SECO/WARWICK

INVENTION MEETS RELIABILITY

ALUMINUM FURNACES FOR HEAT TREATMENT

MISSION

The mission tells us why we exist, for whom we do what we do, why we do it, and what the purpose of the company's existence is.

Thanks to the experience and expertise of our employees as well as cooperation with business partners, we create innovative products that give our customers reliable, safe, and environmentally friendly heat treatment and metallurgy solutions ensuring the economic efficiency of their business.

VISION

The vision is our dream, inspiration, encouragement, stimulus, signpost.

We want to be the first-choice provider of heat treatment and metallurgy solutions. Innovation and reliability are evident in the way we think and create anywhere in the world.

SECOLOGY

The ECO prefix is inscribed in our name and the Group's DNA. We do not talk and do not think differently about ecology other than Secology, because we look at environmental protection so broadly.

Secology is therefore a set of projects and ecological social initiatives, ecological investments within the company and the green technologies that we use or create.

Secology, thus, is not a new science or strategy, it is the SECO/WARWICK Group's attitude visible in various aspects of its operation.

For over 100 years, the SECO/WARWICK Group has been building the global heat treatment and metallurgy industry by providing industrial furnaces for leading companies in the following sectors: aviation, automotive, machinery, medical, toolmaking, power, and commercial heat treatment.

The company specializes in end-to-end solutions in 5 categories: vacuum heat treatment, aluminum thermal processing, atmosphere thermal processing, brazing of heat exchangers, and vacuum metallurgy.

Our solutions help to produce control system components, gears, aircraft landing systems, turbines, aircraft engine blades, plane and car heat exchangers, surgical instruments, and coins, as just a few examples of heat treatment and metallurgy applications.

DISCOVER OUR ALUMINUM HEAT TREATMENT SOLUTIONS.

CONTENT

ALUMINIUM FURNACES – GENERAL INFORMATION

SECO/WARWICK provides basic product groups including coil/foil annealing, solution heat treatment & aging, 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 aluminum process furnace system needs and we guarantee the performance of our equipment.

/ ALUMINUM TECHNOLOGIES

brazing, annealing, solution, aging, homogenizing, preheating, melting.

/ INDUSTRIES

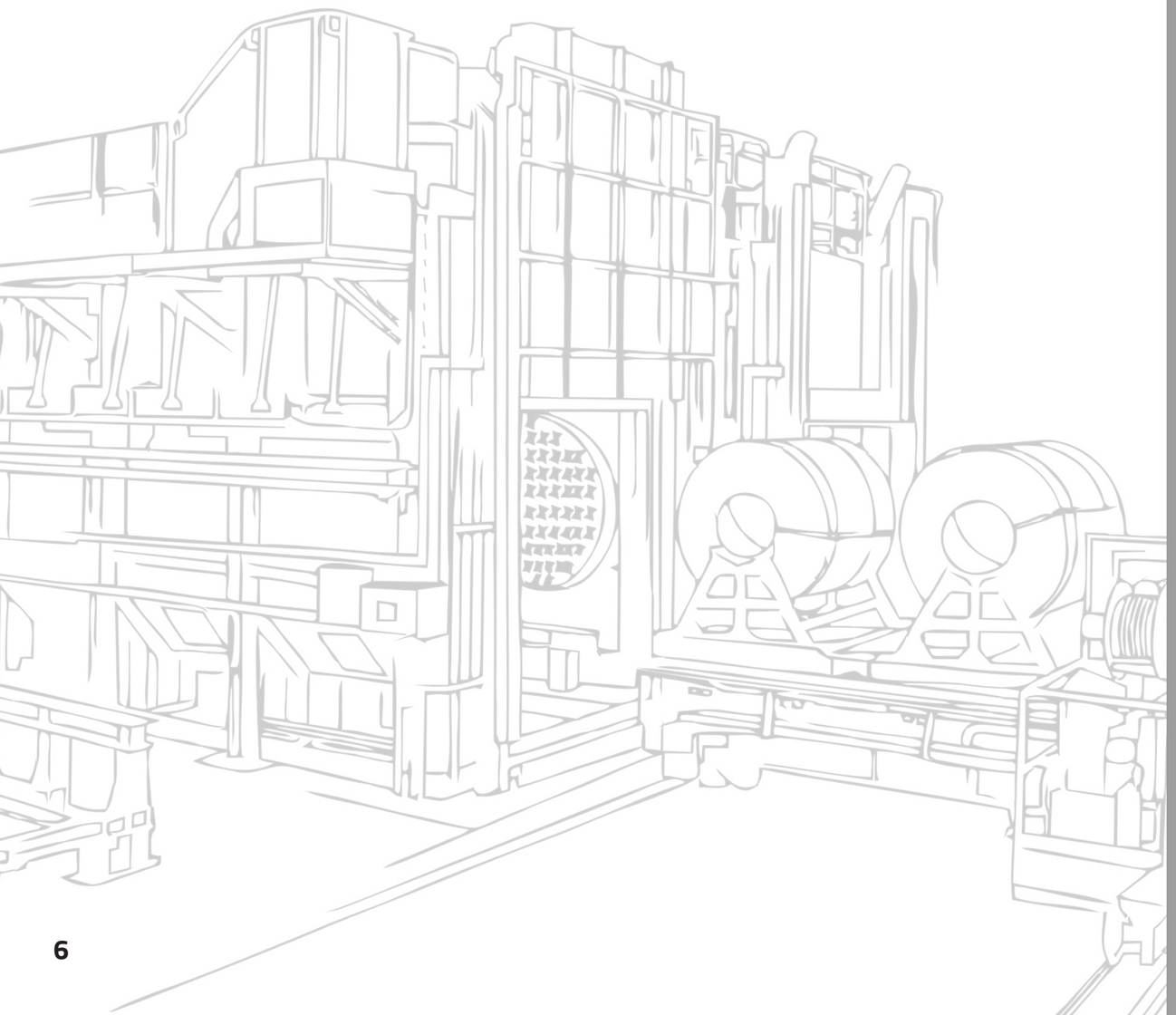
automotive, engineering, energy, aerospace, marine, chemical, defense, electronics.

/ ESSENTIAL FEATURES

Specialized aluminum brazing built to individual requirements. Customization of processes to the specificity of the batch, performance and quality requirements. Process time reduction, energy and other energy factors consumption minimization, meeting customer-specified standards, such as aviation, automotive, environmental and other. Dedicated peripherals: load transport, interoperation cleaning, flux application, packaging, harmful substances emissions reduction.

VORTEX

Custom-engineered aluminum annealing furnaces for coil and foil with capacities ranging from single coil furnaces to multi-zone furnaces with tight zone control. These units are used by aluminum manufacturers from around the world, i.e. in North & South America, Europe or Asia.



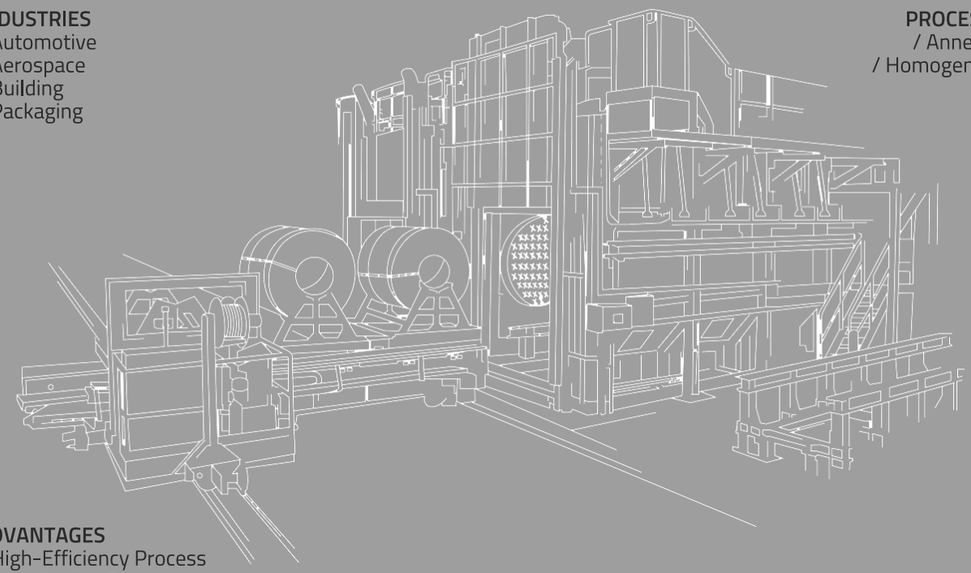
SECO/WARWICK

VORTEX

ANNEALING FURNACES FOR ALUMINUM COILS AND FOILS

INDUSTRIES
/ Automotive
/ Aerospace
/ Building
/ Packaging

PROCESSES
/ Annealing
/ Homogenizing



ADVANTAGES
/ High-Efficiency Process
/ High Quality Process
/ Lower Cost Operation
/ Flexible System Design
/ High Heating Head
/ Coil and Foil Application

FEATURES
/ Vortex Jet Heating System
/ Bypass Cooler
/ SeCoil process control and simulation software

VORTEX

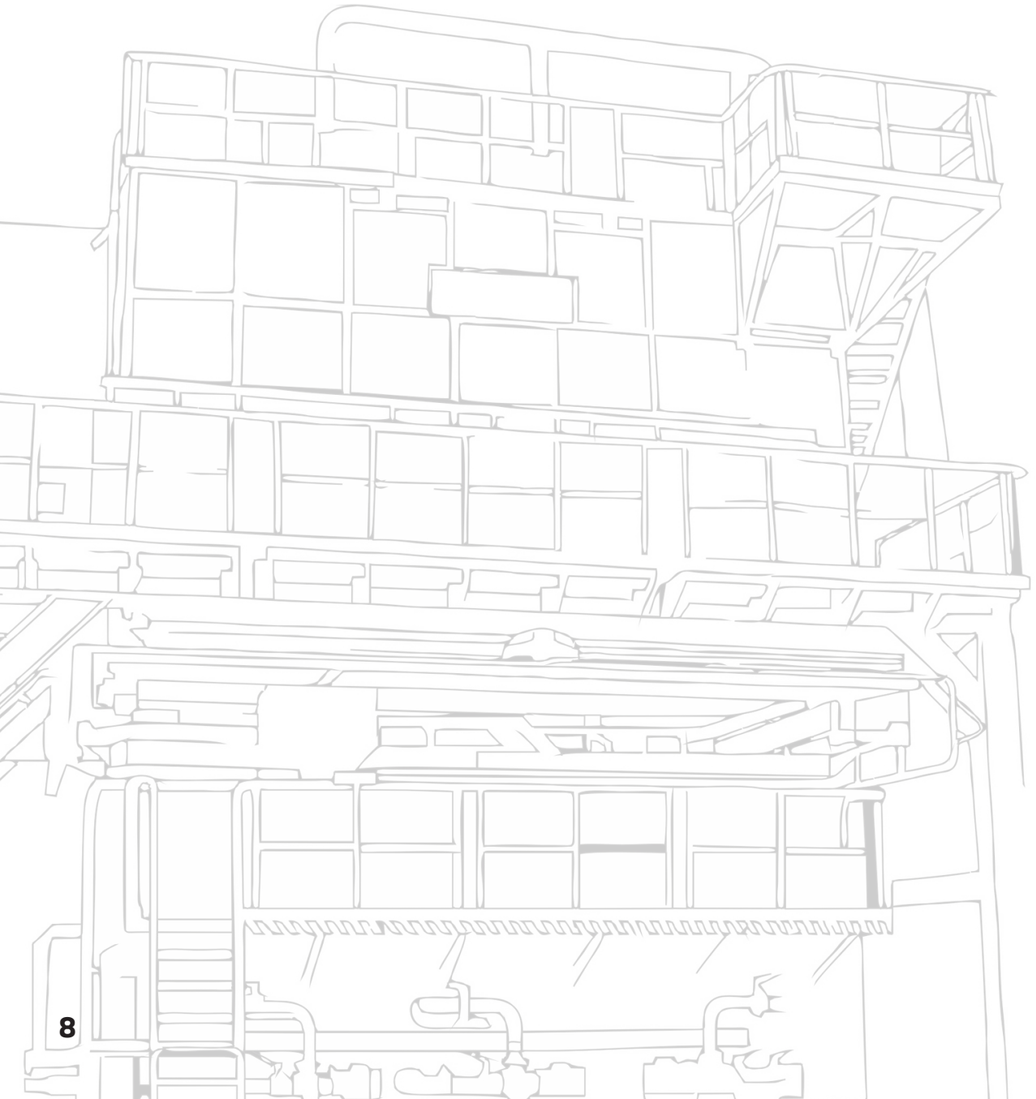
Aluminum Coil Annealing Furnace using High Convection Vortex Jet Airflow

OVERVIEW
Using patented Vortex jet airflow technology, SECO/WARWICK's Vortex aluminum coils annealing system, combined with optional Bypass Cooler and SeCoil control and simulation software, provides coils producers the ability to significantly reduce the overall cycle time of their furnaces, resulting in energy savings, increased productivity, and improved surface quality. The key to the system is an increased heat transfer coefficient achieved by high-speed air impinging on both sides of the coil. The idea is to transfer heat through the coil's edges as opposed to only through the outside layer of the coil.

VertiQuench

VertiQuench provides solution heat treatment followed by quenching and artificial aging for precipitation hardening of products. The furnaces can be supplied in one complete system conforming to AMS standarts, NADCAP certification, and meeting those tight requirements in terms of temperature uniformity, restrictions for processing time in each step, and all other parameters.

VertiQuench provides an optimal heat treatment technology for aluminum alloy extruded and drawn porthole or seamless tubes of 2xxx, 6xxx, and 7xxx series alloys in hard tempers, since it provides the shortest quenching time and produces the highest mechanical properties of treated extrusions.



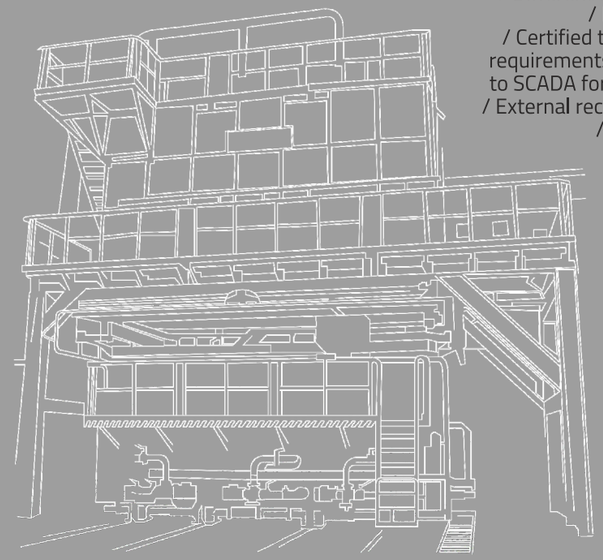
SECO/WARWICK

VertiQuench

DROP BOTTOM FURNACES FOR ALUMINUM SOLUTION HEAT TREATMENT AND AGING HEAT TREATING

MATERIALS
/ Aluminum and magnesium alloys
/ Sheets, castings, forgings, tubes and extrusions

FEATURES
/ Reverse airflow direction (Top to Bottom or Bottom to Top)
/ Applicable for sheet, castings, tubes and extrusions
/ Custom designed fan assemblies
/ Movable or stationary water quench tanks
/ Different designs of water agitation units
/ Heating and cooling of the bath
/ Certified thermocouple modules for AMS requirements as well as recorder connected to SCADA for thermocouples data collection
/ External recorder upon Customer's request
/ Furnace designed according to newest AMS 2750F standard



INDUSTRIES
/ Aerospace
/ Automotive
/ Defense

PROCESSES
/ Solution Heat Treatment
/ Aging
/ Annealing
/ Stress relieving
/ Controlled cooling
/ Controlled heating

VertiQuench

Provides solution heat treatment followed by quenching and artificial aging for precipitation hardening of products

OVERVIEW
VertiQuench Drop Bottom Furnaces provide an affordable solution for demanding automotive and aerospace applications in aluminum solution heat treatment and aging. This innovative NADCAP compliant technology enables very fast and full load immersion, as short as 5 seconds.

As the VertiQuench name implies, the process provides vertical quenching. The heat-treated material is dropped into water or polymer quenching tanks located directly under the furnace.

The furnaces can be supplied in one complete system conforming to AMS standarts, NADCAP certification, and meeting those tight requirements in terms of temperature uniformity, restrictions for processing time in each step, and all other parameters.

Aluminum Age and Annealing Furnaces

SECO/WARWICK is a world leader and innovative manufacturer of Aging and Annealing Furnaces with decades of experience. We provide the complete solution to your needs for a custom designed system. Many factors contribute to the overall efficiency of SECO/WARWICK's solution heat treatment systems.

Convection heating using high velocity air distributes heat evenly and efficiently, producing close temperature uniformity. A variety of circulated airflow patterns add further efficiencies to our furnace designs.

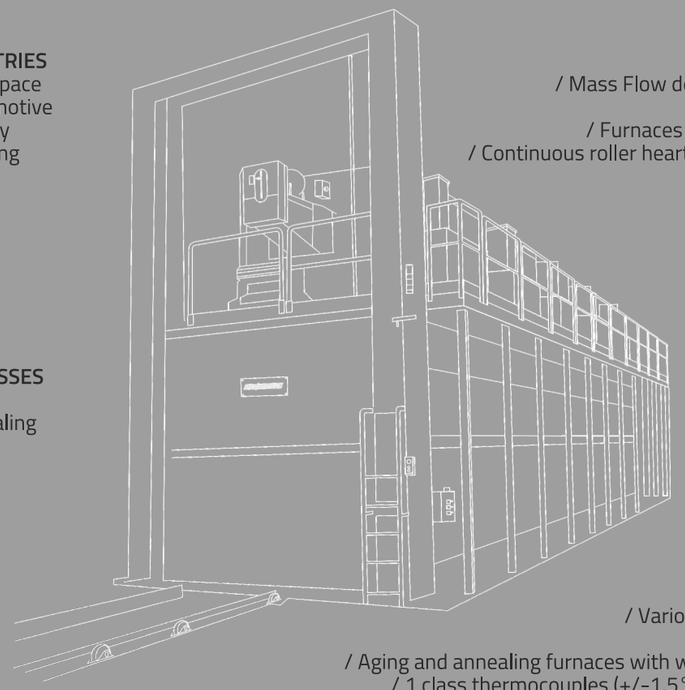
SECO/WARWICK

Aluminum Aging and Annealing Furnaces

COMPREHENSIVE TAILOR-MADE SOLUTIONS FOR THE ALUMINUM INDUSTRY

INDUSTRIES
/ Aerospace
/ Automotive
/ Energy
/ Building

PROCESSES
/ Aging
/ Annealing



DESIGNS
/ Mass Flow design, especially for wire, profile and foil (less than 100microns)
/ Furnaces for T77 process heat treatment
/ Continuous roller hearth furnaces for mass production
/ Scrap dryers
/ Stress relieving furnaces

FEATURES
/ Various designs of airflow depending on the load configurations
/ Aging and annealing furnaces with wide working temperature range
/ 1 class thermocouples (+/-1,5°C) or AMS dedicated (+/-1,1°C)
/ +-2°C temperature uniformity in 1 Class furnace
/ Possibility to use Siemens or Allen Bradley PLC as a recorder along with certified thermocouple modules
/ Full data and trends archive starting from 0.1°C and 1s tact.

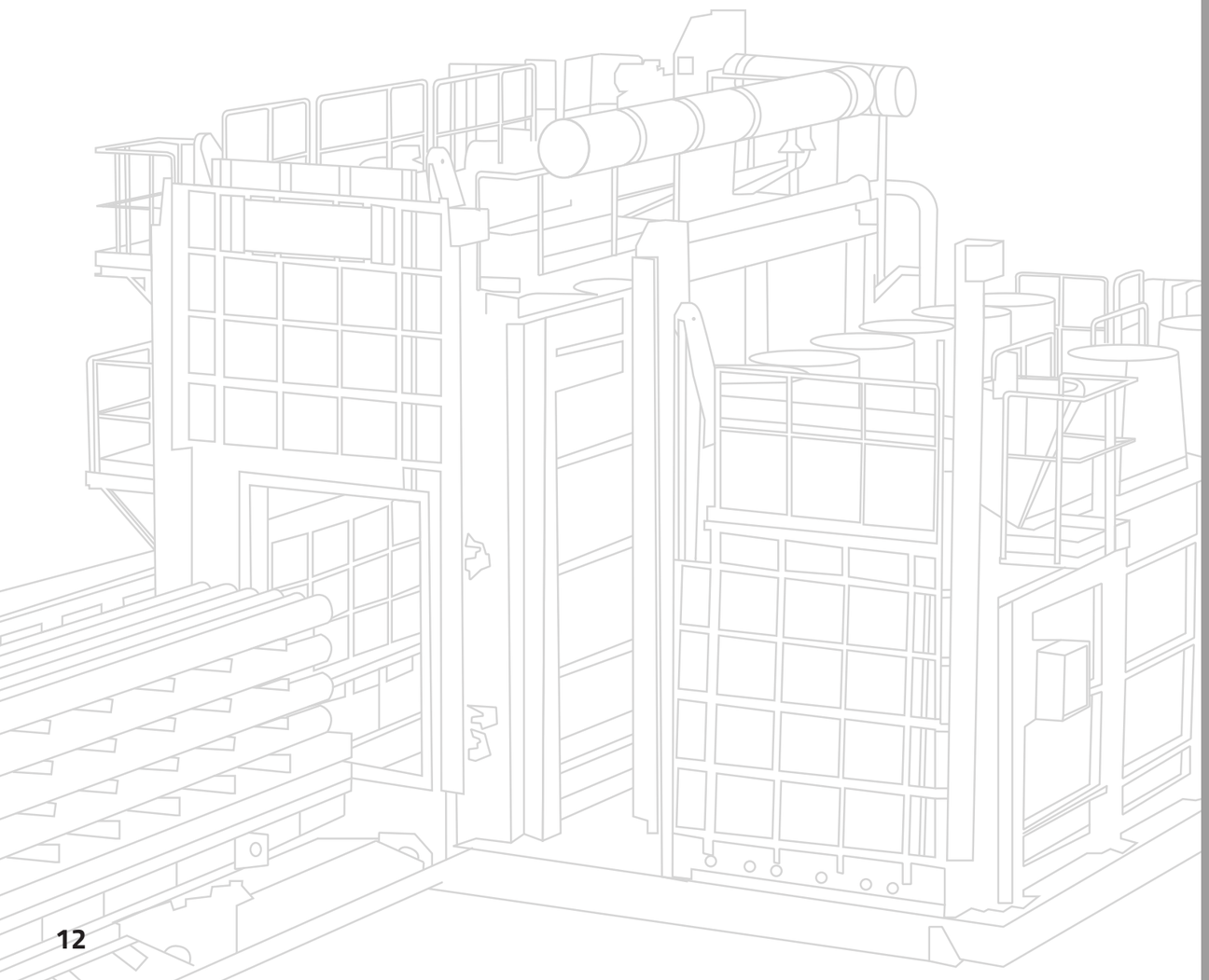
Aluminum Aging And Annealing Furnaces

SCRAP DRYING FURNACES
SECO/WARWICK can provide low cost crap drying furnaces in Class 2 or 3 with the hearth adapted for container loading with the use of forklift. Furnaces provide simple recirculation systems with the use of centrifugal fans and water vapor evacuations system. Heating system is based on compact low cost heating elements easy to replace. Control cabinet is installed on the furnace and equipped with simple controller for process parameters input. The doors are opened manually.

Aluminum Homogenizing Furnaces

The custom-designed homogenizing furnaces for aluminum billets and logs for most technological applications.

Equipment designs include batch types (both car and tray designs), traveling styles and continuous styles, complete with material handling systems and load cooling equipment.



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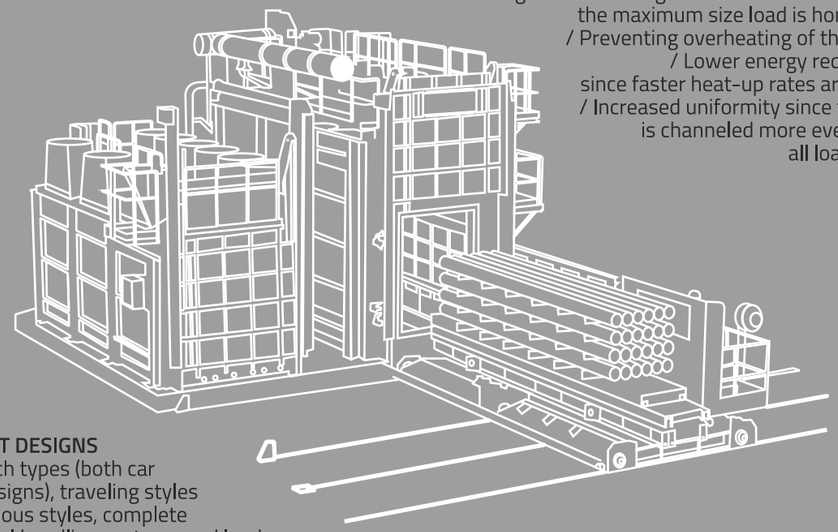
Aluminum Homogenizing Furnaces

CUSTOM-ENGINEERED ALUMINUM LOG AND BILLET HOMOGENIZING FURNACES

INDUSTRIES
/ Automotive
/ Aerospace
/ Energy

PATENTED BAFFLE DESIGN
/ Shorter heat up rates due to increased airflow velocity
/ Preventing short circuiting of the airflow when less than the maximum size load is homogenized
/ Preventing overheating of the top layer
/ Lower energy requirements since faster heat-up rates are achieved
/ Increased uniformity since the airflow is channeled more evenly across all load surfaces



EQUIPMENT DESIGNS
include batch types (both car and tray designs), traveling styles and continuous styles, complete with material handling systems and load cooling equipment.

Aluminum Homogenizing Furnaces

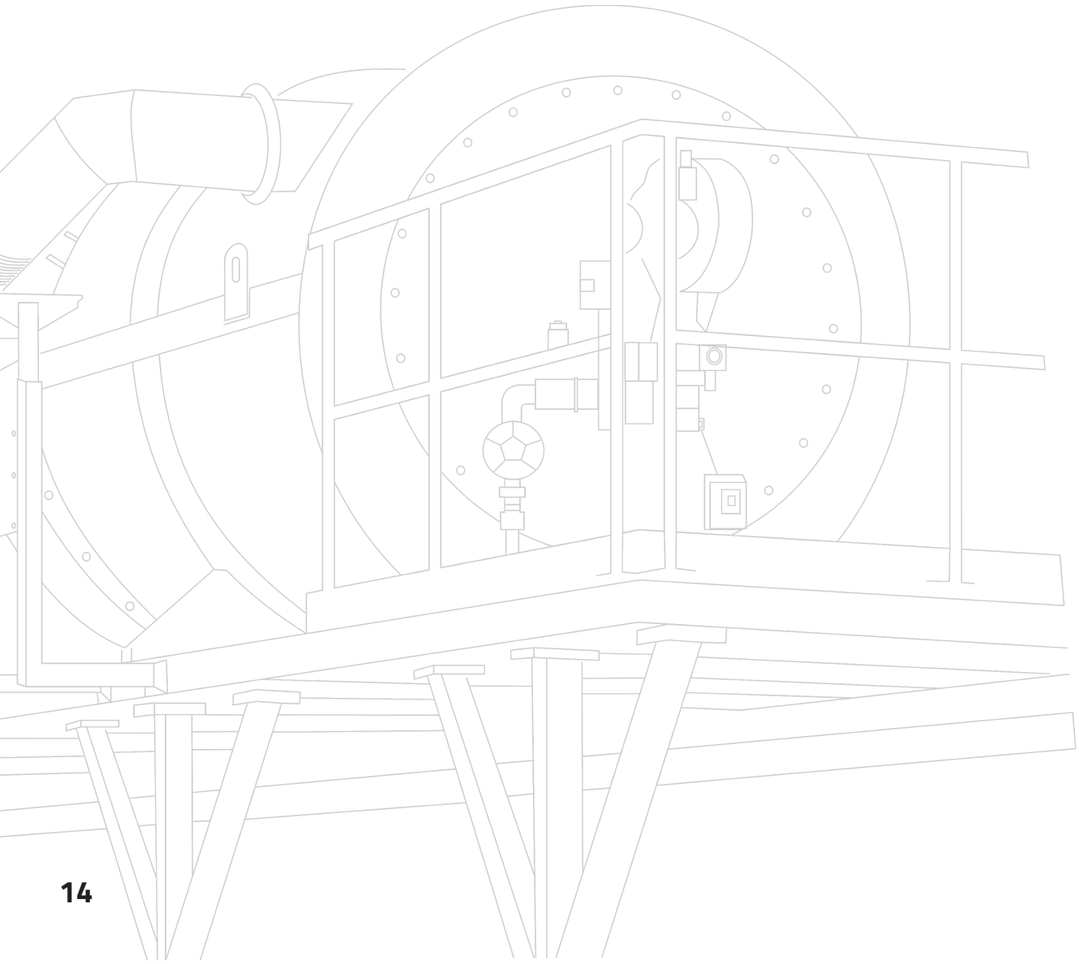
The custom-designed homogenizing furnaces for alluminum billets and logs for most technological applications

AIRFLOW PATTERNS
The patented reversing airflow design with upstream/downstream temperature control using an axial flow fan wheel reverses rotation on a timed basis, which, in turn, reverses the direction of the horizontal airflow through the load. The air stream temperature is monitored and controlled on each side of the load. A thermal head is used during the early stages of the cycle for fast, efficient heating. This design increases both the heating rate and temperature uniformity of the load compared with one-way airflow, resulting in better efficiency, lower fuel cost, and improved metallurgical results.

AFTERBURNER

The Afterburner is a standard product in our company's portfolio typically supplied together with a degreaser (a device for thermal removal of oil from the surface of aluminum heat exchangers) included in a CAB line. This design has started to be used when annealing aluminum coils in Vortex and mass flow furnaces.

Large quantities of oil are often used during the rolling and corrugation process. The oil evaporates during the heat treatment process, emitting hazardous organic compounds. In order to protect the health and the environment, SECO/WARWICK delivers a solution that ensures that emission standards are met.



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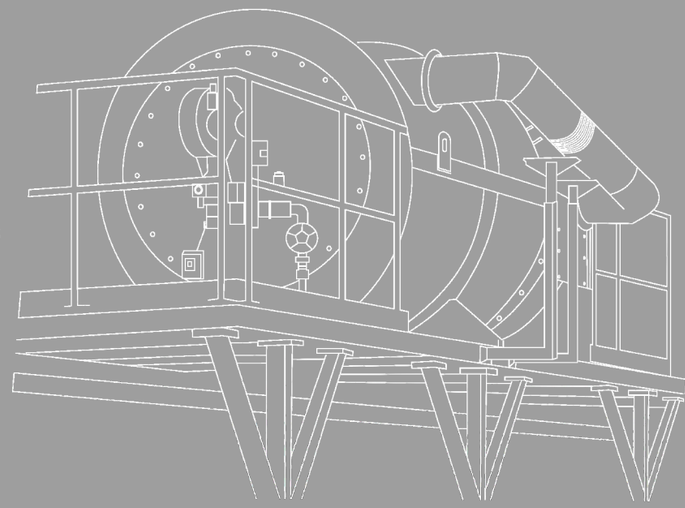
AFTERBURNER

REDUCES THE EMISSIONS OF VOLATILE ORGANIC COMPOUNDS

ADVANTAGES
/ combustion of volatile organic compounds under the temperature as low as 650°C,
/ high reduction of VOC (Volatile Organic Compounds) emission down to 50 mg/Nm3 TOC, complaint with European standards, and even down to 30 mg/Nm3 TOC in selected applications,
/ potential to install the afterburner in an already operating furnace.

PROCESSES
/ aluminum brazing
/ heat treatment of metals



INDUSTRIES
/ Aerospace
/ Automotive
/ Packaging
/ Medicine
/ Energy

FEATURES
/ combustion of volatile organic compounds,
/ reduction of VOC emissions,
/ option of installing a heat exchanger in order to reduce the energy consumption in the combustion process,
/ gas heating system comprising one compact gas burner with gas path,
/ high-efficiency insulation of the combustion chamber,
/ independent control system equipped with a safety system in case of flame extinction.

AFTERBURNER

Effectively reduces the emissions of volatile organic compounds

OVERVIEW
Volatile Organic Compounds (VOC) are a group of organic compounds which easily volatilize or vaporize with the presence of sunlight. At the same time, they release hazardous substances to the environment. During the combustion process, the contaminants are chemically transformed into neutral by-products of combustion such as water and carbon dioxide that can be safely discharged as flue gas. Due to the high process temperature, thermal afterburners are usually fitted with an energy-recovery system. The heat-recovery systems make it possible to reduce energy consumption by up to 70%.

SECO/WARWICK
Invention Meets Reliability

SECO/WARWICK is the 1st choice supplier
of solutions for heat treatment and metallurgy.

We create innovative products that provide our customers with reliable, safe and environmentally friendly solutions for heat treatment and metallurgy and ensure the economic efficiency of their businesses. Expertise includes end-to-end solutions in 5 categories: vacuum heat treatment, atmosphere, and aluminum thermal processing, controlled atmosphere brazing of aluminum heat exchangers and vacuum metallurgy.

SECO/WARWICK Group, with 8 companies located on 3 continents, has customers in nearly 70 countries with more than 4000 deployed solutions. The company provides standard or customized state-of-the-art heat processing and metallurgy equipment and technologies to leading companies in the following industries: automotive, aerospace, electronics, tooling, medical, recycling, energy including nuclear, wind, oil, gas, solar and production of steel, titanium, and aluminum.

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