setup enables archiving of the setups

For the head engineer

- Advanced management system of manufacturing programmes
- Comprehensive information storage at one place
- Long term data accumulation
- Fast, read only, remote access to archived data
- Application browser provides read - only access to data
- Work time savings - automatic report creation
- Export to local files/web page

For the Top Management

- Reduced cost of implementation
- Reliability & quick response increases margins
- Data safety – individual data access privileges for the users
- Worktime savings with manufacturing automation
- Availability of data for the plant output control
- Statistics of base availability indicators, analyses of idle time and availability
- Connectivity to ERP and plant floor systems
- Integration with the enterprise IT systems

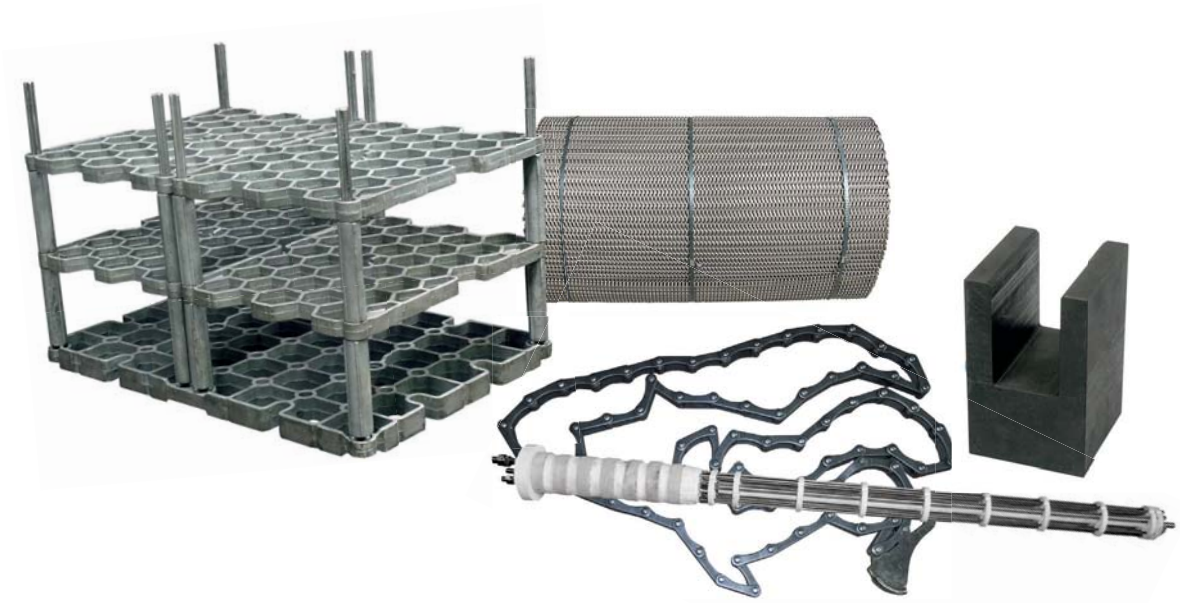
Spare Parts, Service and Modernization

In order to avoid downtime of our customers' equipment caused by a lack of certain elements or by damaged elements, SECO/WARWICK Group maintains a separate professional departments devoted exclusively to sale of spare parts. A wide range of spare parts are in stock at our warehouse to shorten customer delivery time.

If you have any problems with damaged or worn parts, please contact the specialists at our Spare Parts Departments. You will receive professional support to meet your needs. We provide professional advice in all aspects of selection, purchase and replacement of spare parts for your heat treatment equipment.

SECO/WARWICK Group provides:

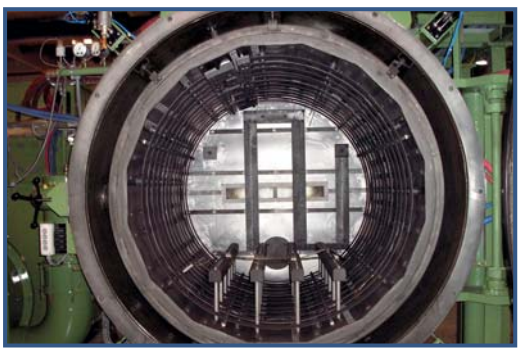
- Spare parts for all equipment we produce and accessories for existing equipment
- Comprehensive servicing by our engineers and support throughout the period of operation of the customer's equipment

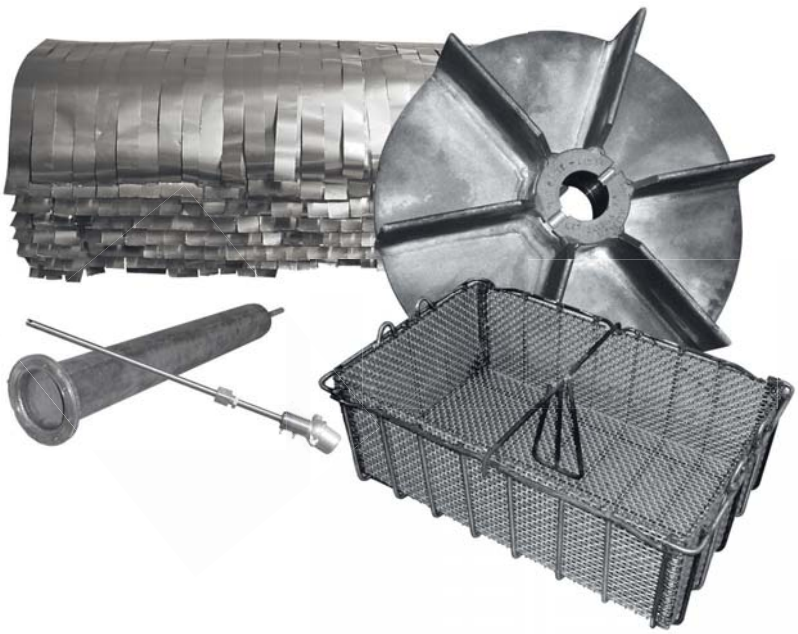


SECO/WARWICK Group is the sole owner of the know-how of Camlaw and provides spare parts for Camlaw brazing furnaces according to the original technical drawings.

SECO/WARWICK Group offers a complete spectrum of spare parts:

- spare parts for vacuum furnaces
  - graphite and molybdenum heating elements
  - graphite components (nozzles, nuts, supporting beams, supporting columns)
  - convection rotors
  - molybdenum components (nuts, fasteners, etc.)
  - tooling (welded and cast)
  - and more
- spare parts for aluminum treatment furnaces, heat processing equipment and CAB furnaces
  - muffles
  - conveyor belts
  - curtains
  - bearings
  - cells for oxygen analyzers
  - mixers/rotors
  - burners
  - heating elements
  - rolls and driving systems
  - retorts
  - loading baskets and trays





Renovation and repair

Heat treatment is a constantly developing field, and a growing number of new solutions and equipment appear, offering improved performance and product quality. But what about the equipment you already own? SECO/WARWICK Group has the knowledge and experience to provide you equipment produced using the best solutions to meet market requirements.

We carry out renovation and repairs of a wide range of equipment, from control systems to complete heating chambers, whether the equipment was produced by SECO/WARWICK Group or other manufacturers.

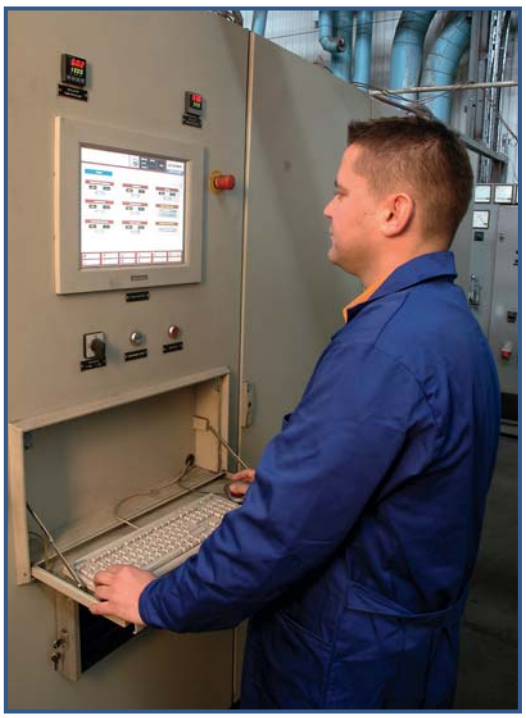
Service

The SECO/WARWICK Group service teams are made up of field engineers that are trained to solve problems and get equipment running quickly and efficiently. We provide support for installation, start up, testing, preventive maintenance and equipment breakdowns.

We understand our customers' need for a quick response in emergency situations and provide prompt and reliable service.

Additional services include:

- Warranty and aftermarket repairs
- Regular and/or periodical inspections
- Maintenance
- Operator Training



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