

# HICON®

**EBNER** GROUP journal for technology and progress





# EBNER GROUP

Ladies and Gentlemen,  
 Esteemed readers of the **HICON®**  
 Journal, dear friends and  
 colleagues of the **EBNER GROUP!**

In a time of increasing global uncertainty, two factors have become more important than ever before: **stability** and **reliability**. At **EBNER**, we see ourselves as more than just a technology supplier: we are a stable, reliable partner for ambitious projects. We provide you with the certainty you need to successfully operate in dynamic markets and remain competitive.

In this edition of the **HICON®** Journal we underline, our leadership in technologies for the heat treatment of aluminum plates, a field which faces extremely strict requirements and in which international standards for quality are extremely high. We also present our technical expertise in innovative annealing technologies for wire applications, and report on a successful project that installed our new “combi” technology.

Our focus on **sustainability** and **efficiency** has allowed us to develop groundbreaking solutions for green industry, setting new standards for energy efficiency.

From our new line of **GREENBAF<sup>x</sup>** furnaces to the Compact Coil Furnace (CCF) from our subsidiary **Gautschi** Engineering, as well as upgrades and rebuilds, projects incorporating many exciting technologies and sustainable solutions await you in this issue.



You may also be interested to know that, to be even closer to our customers, we continue to expand our global presence. This effort has included the founding of **EQMS** in Mexico, which incorporates 6,000 square meters of workshop space, the expansion of our Indian offices in Mumbai. In line with this commitment, we are planning to open additional locations staffed by local personnel and will provide updates on this throughout the year.

Finally, I would like to take this opportunity to invite you to visit our booth at one of our upcoming trade fairs, and look forward to meeting many of you in person at **Wire Düsseldorf** (April 13 - 17, 2026).

I greatly appreciate the trust you place in the **EBNER GROUP!**

Yours,  
 Robert Ebner  
 CEO **EBNER GROUP**

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### IMPRESSUM:

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# Innovative annealing technologies for wire rod and drawn wire

bringing efficiency, quality and sustainability to the forefront



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Hot-rolled and Stelmor-cooled wire rod are essential starting materials for a number of cold forming processes. The first heat treatment a coil of wire rod usually undergoes is a spheroidization anneal, where the as-cast hot-rolled microstructure is optimized for additional cold forming. The decisive factors for this process are the ability to precisely control the temperature and the composition of the atmosphere.

## TEMPERATURE UNIFORMITY AND THERMAL TRANSFER

The excellent temperature uniformity that is achieved in HICON/H<sub>2</sub>® bell annealers is essential for successfully annealing wire coils, particularly when heat treating highly-alloyed steels above the Ac1 temperature.



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Thanks to high heat transfer coefficients, the energy required for transformation penetrates all the way into the center of even the most compact wire coils.

This means that the outer and inner wraps have almost identical temperature profiles, leading to extremely homogeneous mechanical properties.

Due to our special design, which emphasizes temperature uniformity, the temperature difference between the hottest and coldest points in a charge stack typically lies below 10 K - even when processing charges with large diameters and weights.

The high rate of heat transfer is achieved through high-atmosphere circulation rates (up to 50 m<sup>3</sup>/s) and an optimized flow of atmosphere through the workbase.

## LIGHTWEIGHT WORKBASES AND ATMOSPHERE FLOW CHARACTERISTICS

The workbases are lightweight designs that incorporate concentric support rings and segments of welded plate, which combine to significantly reduce the weight of the diffuser/load plate assembly.

In turn, this allows a more uniform flow of atmosphere through the load-bearing surface and minimizes temperature gradients. Fan impellers that have been specially developed for wire applications have intakes with increased cross-sections, allowing extremely high fan

speeds and the recirculation of extremely high volumes of gas (up to abt. 50 m<sup>3</sup>/s).

The high atmosphere flow speeds that result both reduce annealing times and improve temperature uniformity.

See figure 1.

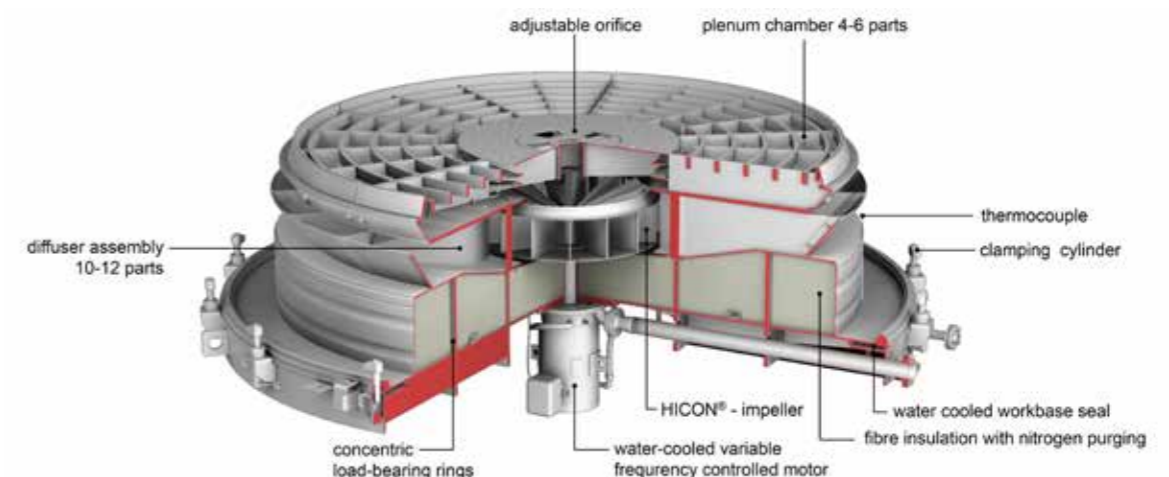


Fig. 1: Structure of a HICON® workbase for wire products

## ENCAPSULATED PROCESSING CHAMBER AND BAFFLE SYSTEM

The all-metal inner cover fully encapsulates the processing chamber, allowing operation with extremely pure atmospheres. Contamination with exhaust gases escaping from the heating chamber or ambient air is eliminated.

Inner covers are corrugated designs, which minimize thermal stresses and deformation at temperatures above 1,000 °C and in the frequent temperature changes that covers are exposed to.

The integrated baffle system prevents the formation of "short circuits" in the atmosphere flow, and ensures that gases flow in a controlled, uniform manner through the entire volume of the workload space.

The material selected for an inner cover is chosen to inhibit the thinning caused by the interaction between the oxidizing gases flowing across the outside of the cover and the reducing gases flowing across the inside.

## RECRYSTALLIZING COLD-DRAWN WIRE IN HYDROGEN

When carrying out recrystallization anneals on cold-drawn wire, straight hydrogen is the process atmosphere of choice. Depending on the material, the operating temperature may vary between 660 °C and 860 °C.

The high thermal conductivity of hydrogen ensures that the charge is heated up quickly and evenly. At the same time, the reducing atmosphere both ensures that drawing compounds are efficiently removed through evaporation and inhibits surface oxidation.

Automatic atmosphere control systems regulate the purging phases, even as evaporated drawing compounds are continuously drawn out of the workload space during the heating-up phase.

In comparison to a nitrogen process atmosphere, the use of hydrogen increases throughput from 1.8 t/h to 2.6 t/h (assuming a charge weight of 44 t), while the cleanliness of surfaces is also significantly improved.

See figure 2.

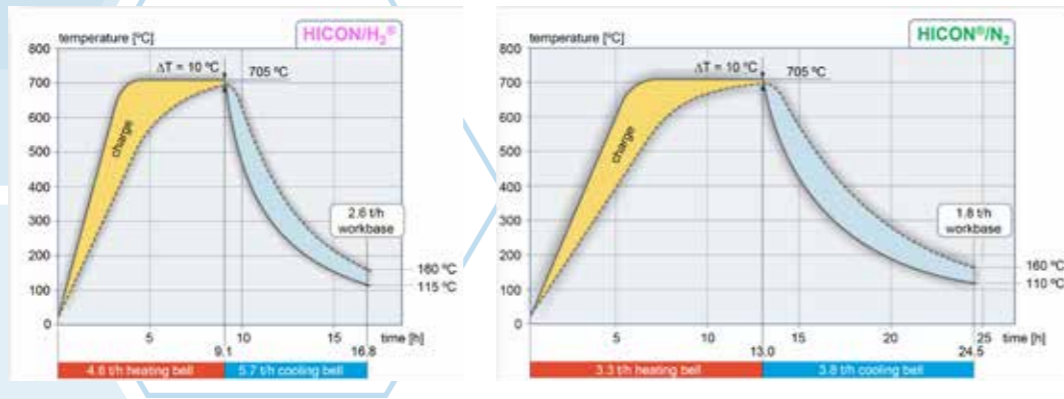


Fig. 2: Comparison of an anneal in hydrogen atmosphere (left) and an anneal in nitrogen atmosphere (right)

### ATMOSPHEREperfect: INTELLIGENT ATMOSPHERE CONTROL

The **ATMOSPHEREperfect** software module provides full automatic control of the H<sub>2</sub> purging program. A single click in the visualization system is all it takes to activate the system. An automatically-calculated purging segment allows the switch to a 100 % H<sub>2</sub> atmosphere to be made extremely rapidly. The H<sub>2</sub> purge flowrate is dynamically adapted as needed to support the evaporation of rolling and drawing compounds - which the module detects by monitoring the current draw of the workbase fan motor.

This automatic control ensures that premium qualities (surface quality, freedom from decarburization, etc.) are highly reproducible, regardless of the condition of the coils at the start of heat treatment. It also significantly reduces the consumption of both hydrogen and electrical energy (depending on the configuration of the facility up to 20 %, although even higher results have been attained).

See figures 3 and 4, which show long-term savings in hydrogen and electricity.



Fig. 3: H<sub>2</sub> consumption (over an extended period)

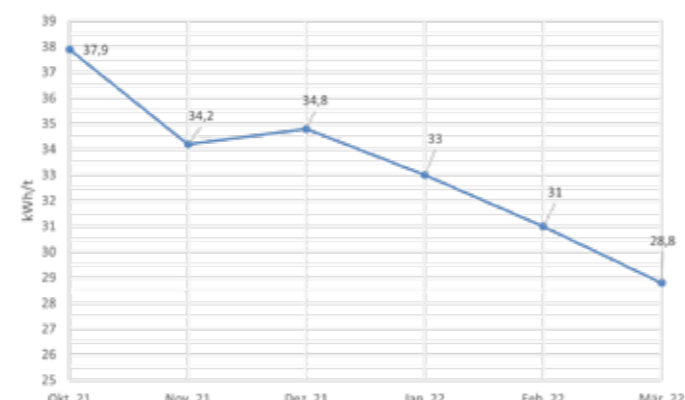


Fig. 4: Electrical energy consumption (over an extended period)

### ECOBURN FLEX: DUAL-FUEL BURNER TECHNOLOGY

To reduce NO<sub>x</sub> and CO<sub>2</sub> emissions, the development of **EBNER** burner technology never stops. Our **ECOBURN FLEX** line of special burners can be fueled with either natural gas or hydrogen, and switch automatically to flameless operation when they have reached a certain safety temperature. When operating with natural gas,

NO<sub>x</sub> values under 50 mg/m<sup>3</sup> can be achieved (at 3 % O<sub>2</sub>). When operating with hydrogen as a fuel, values under 70 mg/m<sup>3</sup> can be achieved (at 3 % O<sub>2</sub>) – around 30 % less than the values achieved by standard burner designs. Production anneals using H<sub>2</sub> as a fuel gas have already been successfully carried out.

See figure 5.

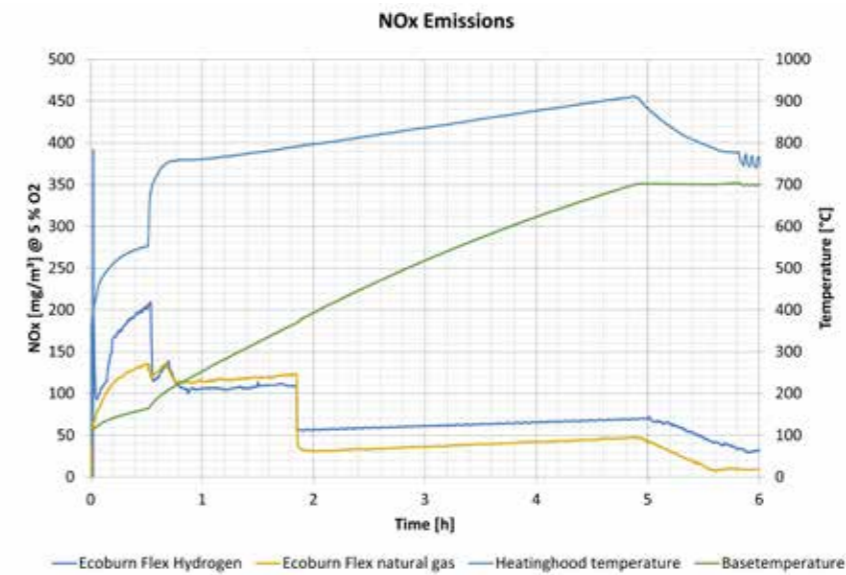


Fig. 5: NO<sub>x</sub> emissions of an **ECOBURN FLEX** burner when operating with natural gas and hydrogen

### ELECTRIC HEATING SYSTEM

Alongside classical heating methods using natural gas or hydrogen as a fuel, bell annealer facilities with electric heating systems have steadily increased in importance among industrial wire manufacturers. This is particularly the case in the context of decarbonizing industrial processes.

The direct transformation of electrical energy into heat completely eliminates the local creation of emissions like CO<sub>2</sub> and NO<sub>x</sub>. Ideally, the electrical energy is also generated from renewable sources.

Modern electric-heated facilities achieve heating-up and cooling rates that are comparable to those of gas-fired facilities, and are extremely flexible in terms of process

control and carbon balance.

### PUTTING IT ALL TOGETHER

Bell annealers that employ **HICON/H<sub>2</sub>** technology set the standards for temperature uniformity, energy efficiency and low emissions.

The combination of lightweight design, optimized atmosphere flow, intelligent atmosphere management and innovative heating technology ensures the highest product quality and process stability. The precise control of heat treatment parameters allows the production of wire products with outstanding mechanical properties and homogeneous microstructures. Processes ensure that products are free of decarburization, inhibit the oxidation of grain boundaries and provide extremely clean surfaces.

Over 4,900 **HICON** workbases, of which around 500 are for wire applications, are in service throughout the world - figures that underline **EBNER**'s technological leadership in the heat treatment of wire rod and drawn wire.





## From concept to reality: how sustainability shaped the development of GREENBAF<sup>x</sup>®



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Industries are under increasing pressure to make manufacturing more sustainable and to drastically reduce carbon emissions. EBNER Industrieofenbau saw this challenge coming very early, and developed a revolutionary product: the GREENBAF<sup>x</sup>® line of furnaces, electric heated bell annealers that not only operate with zero emissions but also offer significantly improved energy efficiencies. In the following interview, Sascha Eppensteiner, Vice President Product Management, offers insights into the thought processes, challenges and technological innovations behind this new development - insights that show how sustainability and profitability can go hand in hand.

**Why did EBNER choose to develop a zero-emissions bell annealer, one that is far more energy efficient than standard facility designs?**

Very early on, EBNER decided that it would offer its

customers a competitive “green” product that not only supported the realization of their goals but would also fulfill upcoming climate protection and environmental protection regulations.

**How did the idea of “sustainability” shape the development of GREENBAF<sup>x</sup>® bell annealers?**

EBNER fully supports the idea of sustainability, and it is deeply anchored in our company’s long-term strategy. The conservation of natural resources and the reduction of emissions are in our DNA, and they are central elements in all of our new developments. This approach can be clearly seen in our guiding principle, *Driving Green Technologies*.

**What challenges had to be overcome to develop a sustainable heat treatment solution that was also efficient and cost-effective?**

Along with a variety of technical challenges, we kept a sharp eye on costs as we were developing the facility. This meant not only the investment costs (CAPEX), but also the operating costs (OPEX) - as across the service life of the facility, operating costs actually make up the majority of the expense.

Reviewing solutions from a Total Cost of Ownership (TCO) standpoint can be awkward at times, as some technical solutions simply turn out to be unprofitable and have to be discarded and rethought. This also happened to us during development of the GREENBAF<sup>x</sup>®.

**Did the elimination of fossil fuels pose any particular challenges?**

The elimination of fossil fuels was indeed a challenge, as we did not want to simply design a normal electric heated bell annealer facility. We wanted to move forward and revolutionize the way energy is input.

**Which technological solutions were decisive in the creation of a zero-emission, energy-efficient process?**

One of the most significant features of the design is the innovative method of heating. In this design, an electric heating system with a high power density is integrated into the workbase itself.

We call this a *direct heating system*. When compared to the standard types of heating systems employed in bell annealers, several steps of the heat transfer process are eliminated and energy is transferred directly from the heating system to the process atmosphere.

Another central element in the design is the process bell, which replaces the heating bell, inner cover and cooling bell of a normal facility. This greatly simplifies operations at the bell annealer facility, as there is no need to exchange heating and cooling bells.

The process bell is also tied into a heat exchange circuit, which transfers thermal energy from one workbase to another. This significantly increases energy efficiency. Energy savings of up to 30 % can be achieved.

**What factors had to be taken into account during the design process?**

With regard to the new heating concept, the changing ambient conditions naturally had to be taken into account. The heating system would now operate within the encapsulated process atmosphere, and would be exposed to any reactions that took place during the process - such as vaporized lubricants.

Considerable care was taken when selecting the conductor material, as well as when designing the arrays of heating elements. A special temperature/atmosphere program was also developed. This program cleans the heating elements before every anneal.

**During development, were there any collaborations with research institutions, universities or companies?**

All development was by EBNER, from the initial small-scale trials all the way up to the 1:1 scale prototype in the EBNER TECHCenter.

However, an innovative pilot customer could be found for long-term testing in an industrial environment.

**Has there been an initial reaction from customers to the new GREENBAF<sup>x</sup>®, and if so, what has it been like?**

Since this development was announced, there have been numerous discussions with customers. Customer feedback has been extremely positive, and we are certain that the new development addresses critical issues.

**What arguments will be decisive in convincing customers to switch to a GREENBAF<sup>x</sup>®?**

The most significant arguments will include the elimination of carbon and NO<sub>x</sub> emissions, the extremely high energy efficiency, the significant energy savings provided by the heat exchange system and the simplification of operations provided by the process bell. Of course, there are many other advantages.

These features will both assist our customers in achieving their decarbonization goals and increase their competitiveness by reducing their operating costs.

**What contributions can the steel industry make to protect the climate, and what role does EBNER play in these efforts?**

The steel industry can make a significant contribution to climate protection. The most leverage can be found in the processes used for steel making, where major investment drives have already begun. However, additional steps are seeing the decarbonization of many “downstream” processes - and EBNER is developing the heat treatment solutions that are needed. One of these is GREENBAF<sup>x</sup>®, but others include carbon-neutral heating solutions like special electric heating systems for high-performance applications, hydrogen burner technology, energy exchanging systems and more.



## EBNER – global leader in Aluminum plate heat treatment

Innovation, precision and decades of experience have made EBNER the world's technology leader in the heat treatment of aluminum plates for the aerospace industry.



**MARKUS GANGL**

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The requirements placed on modern aircraft components are constantly increasing: maximum load capacity, highest material quality and absolute process reliability are essential criteria that manufacturers and suppliers must meet. Aluminum plates that will be used in safety-related parts are subject to strict regulations, such as the international AMS2750 standards. For furnace manufacturers, this presents a complex set of challenges - challenges that EBNER has been successfully tackling for decades. Last year alone, EBNER sold three new facilities in this technology class - clear evidence of the industry's confidence in the performance and reliability of these systems.

### 35 YEARS AS THE TECHNOLOGY LEADER

Over thirty years ago, the first EBNER roller-hearth furnace for the heat treatment of aluminum plates went into operation. Even then, the quality requirements placed by the aerospace industry were fulfilled. However, standing still is not an option for EBNER.

Through close cooperation between the R&D team and the Engineering Department, the technology undergoes constant development geared towards the increasing demands of the customers.

Our focus has been on two central factors affecting product quality:

- highest degree of temperature uniformity in the furnace
- precise, fast and uniform cooling in the water quench

These two process steps play a particular role in shaping the metallurgical properties of the finished plate and determining its subsequent suitability for use in aviation.

### PRECISE TEMPERATURE CONTROL AT THE HIGHEST LEVEL

To achieve temperature accuracies better than  $\pm 2^\circ\text{C}$ , each furnace zone is divided into sections that can be individually controlled. This high level of granularity allows the temperature profile to be adapted precisely to the plate geometry.

In addition, EBNER implements an extremely accurate process cooling system that compensates for excess energy in the process and prevents even minimal spikes

in temperature. Working with the principles of the proven HICON® high convection system, extremely efficient heat transfer is achieved.

Large, high-pressure impellers, powered by frequency-controlled motors, ensure that the furnace atmosphere has a significantly high circulation rate and a superior coefficient of heat transfer.

### THE QUENCH - THE HEART OF THE SOLUTION HEAT TREATMENT PROCESS

After the charge has reached solution temperature, the most critical step in heat treatment begins: quenching.

An EBNER quench is divided into three zones:

- **HIGH-PRESSURE QUENCH**  
Critical for the establishment of metallurgical properties
- **LOW-PRESSURE QUENCH**  
Inhibits reheating caused by residual energy
- **DRYER**  
Removes any remaining water from the surface of the plate

A particularly innovative feature is the height-adjustable high-pressure quench, which offers maximum flexibility for a wide range of plate thicknesses. Symmetrical sprays of water from above and below ensure uniform cooling throughout the entire thickness of a plate. The special arrangement of the high-pressure nozzles also ensures that the cooling rate remains linear across the width of the plate - a key advantage for homogeneous metallurgical characteristics.

Due to the high water pressure, the film of water on the plate surface is constantly broken up. In contrast to conventional quenching systems, this approach prevents creation of the *Leidenfrost* (vapor film) effect and fresh cold water can be continuously applied. This results in maximal uniform physical properties, an aspect that is clearly demonstrated by conductivity testing.

## NEXT-GENERATION ENERGY EFFICIENCY

**EBNER** does not only set benchmarks for quality, but also in energy efficiency. For example, optional temperature measurement systems can be integrated into a charging roller table to calculate the thermal energy present in hot plates arriving straight from the hot rolling process. This energy calculation then flows directly into the calculations for the furnace recipe. High entry temperatures shorten the heating-up phase, reducing overall energy consumption - a clear economic and environmental benefit.

## SOFTWARE MODULES THAT REVOLUTIONIZE TESTING PROCESSES

With its **VISUALFURNACES® SURVEYperfect** software module, **EBNER** has fundamentally simplified and optimized how the heat treatment industry takes safety-related and quality assurance measurements. Compliance with the AMS2750 and CQI-9 standards is not only assured, but requirements are fulfilled more efficiently than ever.

The module provides a menu-based approach to required Instrumentation Tests (IT), System Accuracy Tests (SAT) and Temperature Uniformity Surveys (TUS). Fully integrated into the **VISUALFURNACES®** Process Control System (PCS), the module allows all documents, measuring points, test instruments and results to be clearly organized and centrally managed. This ensures transparency, increasing traceability for both the user and quality assurance teams.

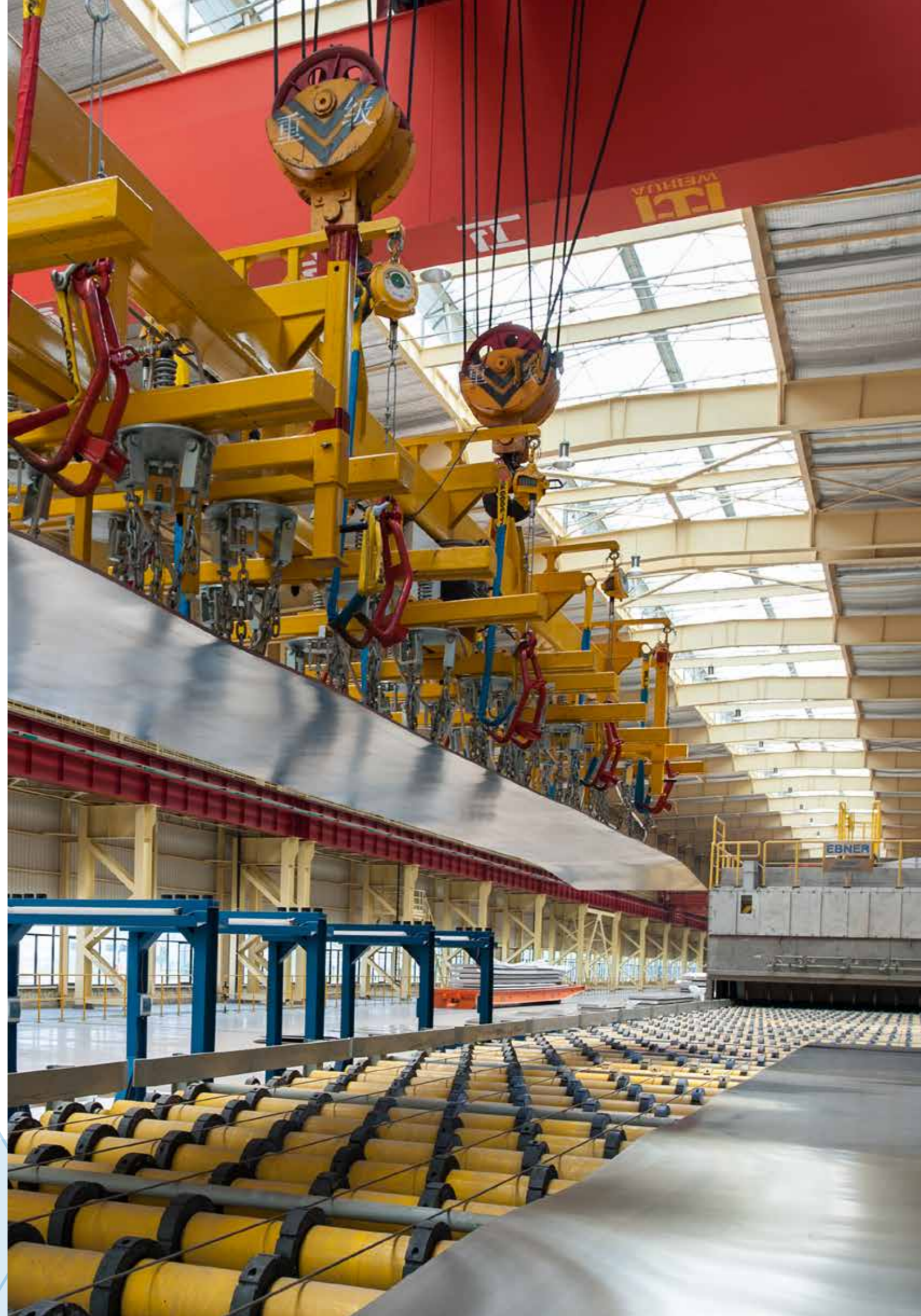
Along with the automated recording of data, the system compiles test reports that comply with the standards used in safety-critical sectors such as the aerospace or automotive industries. To ensure operational safety is at a maximum, **SURVEYperfect** also includes automatic reminder functions - informing operators of upcoming tests and when thermocouples and measuring devices require calibration. This ensures that no safety-critical measures are overlooked.

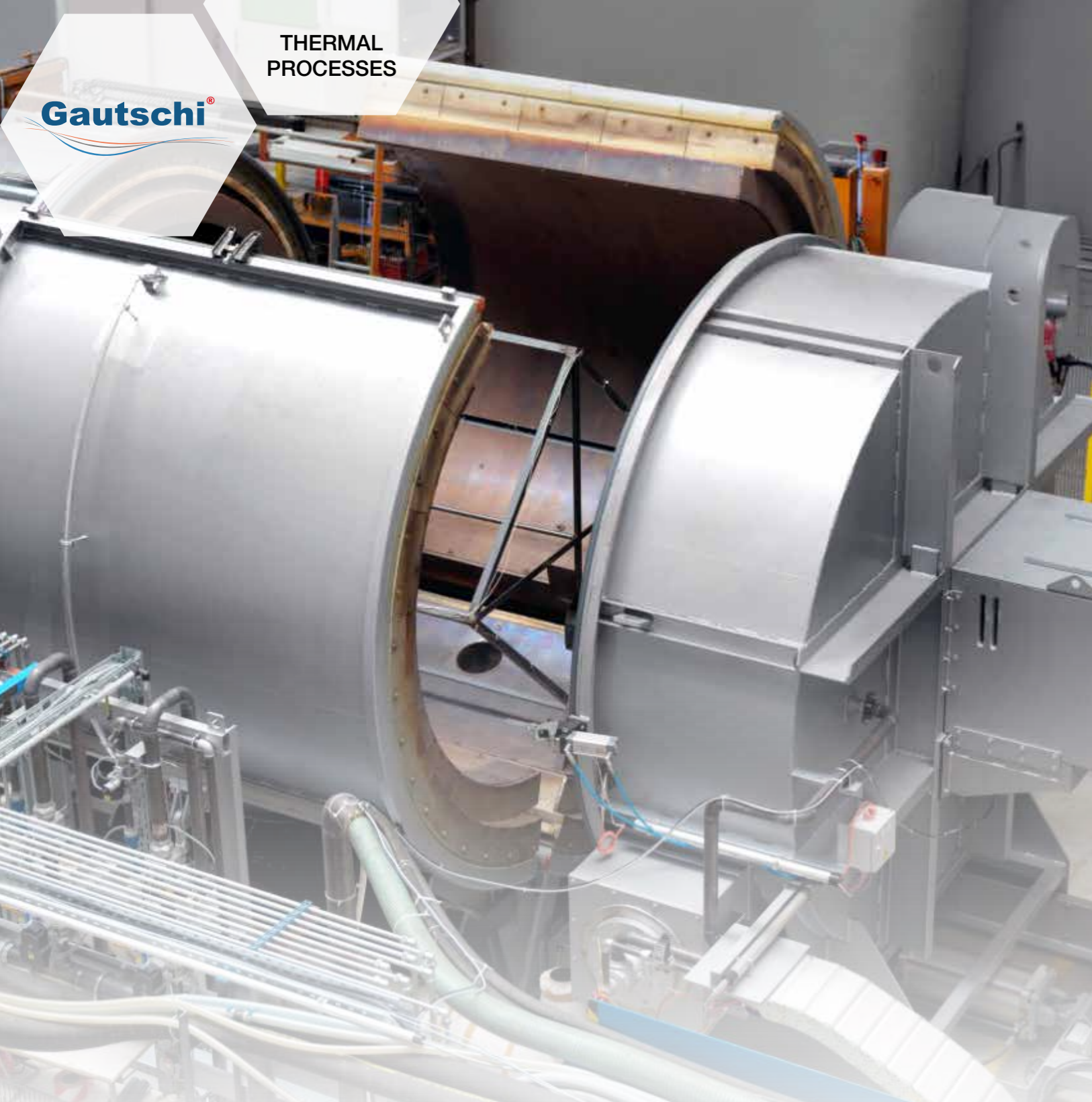
## A TECHNOLOGICAL BENCHMARK - AND FAR FROM DONE

**EBNER** roller-hearth furnaces are the technological benchmark for heat treatment of aluminum plate. Continuous development over the course of numerous projects has ensured that this type of facility has been constantly improved. Our teams from the R&D and Engineering Departments are currently working intensively on new designs, particularly ones intended to revolutionize heat treatment of thin plate and sheet.

**EBNER** is sticking to the path that has distinguished us for decades:

**being both a global leader in innovation and in the heat treatment of aluminum plates for demanding applications - particularly aerospace.**





# Compact Coil Furnace (CCF)

Combining state-of-the-art technology with high efficiency.



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To improve the economic and ecological performance of industrial heat treatment processes, there is an increasing focus on energy optimized plant concepts. The Compact Coil Furnace (CCF) combines modern technology with high efficiency and sets new standards in the heat treatment of individual coils.

## FURNACE DESIGN AND PLANT LAYOUT

The Compact Coil Furnace (CCF) consists of a cylindrical central section and two detachable end sections located at the sides of the unit. The central section serves as the actual furnace chamber and accommodates the coil during heat treatment. It is equipped with two upward opening door wings to load and unload the coil.

The two end sections contain the recirculation fans, their drive motors, and the complete heating system. Each end section is fitted with individual temperature control, allowing precise control of process temperature and optimal adjustment to varying material requirements. The CCF can be heated either by gas-fired radiant tubes or fully electric. For electric operation, robust and modular stainless steel heating elements are used.

The entire system requires only a small footprint, making it easy to integrate into existing production lines. The control cabinets and the gas train are arranged outside the furnace in a space-saving manner to ensure good accessibility for service and maintenance.

## HEAT TREATMENT IN THE COMPACT COIL FURNACE

To initiate the process, the coil is lowered into the CCF's central section from above. Loading and unloading can be carried out entirely using the customer's existing coil handling system. Either coil grippers or C-hooks can be used without additional modifications to allow for seamless integration of the CCF into existing material flow concepts.

After loading, the two door wings of the central section close, the end sections are pneumatically moved toward the furnace center, and the unit locks automatically. All relevant components are equipped with double thermal and gas tight seals. Depending on the coil material, process requirements, and the desired surface quality, heat treatment in the CCF can be performed either under protective gas or in air.

During the heat treatment process, the furnace atmosphere is heated and continuously circulated between the heating system and the furnace chamber. A specially developed circular nozzle system distributes the hot atmosphere evenly onto the coil's end faces. This optimized flow design ensures highly efficient heat transfer and uniform temperature across the entire cross section of the coil. To shorten overall process times, the CCF can be equipped with a water-cooling circuit that enables accelerated and controlled cooling of the coil after heat treatment.

## EFFICIENT DESIGN FOR COST REDUCTION

The CCF's cylindrical furnace chamber closely conforms to the cylindrical shape of the coil. This geometric adaptation minimizes both the external surface area and the total volume of the furnace. Compared to conventional single coil furnaces, this results in the following economic advantages:

- **SIGNIFICANTLY LOWER HEAT LOSSES:**  
The reduced surface area decreases heat losses during holding operation by up to 75%. This substantially lowers energy consumption, especially during longer holding periods.
- **REDUCED PROTECTIVE GAS CONSUMPTION:**  
The minimized furnace volume lowers protective gas demand by around 55%.
- **ADDITIONAL ENERGY SAVINGS DUE TO LOWER PROTECTIVE GAS CONSUMPTION:**  
Since less protective gas is required, less heating energy is required – providing another direct contribution to reduced operating costs.

If desired, the CCF can be operated as fully electric system. When paired with sustainable electricity, the heat treatment process in the CCF can be carried out with zero CO<sub>2</sub> emissions. This not only reduces operational emissions but also significantly lowers the cost of CO<sub>2</sub> certificates.

The savings depend on the number of heat treatment cycles, the specific temperature profile, and the selected operating mode. In many applications, however, the CCF's efficient design proves to make a significant contribution to reducing overall operating costs.

## CONCLUSION

The Compact Coil Furnace (CCF) offers a future oriented solution for energy-efficient heat treatment of individual coils. Its compact design significantly reduces both energy and protective gas consumption. This results not only in lower resource usage but also substantial cost savings during furnace operation.

Thanks to the flexible heating options – either gas fired or fully electric – the CCF can be optimally adapted to different production requirements. Operations aiming to make heat treatment processes more efficient, reduce operating costs, and improve their CO<sub>2</sub> footprint particularly benefit from the innovative concept.

The CCF is thus ideally suited for operations that require high process flexibility and value modern, energy-optimized technologies. With its innovative design and economic advantages, the Compact Coil Furnace sets new standards in the heat treatment of individual coils.





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The decades of cooperation between **EBNER** and C.D. Waelzholz GmbH & Co. KG represent one of the most successful partnerships in the field of heat treatment technology. Over the years, what began as a classic customer/supplier relationship has developed into a close technological collaboration that serves as a prime example of future-oriented innovation in an industrial context.

The Werk Nord (North Plant) in Hagen, Germany deserves a closer look. In Hagen, Waelzholz's spirit of innovation is particularly easy to see: the company was one of the first to install the then newly-introduced **EBNER HICON/H<sub>2</sub>** bell annealers, a step that laid the foundation for many further modernization and digitalization projects. Today, in the same plant, the latest generations of workbases are in operation: everything from designs equipped with high-performance internal coolers to a brand-new **GREENBAF<sub>x</sub>** workbase with its directly-heated workload space. This equipment is among the most technologically advanced solutions currently available to the industry.

#### A NEW DEFINITION OF ENERGY EFFICIENCY: ECOMODE GOES LIVE AT THE HAGEN WORKS

An additional milestone on the shared journey was the **ECOMODE** software module, which **EBNER** developed in close cooperation with Waelzholz. The system is based on a mathematical model, which intelligently reduces energy consumption throughout the entire heat treatment cycle - without sacrificing product quality or the reliability of the process.

However, to be able to use this technology in daily operations, it was necessary to upgrade to the latest generation of the **EBNER** control system. The update not only established the technical prerequisites for implementation of the module, but paved the way for Waelzholz to move forward towards digitally-networked and future-proof production processes.

Particularly gratifying was the fact that the project was supported by the award of an environmental subsidy. While this provided financial support, it was also clear confirmation of the relevance of the project to society at large - energy efficiency and the conservation of resources are influential aspects of modern industrial policy.

#### LOOKING TO THE FUTURE

Installation of the **ECOMODE** module marked yet another high point in a partnership that has been based

on trust, an investigative approach to technology and a mutual drive to make industrial processes more efficient and more sustainable. For both **EBNER** and Waelzholz, the project represents more than just a technical upgrade: it is an affirmation of both a responsible approach to manufacturing and technological progress.

The many years of collaboration are an impressive indication of how teamwork and continuous innovation go hand in hand. They are also yet another demonstration of how the future of industrial heat treatment is created where tradition and a pioneering spirit meet.

## EBNER®

... offers tailor-made modernization solutions that integrate energy-saving technologies with automated systems, ensuring that your facility remains competitive and fit for the future.

Digital service support, remote diagnosis and customized maintenance programs enable your team to achieve and maintain peak performance with flexible training programs and expert guidance.

To upgrade your facilities to the latest standards, please feel free to contact us at any time!

#### WE CAN OFFER YOU A WIDE RANGE OF MODERNIZATION SOLUTIONS, INCLUDING

- Control system and software upgrades
- Products and services to reduce carbon footprints
- Modernization projects to reduce energy consumption - savings of up to 30 % in operating costs can be achieved
- Renovation and repair of insulation
- Extension of facility service life
- Storage and recommissioning of heat treatment systems
- Automation and digitalization

# Partnership and innovation

EBNER and Waelzholz set new standards  
with **ECOMODE**



www.ebner.cc



## Global Engineering in practice

US-site expands its capacity with  
a new HPI horizontal casting line



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In today's industrial landscape, success depends not only on technical expertise but also on effective intercultural collaboration. This current project between HPI and a U.S. customer demonstrates how international teamwork can turn ambitious ideas into reality.

Experts from Austria, the United States, and India worked together seamlessly, combining their strengths to achieve this success. The project was driven on one hand by technical know-how and structured processes, and on the other by a pragmatic approach paired with flexible and creative problem-solving.

The objective of the project was a complete production line that begins with charging aluminum scrap into the melting furnaces and ends with finished forged components for the automotive industry. HPI's contribution consisted of supplying the entire casthouse, which produces the finished, inspected, and cut to length billets required for the forging presses.

The customer has now placed the HPI-supplied casthouse for forging billets into regular operation, representing a key milestone for our client.

### INTEGRATED ALUMINUM PRODUCTION: FROM SCRAP TO FORGED AUTOMOTIVE PARTS

From the customer's perspective, the key challenge was to integrate the entire production process from the delivery of scrap metal through the manufacture of short billets to the finished forged automotive part at a single location.

By combining a casting line with a directly connected forging line, the customer is able to carry out all the process steps required to produce aluminum forged parts entirely "in-house". This design and arrangement of the process steps allow for consistent production output without the casting process having to be interrupted due to minor irregularities. This is achieved in particular through a generous layout, which provides sufficient buffer capacity for continuous operation.

This not only creates a seamless process chain but also ensures a high level of supply reliability. This is the key advantage for efficiently supplying the American automotive market.

Additionally, the spacious layout also provides operators with a clear overview to monitor the processes.

### CLOSED VALUE ADDED CYCLE

Another significant feature of the plant is its closed value-added cycle: All aluminium scrap generated by the process, including slugs and chips, is fed back into the internal production cycle. This increases the efficiency of re-source use, while also contributing to the sustainability of the operation.

### MELT MANAGEMENT IN HORIZONTAL CONTINUOUS CASTING

For the first time, HPI was able to implement its decades of experience in horizontal continuous casting within a complete integrated solution. To meet the requirements of horizontal continuous casting, which typically involves lower flow rates of around 3.5 to 5.0 t/h melt, all launder components from the furnace spout onward, including the degasser, rod feeder, and the filter box itself, were newly developed. This minimized heat losses that would otherwise require overheating the melt in the furnace, which negatively affects metal quality and energy consumption.

The launders consist of a steel shell, microporous insulation, and durable fused silica refractory. All launder elements are additionally equipped with electrically heated lids. Just before the tundish, a T shaped launder segment is used, which enables remote and therefore particularly safe tundish emptying. When necessary, immersion heaters allow targeted temperature adjustments in this area. The so-called "casting start shutter" in this T-piece allows for rapid filling and emptying of the tundish, which is particularly important given the small casting diameters in order to ensure a reliable start.

The highlight of the casting system is the HPI ForgeMaster® mould system, which enables uninterrupted casting sequences of more than 30 hours (e.g. diameter 118 mm, alloy EN AW 6082).



ForgeMaster®

## TRACEABILITY, QUALITY AND EFFICIENCY

The facility also sets new benchmarks in quality assurance. Each billet is individually marked and can be traced throughout the entire process, from the first casting step to the final, tested product linked to its process and quality data. Integrated ultrasound testing, combined with state-of-the-art surface inspection methods, allow the quality of each individual aluminum billet to be accurately assessed. If local deviations are detected, the saw only removes the defective area. This ensures that yields are maximized and prevents problems during downstream processing.

The approach reduces manual testing, improves the reproducibility of results and minimizes human error. In turn, this results in consistently high quality, outstanding reliability and efficient processing sequences.

## ONE SHARED VISION, ONE STORY OF SUCCESS

The American plant is an example of how international technical collaboration can translate complex ideas into efficient, practical solutions. By integrating both a casting line and a forging line into a single workshop, an optimized and powerful production chain was created, one that is specifically tailored to the needs of the American automotive industry. Both companies are looking forward to future collaborative projects that will both create added value and advance meaningful innovations.

**Explore our product portfolio and technologies, and keep current with the latest updates from HPI!**



[www.hpi.at](http://www.hpi.at)



# CRC - Casthouse (R)Evolution Center

## The competence center for aluminum casting and special alloys

The Casthouse (R)Evolution Center was founded in 2020 and is a fully operational industrial foundry. It brings together innovation, research, and practical application—with the goal of advancing state-of-the-art casting technologies and meeting individual customer requirements.

Equipped with a horizontal casting plant from HPI and a vertical casting machine from Gautschi, the CRC serves as a hands-on center for:

- Customer demonstrations
- Casting process and mold optimization
- Training and education for equipment operators
- Small-series and special production

One of the outstanding features of the CRC is its tremendous flexibility: toll casts of a wide variety of aluminum alloys and formats can be carried out on short notice, while small batch sizes and short production runs can be offered at attractive prices

### Do you have a need for a

- Small production run
- Special alloy or
- A new development?



[www.c-r-c.info](http://www.c-r-c.info)



## We are the right manufacturing partner for you!



THERMAL PROCESSES

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# Leveling up the production of stainless steel

Cleveland-Cliffs commissions a new bright annealing line for stainless steel at their Coshocton (USA) plant



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Last year, Cleveland-Cliffs started up a new **EBNER** bright annealing line for stainless steel at its Coshocton works in Ohio, USA. Opening ceremonies took place in the presence of CEO Lourenço Gonçalves, along with local politicians and employee representatives.

As the supplier, **EBNER** Furnaces is proud to be a part of this landmark achievement - one that strengthens local manufacturing and allows Cleveland-Cliffs to produce high-quality surface finishes for demanding applications.

### INVESTING IN A FIRST-CLASS FACILITY

The high-performance **EBNER** facility is the centerpiece of a 150-million-dollar investment, supplying stainless steel strip with a mirror-bright surface finish that is tailor-made to meet the highest quality standards, fulfill the strictest surface finish requirements and satisfy the most challenging customer requirements. The facility is designed for maximum reproducibility, durability during operation and long-term performance. It fulfills the most stringent requirements of the automotive and aerospace industries, where consistent surface properties, stable processes and reliable throughput are critical.

### IN FOCUS: THE 100% HYDROGEN ATMOSPHERE

One of the technical highlights of the facility is that heat treatment is carried out in 100% hydrogen atmosphere, eliminating the need for post-treatment processing in a pickling facility. Thanks to the integrated hydrogen recycling facility, highest surface quality and ecological sustainability result in efficient operations.

### A STRATEGIC MILESTONE FOR THE PLANT

The commissioning of the facility was a clear statement of commitment to the community of Coshocton and the plant employees. The new facility represents a significant milestone for the plant, and underlines the excellence of the collaboration with the engineering, maintenance, safety and manufacturing teams in Coshocton.

Stainless steel products manufactured at the plant will see use in a wide variety of applications, whether as automotive components, household appliances, sinks, pipes, knife blades, aerospace components, surgical instruments or furnace components.

### PROJECT HIGHLIGHTS

The new facility is distinguished by:

- A dedicated investment framework and clear strategic goals
- A focus on premium products aimed at demanding industrial customers
- A processing concept based around heat treatment in straight hydrogen atmosphere and complemented by a hydrogen recycling system
- A visible commitment to the development of operating personnel and regional manufacturing

As one of Cleveland-Cliffs' partners, **EBNER** is proud to have supported this technological step forward in stainless steel manufacturing.





THERMAL PROCESSES

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# Precision movement

EBNER's new roller-hearth furnace raises production at Acciaierie Valbruna to a new level



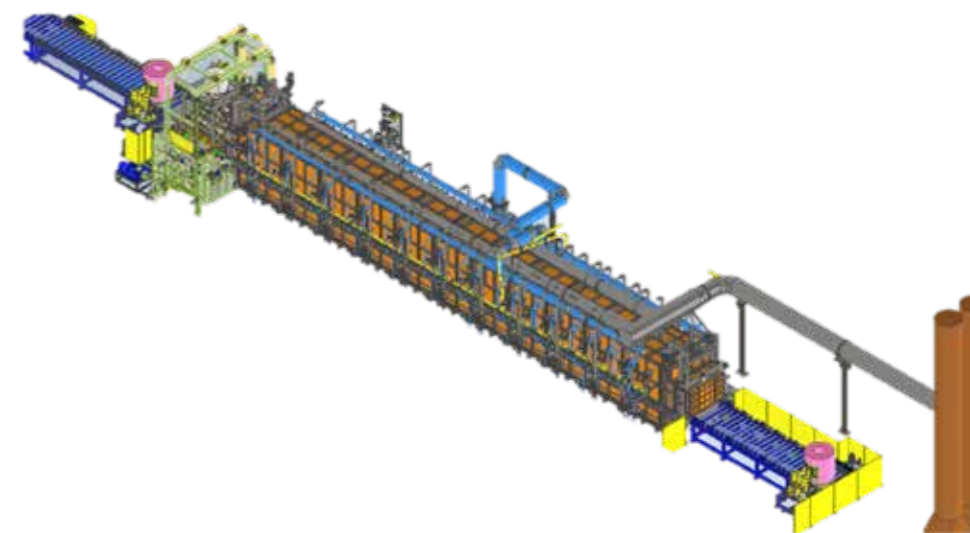
**FABRIZIO MILANOLO**  
**EBNER Thermal Solutions S.r.l.**  
**Managing Director**  
*sales@ebner.cc*

Our advanced "Combi Concept" technology provides first-class heat treatment for stainless steel and superalloys, fulfilling the strict requirements of the aerospace and automotive industries.

A new roller-hearth furnace for Acciaierie Valbruna's works in Vicenza, Italy demonstrates the excellent performance that this technology can bring. The facility is designed to solution heat treat long products manufactured out of stainless steel or superalloys, and is capable of fulfilling the stringent requirements placed by customers from the automotive or aerospace sectors.

The market for premium steels has been increasingly shaped by the need to meet extremely high quality requirements from end users. Heat treatment technologies play a decisive role in achieving this, as they directly influence the metallurgical and mechanical properties of the final product.

Today, advances in both heating and quenching technologies have made it possible to carry out a wide variety of heat treatment processes and still meet extremely strict specifications. Consistent with these market trends, EBNER Thermal Solutions has successfully commissioned a new roller-hearth furnace to heat treat stainless steel and nickel-based alloy long products (bars and rod coils) at Acciaierie Valbruna's works in Vicenza, Italy.



Facility layout

## THE EBNER "COMBI CONCEPT"

The furnace is based on EBNER's "Combined Concept", which enables the heat treatment of bars and rod coils in a single facility and ensures that both types of product achieves the same quality. To maximize the flexibility of the process, the cooling section was designed to allow a number of options: an

extremely intensive quenching step can be carried out using a water tank for rod coils or a water spray system for bars, while slower cooling can also be carried out using blowers. Both systems are integrated into the same processing line.



Charging end



Decharging end



Quenching vessel for coils



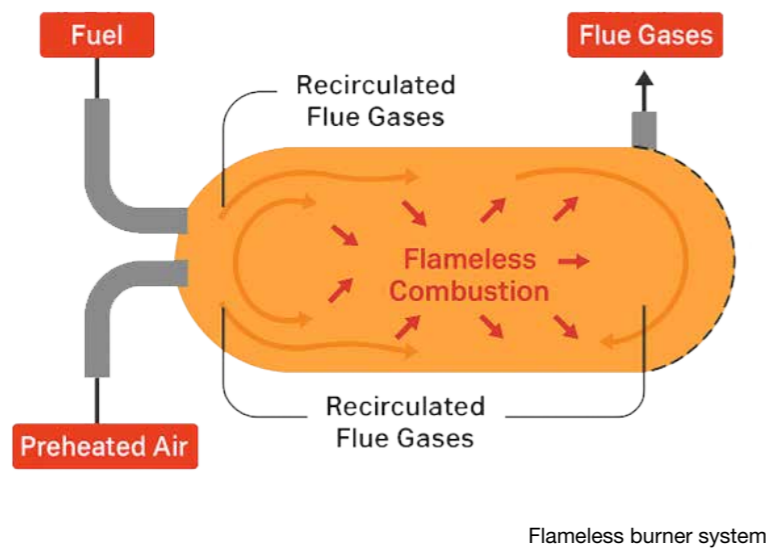
Spraying system for wire rods

## INNOVATIVE COMBUSTION: EFFICIENCY AND UNIFORMITY

One of the key technological features used to meet the contracted level of performance - which is in full compliance with the AMS 2750 standard for aerospace products and the CQI-9 standard for automotive products - was the installation of the latest generation of flameless burners.

This technology ensures optimal temperature distribution throughout the entire furnace chamber. Temperature uniformity is improved by up to 30 % in comparison

to standard burner systems, and in the material temperature scatters below  $\pm 5^\circ\text{C}$  are achieved during the soaking phase. Flameless combustion does not only improve performance - it also offers significant environmental and economic advantages. These include a NOx reduction of up to 50 % at 1100 °C and energy savings of over 20 %.



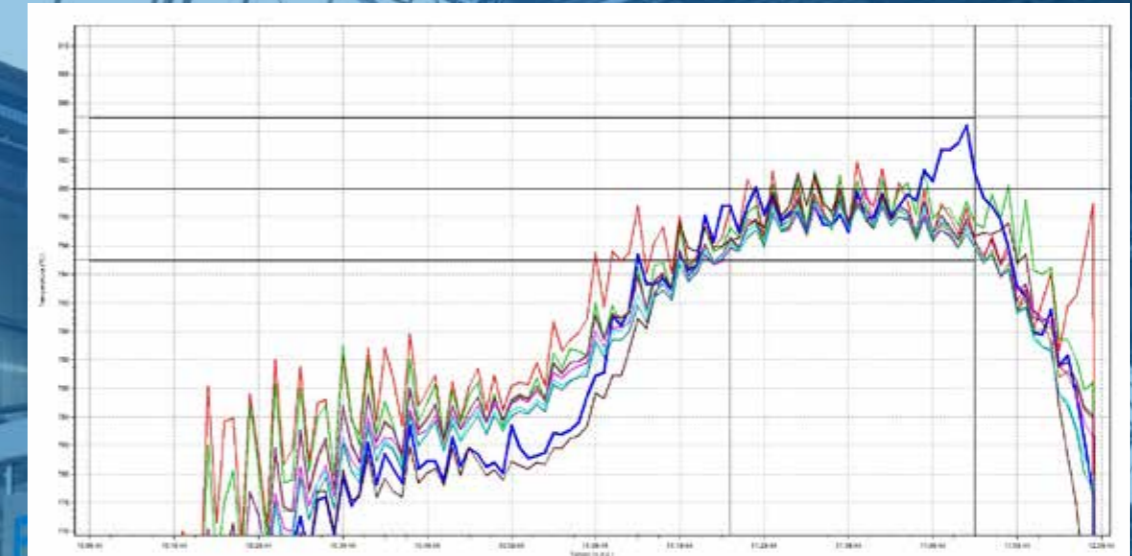
## PERFORMANCE DATA AND TECHNICAL SPECIFICATIONS

- Heat treatment of bars and rod coils (reference weight: 1400 kg/m)
- Furnace temperatures from 800 to 1150 °C
- Water tank for rod coils, water spray system for bars; air cooling blower system
- Annual throughput: 40,000 metric tons
- Certified accuracy: AMS 2750H class 2 successfully tested at 800 °C, 1060 °C and 1150 °C
- Latest generation of **EBNER** Process Control System (PCS; HMI and Level 2)

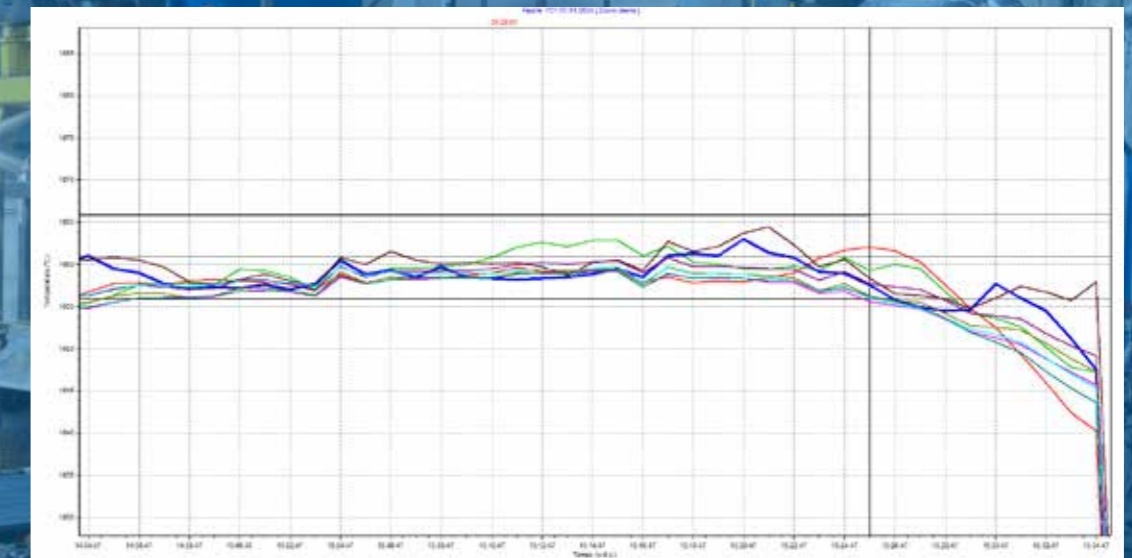
## “DRIVING GREEN TECHNOLOGIES” FOR MODERN INDUSTRY

Guided by our principles of quality, innovation, productivity and flexibility, and inspired by **EBNER**'s commitment to the principle of *Driving Green Technologies*, we have developed our new Combi Concept furnace to fulfill the most demanding market standards. It ensures

that processes are highly reproducible, with minimal variation in metallurgical and mechanical properties. It delivers performance that fully meets the expectations of advanced industrial sectors.



TUS at 800 °C (AMS 2750H class 2, dwell time of 30 minutes in the soaking zones)



TUS at 1,060 °C (AMS 2750H class 2, dwell time of 30 minutes in the soaking zones)



TUS at 1,150 °C (AMS 2750H class 2, dwell time of 30 minutes in the soaking zones)



www.eqms.mx



# Excellent Quality Manufacturing Services

State-of-the-art production facility successfully launched in Saltillo/Ramos Arizpe, Mexico.



**AGUSTIN MARTINEZ**  
EQMS  
Sales Manager  
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On an area of approximately 50,000 m<sup>2</sup> in Saltillo/Ramos Arizpe, a cutting-edge 6,000 m<sup>2</sup> production hall was erected during the first phase of construction. Originally conceived to support the **EBNER GROUP** with locally manufactured “**EBNER Quality**” in the rapidly growing Mexican market, the vision for **EQMS** extends far beyond this. The clear objective: to offer this profound expertise—Made by **EBNER**—across various industries and to utilize more than 50% of the capacity for external customers in the long term

Founded in 2022, **EQMS** initially began serving the Mexican market from a leased facility. Over the past few years, **EQMS** has significantly expanded its operational capabilities and broadened its portfolio to include complex metal construction and manufacturing projects. With proven experience in processing heavy plate (thick plate), industrial ventilation and extraction systems, structural components, and precision assemblies,

**EQMS** has demonstrated its ability to reliably execute demanding international projects with high technical competence and competitive lead times.

It quickly became clear that an independent, self-contained location was essential to keep pace with the surging Mexican market. The new Saltillo/Ramos Arizpe site now features state-of-the-art systems for cutting, bending, and rolling heavy plates. Due to this great success, we are already in the next stage of expansion, adding a “Superbay” to the production hall with a crane capacity of up to 60 tons and a crane height of up to 14 meters.

The strategic direction of **EQMS** for 2026 is clearly defined: to expand market presence, further strengthen quality systems, and position the company in high-value industrial sectors throughout North and South America. As a specialist in contract manufacturing, **EQMS** serves



**EQMS** - the next stage of expansion

a wide range of industries with unparalleled commitment—from initial contact to final delivery.

## A STRATEGY OF FOCUSED EXPANSION

Following the successful launch of the new production facility, **EQMS** is now focusing on growth. For 2026, a structured expansion into key industrial regions is planned:

- Southern Mexico
- South America
- USA

These markets are regions of dynamic growth, particularly in industries in which the manufacturing expertise offered by **EQMS** is in high demand. This expertise includes:

- Industrial furnace technology
- Steel and aluminum processing
- Energy and power generation
- Mechanical engineering for heavy industry OEMs
- Infrastructure, including transport and material handling systems

## STRENGTHENING PARTNERSHIPS WITH OEMS

A second strategic priority for 2026 is for the company to expand its collaboration with customers that are OEMs. **EQMS** intends to intensify its collaboration with selected OEMs, integrating itself more deeply into their supply chains, expanding long-term framework agreements and supporting customer growth by offering scalable manufacturing solutions.

## QUALITY ADVANCEMENT: ISO AND AWS CERTIFICATION

Quality is a central focus of every order placed with **EQMS**. For this reason, **EQMS** will elevate its quality

management system to a new level this year through two central initiatives:

- Introduction and certification according to ISO standards
- AWS (American Welding Society) certification for welding processes

These certifications strengthen process control, documentation, traceability, and compliance with welding requirements for international projects and technically regulated industries. By aligning internal systems with globally recognized standards, **EQMS** underscores its commitment to reliability, repeatability, and continuous improvement.

## CONTINUOUS DEVELOPMENT

In addition to strategic plans, **EQMS** will expand its internal training programs to further strengthen the following employee competencies:

- Welding technology qualifications
- Expertise in quality control and assurance
- Know-how in CNC programming
- Project management skills
- Cross-functional cooperation between the Sales, Engineering and Manufacturing departments

Our goal is to create a culture of continuous learning, in which employees from every department - whether manufacturing, engineering or management - actively contribute to innovation, efficiency and operational excellence. With this approach, **EQMS** intends to ensure that growth remains sustainable, and that the skills of our employees evolve with the increasing complexity of the projects we undertake.

The team benefits from the parent company’s decades of experience and can draw on its profound know-how at any time.

As we focus on continuously developing the **EQMS** team, from manufacturing to management, our customers benefit from maximum efficiency and execution strength.

With a strong foundation for its operations, a state-of-the-art workshop, advanced machinery and a highly qualified team, **EQMS** is ready to take the next step forward in 2026 and become one of the leading high-value partners for metalworking in both North and South America.

# NEWS

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Journal is  
also available  
by email!

## Trade fairs. Conventions. 2026.

APRIL 13 - 17, 2026	<b>WIRE DÜSSELDORF</b>	Düsseldorf	<b>DE</b>	Booth no.	<b>H10 / D42-04</b>
MAY 4 - 6, 2026	<b>AISTECH USA</b>	Pittsburgh	<b>USA</b>	Booth no.	<b>1243</b>
MAY 5 - 7, 2026	<b>WIRE EXPO</b>	Milwaukee	<b>USA</b>	Booth no.	<b>421</b>
MAY 18 - 21, 2026	<b>SEAISS CONFERENCE &amp; EXHIBITION</b>	Singapore	<b>SGP</b>	Booth no.	<b>A14</b>
MAY 19 - 22, 2026	<b>ELMIA MACHINE TOOLS</b>	Jönköping	<b>SWEDEN</b>	Booth no.	<b>B02:44</b>
JUNE 15 - 17, 2026	<b>ALUMINUM ARABIA</b>	Riyadh	<b>SAU</b>	Booth no.	<b>B90</b>
JULY 8 - 10, 2026	<b>ALUMINUM CHINA</b>	Shanghai	<b>CHINA</b>	Booth no.	<b>TBA</b>
SEPT. 9 - 11, 2026	<b>THERMOTEC</b>	Tokyo	<b>JAPAN</b>	Booth no.	<b>TBA</b>
SEPT. 9 - 12, 2026	<b>METEC INDONESIA</b>	Jakarta	<b>IDN</b>	Booth no.	<b>TBA</b>
SEPT. 21 - 24, 2026	<b>WIRE CHINA</b>	Shanghai	<b>CHINA</b>	Booth no.	<b>TBA</b>
OCT. 6 - 8, 2026	<b>ALUMINIUM DÜSSELDORF</b>	Düsseldorf	<b>DE</b>	Booth no.	<b>6H20</b>
NOV. 30 - DEC. 2, 2026	<b>WIRE INDIA</b>	Mumbai	<b>INDIA</b>	Booth no.	<b>TBA</b>
DEC. 3 - 5, 2026	<b>MTM EXPO SHANGHAI</b>	Shanghai	<b>CHINA</b>	Booth no.	<b>TBA</b>

We look forward to seeing you there!



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