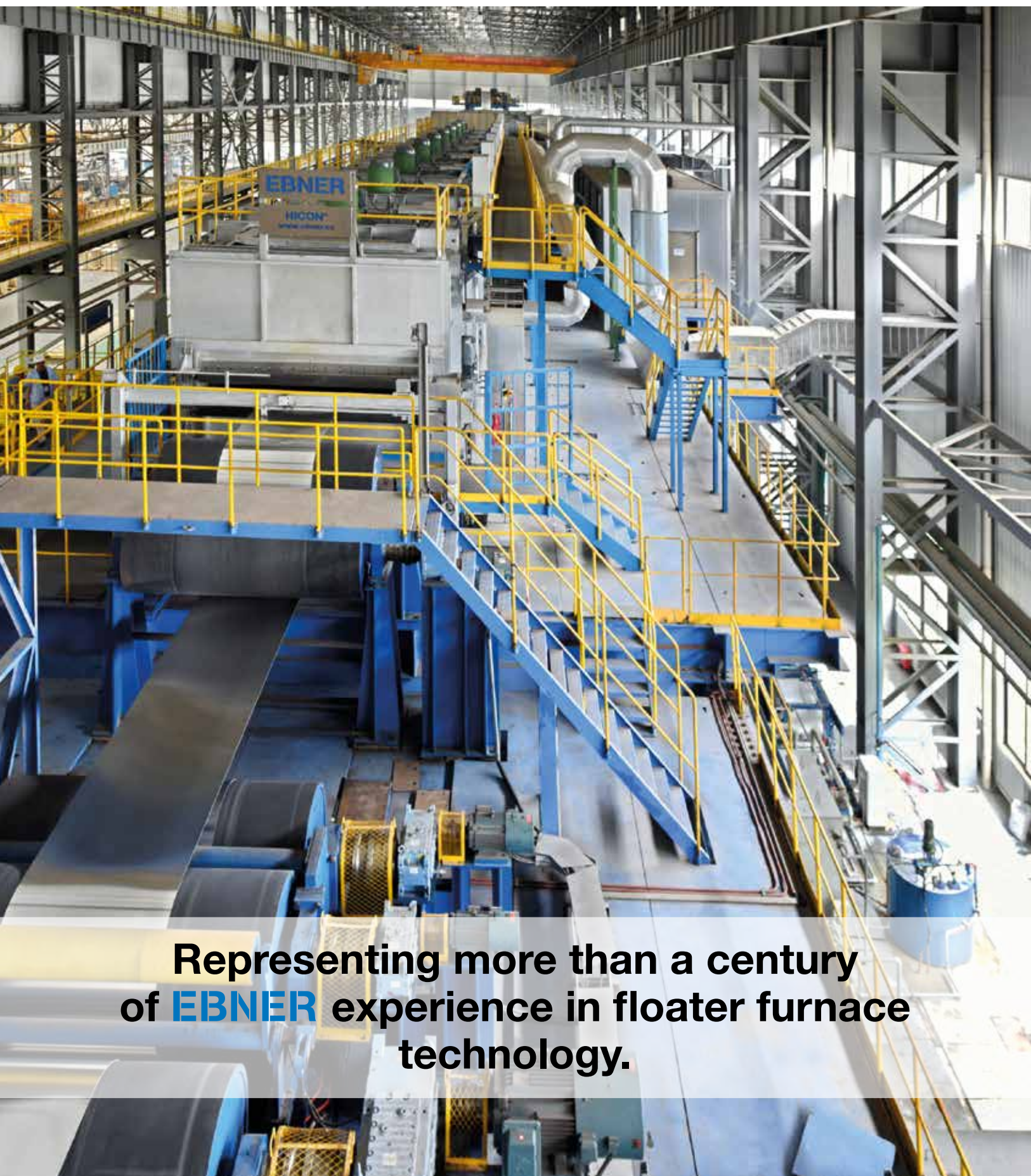


HICON[®]

EBNER Journal for Progress in Industrial Furnace Technology



**Representing more than a century
of **EBNER** experience in floater furnace
technology.**



EBNER

Ladies and Gentlemen,
Esteemed readers of the
HICON® Journal,
Dear friends and colleagues.



By far the most important trade show for plant engineers like us takes place every 4 years in Düsseldorf. The **EBNER** Group will be at Thermprocess with an exhibit representing the whole group of companies from 25 to 29 June 2019.

Our visitors will be given an overview of the entire range of **EBNER**, Gautschi and HPI products. We will be presenting the various technical highlights that we have successfully implemented for customers in recent months, such as our double-muffle concept for vertical bright annealing lines that process stainless steel strip at temperatures of up to 1230 °C and at the highest possible throughput, as well as our strip cleaning facilities.

In the electrical steel strip sector, we will show you our portfolio for grain-oriented and non grain-oriented grades. For the aluminum industry, you will be able to gain insight into our Smartquench technology for maximum versatility in cooling across the full spectrum of cooling gradients, up to the spiking furnace in which precision reheating gives the material additional strength. We will also introduce our E³ concepts (**EBNER** Energy Efficiency) for different types of furnace facilities.

HPI will show their homogenizing facility for billets and Gautschi will present the Single Coil Furnace with all its advantages. In addition, Gautschi and HPI are also represented at another exhibit at the GIFA 2019 trade show, where they will demonstrate their molten metal competence. Our two subsidiaries will present their latest mold technology as well as their new R&D center in Ranshofen for molten metals. Gautschi is going to exhibit their very latest

development in the form of a full-scale mold for casting aluminum slabs.

As in previous years, **EBNER** will be there with a small, cost-efficient, yet very informative trade show exhibit. In doing so we remain true to our motto that our trade show presence is important for customer contact and customer care, while larger budgets are better invested in R&D projects to generate more benefits for our customers there.

I am looking forward to welcoming you in person to our trade show exhibit in June and wish you a successful time until then.

Yours, Robert Ebner
CEO

P.S.: There is a key figure that we are very proud of that I just have to tell you about.

Since we started up our first aluminum floaters furnace facility in March 1999 at AMAG, today we have 24 lines in operation and more being ordered.

Together, all these lines have been producing aluminum strip for the automotive and aerospace industries for more than 1224 months. That translates into more than 102 years of **EBNER** production experience on CASH lines (Continuous Annealing Solution Heat treatment) - a figure that we are extremely proud of!

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Relocating two existing facilities

Thanks to Fisacero, two EBNER facilities from Brazil find a new home in Mexico.



PETER ANDEXLINGER

EBNER news
from Mexico

When a Brazilian customer found that they no longer needed the production capacity to justify two of their EBNER annealer facilities, Fisacero used the opportunity to install the facilities at their new works.

Mexican steel manufacturer Fisacero was founded in northeastern Mexico in 1965, the realization of entrepreneur Modesto Alanis Marroquin's vision. The company was later sold, but the founder's grandson and Fisacero's current CEO, Carlos Alanis, fulfilled his childhood dream when he bought back the company name, built a new plant, and built up a business around it.

TWO FACILITIES WAITING IN BRAZIL

Meanwhile, on the other side of the equator, a Brazilian manufacturer of steel strip had ordered two expansion phases for an EBNER HICON/H₂® bell annealer facility in 2006. The second expansion phase was never installed, and was still in storage - still in pristine condition. The equipment for the two phases included 8 workbases, 4 heating bells and 4 cooling bells. Given its reputation for the highest-quality materials and the narrowest possible tolerances, Fisacero naturally wanted to install only the highest quality equipment. To outfit its new plant with heat treatment facilities, the two EBNER bell annealer facilities were purchased. They were then shipped to Mexico and installed with the assistance of EBNER technicians.

FOUR EBNER LOCATIONS SHOW THEIR FLEXIBILITY

One of the facilities was already in operation in Brazil, while the other had not been used for some time. They were to be shipped by sea and some components of course had to be replaced. These new components ensured the safe operation of the facility and the high quality of heat treatment results.

During this installation order, the interplay between the



Overview of the HICON/H₂® bell annealer facilities

different EBNER locations again proved its value to the customer.

EBNER USA technicians began installation until the EBNER HICON/H₂® bell annealer facilities were fully assembled on site. Technicians from EBNER India then came to Mexico to assist Fisacero with commissioning. With consistent EBNER quality worldwide, installation was completed seamlessly and the facilities went into operation. In particular, the efforts of EBNER technicians working on-site were highly praised by the customer.

The "new old" facilities were handed over to the customer in May, 2018. Since it was commissioned, the facility has produced narrow precision steel strip for the manufacture of automotive parts, household appliances and electronic parts.

EBNER REACTS FLEXIBLY TO CUSTOMER REQUESTS

EBNER HICON/H₂® bell annealers ably fill the market niche for special alloys, and special annealing programs can be used to meet extra-special customer needs - one of Fisacero's guiding principles. Thanks to the advanced technology of these EBNER facilities, Fisacero has further strengthened its market position with cutting-edge technology.

www.fisacero.com

Heating bells and cooling bells





ATMOSPHERE perfect

Saving process atmosphere and power.

SAVE UP
TO 20 %
WITH THIS
UPGRADE!



FLORIAN OBERREITER
EBNER technical article

Improving quality and increasing energy efficiency: two goals that lie at the heart of many EBNER innovations. With the new **ATMOSPHEREperfect** software module for bell annealer facilities for steel strip, EBNER is introducing a new product with a very attractive ROI.

Research and development at EBNER has been giving our customers a decisive advantage for over 70 years. Although EBNER HICON/H₂ bell annealers for steel strip have been leading the market for years, we are convinced that they can be improved even further.

For two years now, our Product Development team has been working on ways to reduce the energy consumption and increase the efficiency of EBNER bell annealers. The result is a software solution that, in long-term tests, brought an incredible 20 % reduction in electrical and hydrogen consumption.

IT'S ALL ABOUT HYDROGEN

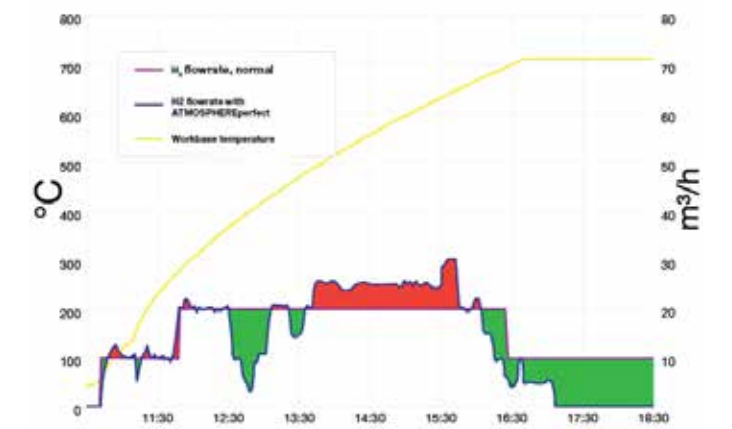
The "secret" of HICON/H₂ bell annealers can already be found in their name. Along with high convection, the hydrogen atmosphere is what makes it possible to provide the shortest annealing times, the shortest cooling times and excellent surface finishes. However, hydrogen is also a significant factor when the overall operating costs of the entire facility are considered.

THE ISSUES

To keep the atmosphere in the workload space as pure as possible and make full use of the advantages of processing in hydrogen, hydrogen is used as a purge gas during heat treatment. Lubricants, which are applied to the surface of the strip during the rolling process, evaporate when the strip is heated up in an EBNER bell annealer. Hydrogen purging transports the products of evaporation (CO, CO₂ and CH₄) out of the workload space. Until now, facility settings for atmosphere purging were based on the experience gathered by EBNER commissioning engineers and our customers, and then refined. Our development team, however, went on a search for new ways to end this guessing game by increasing automation.

THE SOLUTION

By measuring the current draw of the workbase fan motor, conclusions can be drawn regarding the density - and, in consequence, the purity - of the atmosphere in the workload space. With this insight a mathematical model was created, which uses the value for motor current draw to calculate the minimum necessary atmosphere purge flowrate.



Comparison of hydrogen consumption values (green = savings)

PROVEN UNDER OPERATING CONDITIONS

To test the efficacy of this new model, it was installed at one of our customer's workbases. After a two-week test phase showed positive results, the automatic purge flowrate control was integrated into the software. An additional two-week test phase was then held, during which members of the EBNER Product Development team were at the customer's works to supervise the annealing process. After all relevant data was evaluated, minor alterations were made to the new program. The new software module, **ATMOSPHEREperfect**, was then uploaded to EBNER's **VISUALFURNACES®6** Process Control System (PCS) at several workbases for long-term testing.

SAVINGS OF 20 %

When the long-term testing phase had been completed, the results showed that hydrogen was not the only utility for which consumption had been reduced. The power consumption of the workbase fan motor had also decreased by up to 20 % - all without any change to the quality of the strip surface or the material quality of the annealed strip. We would be happy to discuss the possibility of installing **ATMOSPHEREperfect** at your facility. Feel free to contact us!

ATMOSPHEREperfect is a newly-developed add-on for **VISUALFURNACES®6** Process Control Systems. It is designed for use at HICON/H₂ bell annealer facilities operating with 100 % hydrogen atmospheres and frequency-controlled workbase fan motors, and is distinguished by the following capabilities:

- » User-friendly operation with **VISUALFURNACES®6**.
- » Automatic hydrogen purge flowrate control regardless of the lubricant, the coil data or the degree of contamination of the coils.
- » Atmosphere tracks of annealing programs no longer need to be developed or improved.
- » Hydrogen consumption and electrical power for the fan motor reduced by up to 20 %.
- » Software solution.

Tailor-made. Automatic. EBNER.

EBNER supplies a new type of batch-type furnace facility for aluminum coils.



BERNHARD ENNSBRUNNER

EBNER news
from Austria

Investing a billion Euros over 10 years, AMAG has created one of the most modern cold rolling mills in Europe. EBNER, one of AMAG's long-term partners, contributed a new - yet still proven - single-coil furnace design.

For over 80 years, Austria's AMAG Austria Metall AG has been supplying the Austrian, European and global markets with high-quality aluminum products. Whether in an automotive chassis or body, structural components for aircraft, consumer electronics or skis, it is likely that every one of our readers has come into contact with one of AMAG's aluminum products.

For over 70 years, it has also been likely that the materials in these products were processed in an EBNER heat treatment facility. The first mutual project in the late 1940s began a partnership that is still setting the standard for quality today.

LARGE-SCALE INVESTMENT

As one part of their one billion Euro investment program,

AMAG has built a completely new cold rolling mill in Ranshofen, Austria. This step has helped the company become a leading center of industrial expertise in aluminum rolled products.

Production capacity has been doubled, with particular attention paid to both specialty products and issues of sustainability. Automation and digitalization have helped establish the competitiveness of the company in the global market.

CHARGING: DOING IT DIFFERENTLY

After the success of a project in 2016, when EBNER relocated an existing roller-hearth furnace facility for aluminum plates, modernized it and upgraded it with an additional furnace zone, AMAG once again turned to EBNER when they needed to heat treat aluminum coils after cold rolling.

To this end, EBNER supplied 18 single-coil furnaces to their works. The furnaces were installed in rows, allowing a new design of charging machine to operate between them and charge furnaces on both sides.

This charger has space for two coils, meaning that a new coil can be charged as soon as a coil is removed from a furnace. This eliminates additional travel to and from

New design of charger



loading areas to collect or deposit coils. The entire facility is certified for aerospace industry products in accordance with AMS2750, and can operate fully automatically.

To thoroughly test the furnace design and charging procedure, one furnace and the charger were assembled in the **EBNER** R&D lab.

After all parameters were fine-tuned to maximize temperature accuracy and furnace efficiency, the facility was shipped to Ranshofen, installed, and commissioned on schedule.

AUTOMATION INCREASES EFFICIENCY

Alongside the AMS2750 certification, a high degree of automation was an important element in the facility design. The charger, controlled by the **EBNER** PCS, charges and discharges all furnaces fully automatically. It is also used for transport to the storage areas and cooling stands, ensuring that facility capacity is fully utilized.

Each furnace is continuously in operation, and must never wait for charging. Seamless integration into AMAG's coil storage system ensures that coil logistics are also handled automatically.

EBNER supplied the facility complete with turn-key installation, all control systems including a **VISUAL-FURNACES®6** PCS and the new **TREATperfect** software module.

In June 2017, the facility was officially opened together with the new AMAG plant.

EBNER is proud to be a part of the AMAG 2014 and AMAG 2020 investment programs, and be a part of this Austrian success story.

www.amag-al4u.com

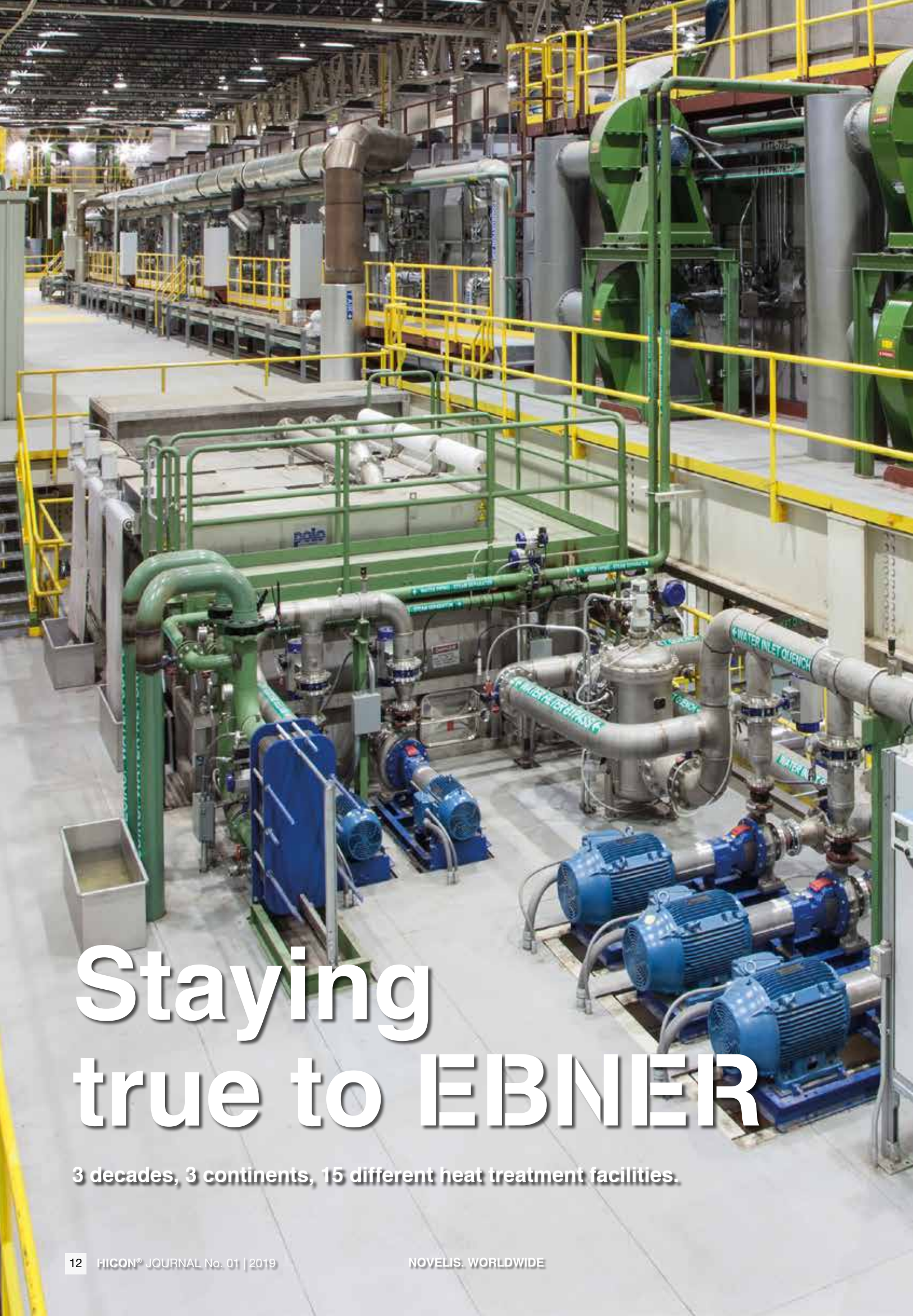
TREATperfect – optimizing processing times for the heat treatment of aluminum

TREATperfect has been developed by **EBNER** and is integrated into the **VISUALFURNACES®6** process control system.

This mathematical model is active during two processing phases. In the first phase, the setpoints required for the material being processed are determined. In the second, the process temperatures during heat treatment are supervised and adjusted if necessary.

Overview of the whole facility with 18 furnaces





Staying true to EBNER

3 decades, 3 continents, 15 different heat treatment facilities.



**CARL-AUGUST
PREIMESBERGER**

EBNER News
worldwide

**Novelis has been placing its trust in the high quality of
EBNER facilities since 1991.**

1991 was the year in which the Soviet Union broke apart, Starbucks opened its first café, the German Bundestag moved back from Bonn to Berlin and the first website went on line. 1991 was also the year in which **EBNER** received its first order from Novelis, then known as Alcan. Since then, this productive relationship has led to numerous pusher furnace facilities and several floaters furnace facilities.

IT ALL BEGAN IN 1991

For **EBNER**, the first contact with Novelis was during a project involving three pusher furnaces in North America. Alcan, as the company was known then, was searching for the ideal partner for the heat treatment of ingots, and found one in **EBNER**.

The facilities were **EBNER**'s first use of jet flow technology in pusher furnaces, an innovation that - as our reference list shows - has impressed not only Novelis. The pusher furnace facilities for Alcan are still among the largest in the world, and are still in operation today!

1997 – 2015

Between 1997 and 2015, Novelis placed orders for five additional pusher furnace facilities for their plants in the USA, Brazil and Korea, as well as pusher furnaces for Europe.

2010

This was the opening round in a run of **HICON®** floaters furnace facilities that have been installed at Novelis. Although at that time **EBNER** had only a few references in the floaters furnace market segment, our furnace and quench designs and the floating and cooling concepts they enabled were convincing.

During the project, the close cooperation between specialists at Novelis and our designers was one of the most positive aspects. Two floaters furnaces were quickly installed and commissioned at Novelis USA. It would seem that the **EBNER** design proved itself, as Novelis promptly placed another order for the same type of furnace - this time for delivery to China.

2014 – THE PRESENT

During this time, Novelis has placed orders for **EBNER HICON®** floaters furnace facilities at more or less regular intervals. These facilities were installed at plants in the USA, Germany and China.

Today, we can look back with pride at this impressive series of orders. However, the number of orders is only one aspect of the relationship: since placing their first order for a floaters furnace in 2010, Novelis has only

Novelis floaters furnace facility in Oswego, USA;
looking from the quench towards the furnace



ordered **EBNER** equipment. No other supplier has been able to convince Novelis that they should turn their backs on **EBNER** technology, service and quality.

The same is true with pusher furnaces. Of the 10 or so Novelis projects that have been started since 1991, **EBNER** has received all but two. These two orders were filled by **EBNER**'s subsidiary, Gautschi.

The tremendous mutual cooperation, extending back over the past 28 years, has been very profitable for both Novelis and **EBNER**. We would like to thank Novelis for the excellent cooperation, and hope that we can continue to support each other during new, challenging projects in the years to come.

www.novelis.com



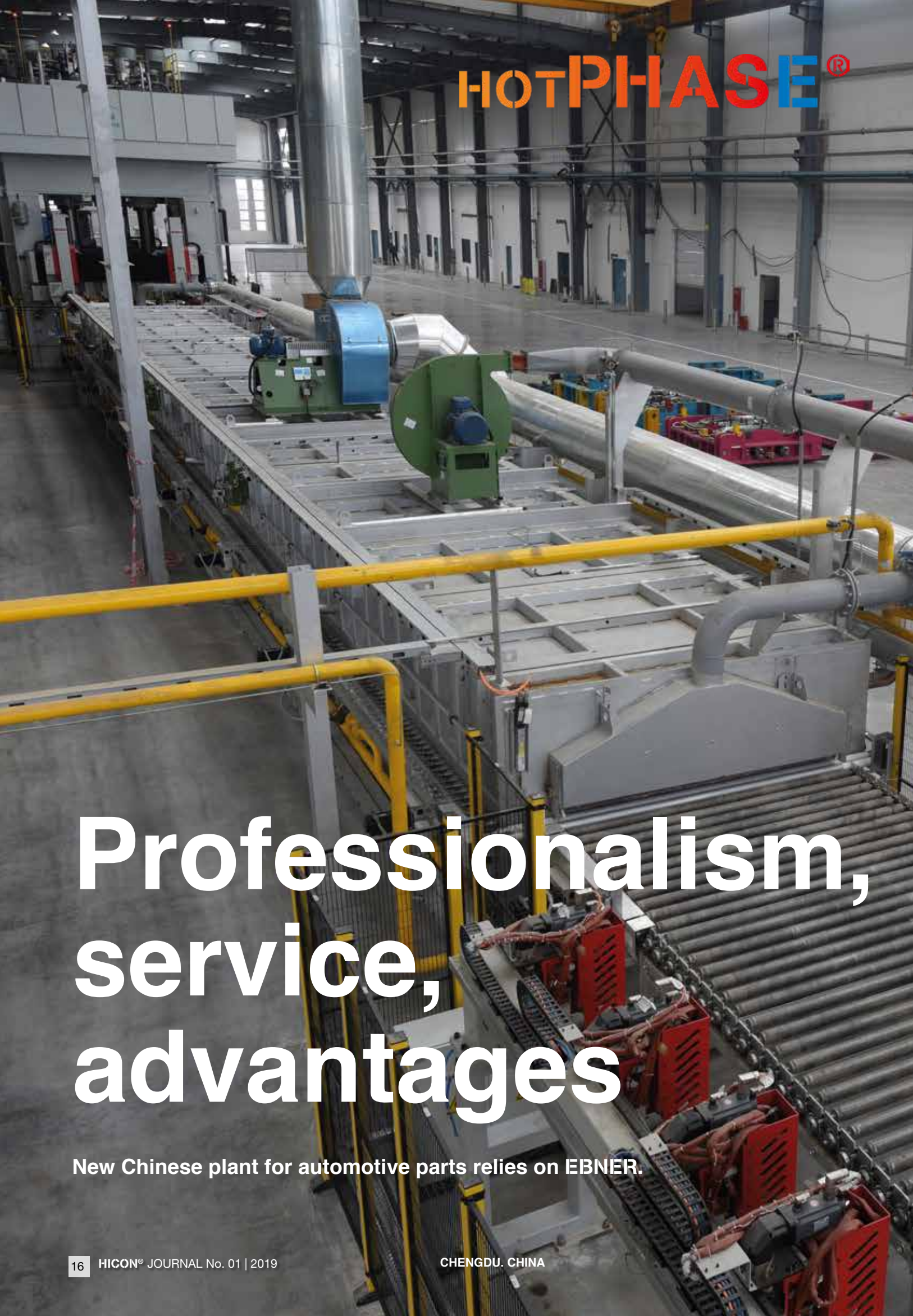
Pusher furnace facility at Novelis Taihan Aluminium in Korea; view of exit end

EBNER HICON® floater furnaces:

The **HICON®** blowers mounted in the furnace roof and floor recirculate air through ducts and specially-designed nozzle boxes arranged in an offset configuration, and direct it towards the strip from above and below. Due to the offset configuration of the nozzles, the strip forms a sine wave shape in the furnace. This gives the strip, particularly thin strip, stability as it moves through the furnace. Thick strip floats through the furnace either flat or in a crossbow shape. The distance between the nozzles can be adjusted to suit strip dimensions. This allows manufacturers to adjust heating-up rates to suit their current product range. The nozzle system delivers a powerful, uniform transfer of thermal energy across the entire width of the strip. Depending on requirements, the intensity of the air stream directed at the strip is regulated using speed-controlled fan motors.

Floater furnace facility at Novelis in China; looking from the quench towards the furnace





HOTPHASE®

Professionalism, service, advantages

New Chinese plant for automotive parts relies on EBNER.



CHEN CARTER
EBNER News
from China

Chengdu Shirun Auto Parts is a new supplier of press-hardened parts based in the city of Chengdu, which is located in southwestern China. Chengdu Shirun chose EBNER to supply precision heat treatment furnace equipment to meet the exacting standards of customers such as VW.

The boom in orders from the Chinese auto parts manufacturing industry continues for EBNER. After our successful projects at Nanjing Starq Y-tec, Chongqing BND Push and Wuhan Superior Die Technology, a fourth Chinese customer has chosen EBNER technology to ensure top-level quality in their press hardened components.

Chengdu Shirun Auto Parts is a new division of the Shanghai Yanlong Industrial Group, specializing in advanced thermoforming stamping technology to produce auto body parts such as pillars, threshold bars, stringers, bumper structures and other parts with high strength and low weight. Customers include FAW-Volkswagen, Volvo and Geely, among many other Chinese auto manufacturers. Many international companies are based in the city of Chengdu, the capital of Sichuan province, making it an important economic hub in western China.

BETTER HEAT TREATMENT FOR BETTER QUALITY

Superior heat treatment just before the stamping process is one of the most important factors in the quality and characteristics of the finished part. For the new manufacturing plant based just outside of Chengdu, EBNER supplied a HOTPHASE® roller-hearth furnace with a throughput of 4.5 t per hour to process steel blanks intended for VW B-pillars.

CUSTOMIZED HEATING SYSTEM

EBNER HOTPHASE® furnaces are available with several different heating systems. Depending on the customer's requirements, budget, and local resources, HOTPHASE® furnaces can be heated by highly-efficient gas-fired radiant tubes, electrical heating systems with or without tubes and elements, or a combination of the two.

The Chengdu Shirun plant has access to a high quality natural gas supply, so a hybrid heating system was chosen - striking a balance between investment costs and running costs.

SOLID REFERENCES MAKE THE DIFFERENCE

Chengdu Shirun first became aware of EBNER technology through their relationship with our customer, Nanjing Starq. EBNER HOTPHASE® furnaces are built using robust rollers and a unique roller bearing design, requiring fewer spare parts than conventional furnaces. Seeing the EBNER HOTPHASE® furnace in operation at Nanjing helped convince Chengdu Shirun of EBNER's design.

A very short delivery time of only 7 months was achieved thanks to the cooperation between all EBNER locations, as well as support by local Chengdu Shirun staff. The facility went into operation in September of 2018. We look forward to completing many more orders together with Chengdu Shirun.

www.ylsh-cn.com

TECHNICAL SPECIFICATIONS

Heated length	30 m
Clear width	1.9 m
Throughput	4.5 t/h

Overall view of EBNER HOTPHASE® roller-hearth furnace





A second masterpiece

EBNER builds 2nd HICON® car bottom furnace for Aleris Rolled Products Germany.



BERNHARD ENNSBRUNNER
EBNER News
from Germany

In 2002, the **HICON®** Journal reported on a **HICON®** car bottom furnace project for Aleris Rolled Products Germany's Koblenz works. After 17 years in operation, this facility is still fully functional and in continuous use - a service life that contributed significantly to Aleris' decision to invest in a second such furnace.

At Aleris, unlocking the unlimited potential of aluminum is a core value. Whether in the automotive, aerospace or packaging industries, the quality of mill products is a significant factor in the quality of the end product. This is exactly the area in which the **EBNER HICON®** car bottom furnace - along with the many other types of **EBNER** facility operating at Aleris - comes into play.

Thanks to the ever-increasing global demand for aluminum products, Aleris is perfectly positioned for growth. The company's latest expansion phase at their Koblenz works is intended to increase capacity, enabling Aleris to meet customer demands even more quickly and efficiently.

CUSTOM-TAILORED FACILITIES

Customer needs are also at the center of **EBNER**'s philosophy, which is why we develop and offer an ever greater variety of facility types and designs to heat treat rolling ingots. In the end, the customer chose to install another **HICON®** car bottom furnace.

This new facility was of course adapted and optimized down to the last detail to meet the customer's specifications.

Issues such as the transport of ingots from an existing production bay to a new building extension, limited avail-

able space and the need to provide room for the installation of future facilities, along with application of the experience gathered by the customer at the existing facility, were all taken into account during planning and layout of the new furnace.

TURNKEY INSTALLATION

When all was said and done, an order was placed for a car bottom furnace accepting a max. net charge of 185,000 kg and designed to heat treat a wide variety of aluminum alloys. The order included turnkey installation, all electrical systems and a **VISUALFURNACES®6** Process Control System (PCS), as well as integration of the existing **HICON®** car bottom furnace into the new visualization system.

After careful coordination of all on-site work to ensure that production was not interrupted, the facility was handed over on schedule in 2018. The **EBNER** design provides extremely uniform temperatures that exceed the requirements for aerospace materials ($\pm 5^\circ\text{C}$).

EBNER technology easily meets the high processing and quality standards of the aerospace industry, even as the excellent flexibility and long service life of the facility will support Aleris for years to come.

www.aleris.com

TECHNICAL SPECIFICATIONS

Material temperature	max. 620 °C
Net charge	max. 185,000 kg
Clear dimensions	approx. 9.8 x 5.8 x 2.65 m
Annual production	approx. 35,000 t
Temperature uniformity	$\pm 5^\circ\text{C}$

Furnace roof of a car bottom furnace



Car bottom outside the furnace





Long-term customer relations

EBNER and SeAH Special Steel - an Austrian/South Korean success story.



FRANZ WIESINGER

EBNER News
from China

The long-lasting relationship between **EBNER** and SeAH Special Steel of Korea has led to success for both companies with several sequels.

The most recent project, the fourth expansion phase to a **HICON/H₂**® bell annealer facility for the joint

venture company POS-SeAH Steel Wire in Nantong, China, has recently been concluded.

Not many customer/supplier relationships in the industrial furnaces sector have lasted as long as the relationship between **EBNER** and SeAH Special Steel of Korea,

which continues to be a win-win situation. When SeAH placed the first order for a **HICON/H₂**® bell annealer facility in 2001, it was just one of many wire producers in Korea. By the time the last of the now 23 workbases producing for SeAH in Korea were handed over, the company had long since advanced to first place.

The development of POS-SeAH Special Steel in Nantong, China (near Shanghai), a joint venture between SeAH and POSCO, the Korean steel giant, also included **HICON/H₂**® annealing technology. After the first expansion phase was complete, an order was placed almost immediately for a second expansion phase. Now we are at the fourth expansion with hopefully many more to come.

HIGHER QUALITY, LOWER COSTS

But what is the basis for this success? "**HICON/H₂**® annealing technology offers many advantages," says Franz Wiesinger, who managed the latest expansion phase project in Nantong for **EBNER**.

"Firstly, the energy required to bright anneal steel wire can be drastically reduced. Also, the as-annealed quality of the material is significantly improved. The difference in the quality is apparent even to the naked eye!"

When a manufacturer such as SeAH Special Steel of Korea is the first of their country to install a **HICON/H₂**® bell annealer, they can give themselves a decisive competitive advantage thanks to the quality of the products. This gives the manufacturer a better market position, which in turn bolsters **EBNER**'s position.

How? The other manufacturers then usually also switch to superior **HICON/H₂**® technology so as not to fall too far behind.



The control cabinets are also supplied by **EBNER**

SUCCESS IN CHINA

"The fact that a joint venture like POS-SeAH Steel Wire based in China (where cheap production tends to be the norm) decided on **HICON/H₂**® bell annealers and thus quality is yet another confirmation of our technology," says Wiesinger.

The results prove us right: the first facility of two workbases, commissioned in 2008, was followed in 2009 by an additional workbase, then two more workbases that were commissioned in 2011 and an expansion with one heating bell in 2017.

www.seahsp.co

The latest phase in Nantong – the heating bell has a diameter of approx. 6.5 m



SEAH SPECIAL STEEL. SOUTH KOREA

HICON® JOURNAL No. 01 | 2019 21



Customer Services - fingers on the pulse

EBNER Customer Services start in our in-house R&D lab.



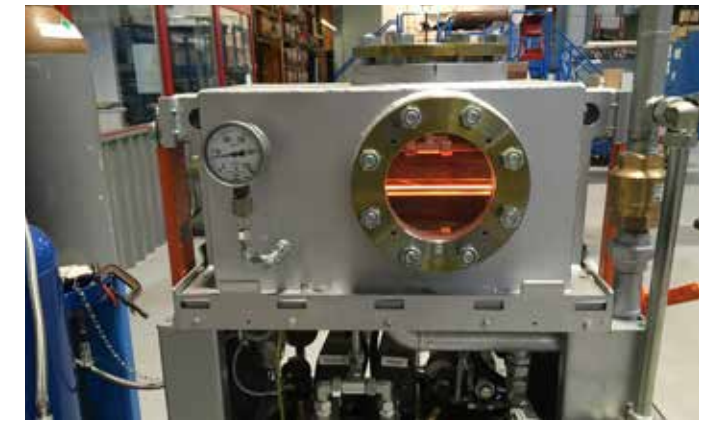
EMANUEL DIETRICHSTEINER
EBNER technical article

Decades of experience mean that **EBNER** service technicians are intimately familiar with the technical features of every customer facility, as well as the special challenges posed by each one. However, in today's world, the ever-increasing rate at which requirements change means that existing facilities often have to be used to carry out new variants of a heat treatment process.

To help our customers meet these new challenges, **EBNER** Customer Service offers the possibility of carrying out test anneals in **EBNER**'s in-house development lab. In this way we are able to support our customers from the very start of their innovation processes. The test anneals carried out at **EBNER** may range from full-scale heat treatment in our lab's own full-size bell annealer to the testing of continuous annealing cycles in our SimCAL (SIMulator Continuous Annealing Line),



Floater furnace entry end



SIMCal

which has been designed for samples of a size similar to that used during tensile testing. To name just one of many other possibilities, samples can also be tested in our floater furnace - which is equipped with a fully-functional quench.

We enable our customers to simulate a wide range of processing temperatures, soaking times, cooling rates and process atmospheres under laboratory conditions. Naturally, the results obtained from a test anneal can be analyzed in our lab.

By providing test anneals as a service, we are also offering our customers the possibility of perfectly tuning their facility to meet new requirements: based on the results obtained during tests, we can offer custom-tailored upgrade packages to our customers and so help make sure that they keep their finger on the pulse of modern developments.

But it isn't just our facilities that have to keep up with the times - our service technicians do too. As Confucius said "tell me and I will forget, show me and I may remember, involve me and I will understand": both our experienced and our new service technicians continuously take part in training programs specially tailored to their needs. Both basic and further education is rounded out by training "on the job". This is yet another benefit that **EBNER** Customer Service provides our customers: they can always count on the support of technicians with up-to-date training.

Naturally, our own in-house processes are also continuously examined, checked, optimized and expanded. One of the driving forces behind our continuous process optimization is our Executive Vice President Customer Services, Peter Gosch. One of the most recent steps that was taken was the introduction of a new Customer Relationship Management program. This system has enabled us to process customer requests even more efficiently. Increased networking among the departments of our company and the introduction of a new ticketing system allow customer-specific inquiries to be forwarded to specialty departments even more quickly for review.

As a consequence of these optimized processes, **EBNER** Customer Service has been able to assess the problems facing our customers - which are often very complex - even more systematically, develop solutions more quickly and, together with our customers and our service technicians, overcome the challenges we face.

Projects designed to digitally support service tasks, such as SMART Remote Services, are continuously developed under the umbrella of the **HDS® (HICON® Digital Services)** brand and made available in a number of variants to our customers.

All of these possibilities and processes have expanded our and our customers' ability to keep our fingers on the pulse of the times, and successfully meet the challenges that the future will bring.



Floater furnace exit end

An investment for generations

Customers benefit from **EBNER** facilities due to their long service life.



KARL WOHLFART

EBNER News
from Germany

EBNER HICON/H₂® bell annealer facilities designed to heat treat steel strip coils in 100 % hydrogen atmospheres have service lives of 40 years or more. Our customers have enjoyed the profits from these facilities for generations.

One of the first **EBNER** hydrogen bell annealers ever sold is still in operation at C.D. Waelzholz GmbH & Co. KG, to the full satisfaction of the customer.

As a result of the long-term, innovative approach taken by C.D. Waelzholz, the company has been one of the leading manufacturers of cold-rolled products for many years.

The family-owned company was founded in 1829, and has specialized in the production of high-quality cold-rolled steel strip and profiles.

EBNER HICON/H₂® bell annealer facility at the CD Waelzholz plant in Plettenberg



EBNER HICON/H₂® bell annealer facility at the CD Waelzholz plant in Hagen

A RELIABLE PARTNER FOR OVER 46 YEARS

The cooperation between the Waelzholz Group and **EBNER** began all the way back in 1983, when their first bell annealer facility for steel strip was developed, tested, and ordered. Gradually, additional investments were made at the different Waelzholz plants in Germany, Brazil and China.

All this has meant that Waelzholz has been one of **EBNER**'s largest and most significant customers - a fact that is underlined by the large number of **EBNER** heat treatment facilities found in their various plants.

- » Waelzholz operates a total of 122 **HICON/H₂**® work bases to heat treat steel strip or flat wire coils in 100 % hydrogen atmosphere, along with
- » 7 hardening and tempering lines designed to produce carbon steel strip with martensitic, bainitic or sorbitic microstructures.

EBNER QUALITY PAYS FOR ITSELF

We are particularly proud of the fact that every **EBNER** heat treatment facility at Waelzholz is still in operation, and has been repeatedly upgraded.

This has been made possible by:

- » The robust structural designs of the **EBNER** facilities
- » Operation by well-trained, experienced staff
- » Continuous maintenance

REPEATED UPGRADES ARE REQUIRED

New norms, standards and developments mean that older facilities must be continuously upgraded and modernized.

The Waelzholz Group has stood behind this approach from the beginning. The most important elements of a modernization project are as follows:

- » Upgrade to the latest burner technology (**EBNER** all-metal burner – type **ECOBURN**)
- » Modification of workbase atmosphere circulation equipment to increase throughput capacity
- » Optimization of atmosphere and energy consumptions
- » Upgrades to facility and process control systems

In terms of user-friendliness, energy efficiency and performance, these measures can put a modernized older facility on a par with a new facility.

EBNER'S CURRENT PROJECT

At the end of 2018, an **EBNER** bell annealer facility that is over 20 years old was successfully relocated from Wickede to Hagen. **EBNER** received an order for turn-key installation.

The facility was upgraded with new process control technology, and was integrated into the existing process control system at the Hagen works.

We hope that the high capacity and long service lives of our facilities will continue to contribute to the global success of C.D. Waelzholz.

New EBNER product

EBNER EXPANDS ITS PORTFOLIO OF ROLLER-HEARTH FURNACES



WOLFGANG DIMSTER
EBNER technical article

EBNER is the worldwide market leader for roller-hearth furnaces with vacuum locks that use process atmosphere. In addition, **EBNER** was the first furnace builder to supply a roller-hearth furnace with vacuum lock for bright annealing high volumes of copper tube coils and straight copper tubes for the non-ferrous metals industry. The vacuum lock was invented in 1958 by company founder Josef Udo Ebner, and guarantees the lowest possible consumption of process atmosphere.

Vacuum lock technology was first used by **EBNER** at the end of the 1950s. Following continuous improvements and further developments, the concept was then successfully transferred to the steel industry and is also in use there.

EBNER RESPONDS TO NEW MARKET REQUIREMENTS

In order to be able to respond to the increased number of inquiries and the demand for heat-treated long products, **EBNER** has decided to expand its portfolio of roller-hearth furnaces.

This new generation of furnaces will be equipped with purging locks at the entry and exit instead of a vacuum lock. Roller-hearth furnaces equipped with purging locks



Vacuum lock on display at **EBNER** Leonding

can be successfully used for the heat treatment of hot-rolled steel bar stock (e.g. for soft annealing, spheroidizing, normalizing and isothermal annealing of medium to high-alloy steels) and drawn tubes (e.g. for bright annealing, normalizing and stress-relief annealing of low-alloy to medium-alloy steels and for the recrystallization of austenitic, ferritic and (duplex) stainless steels).

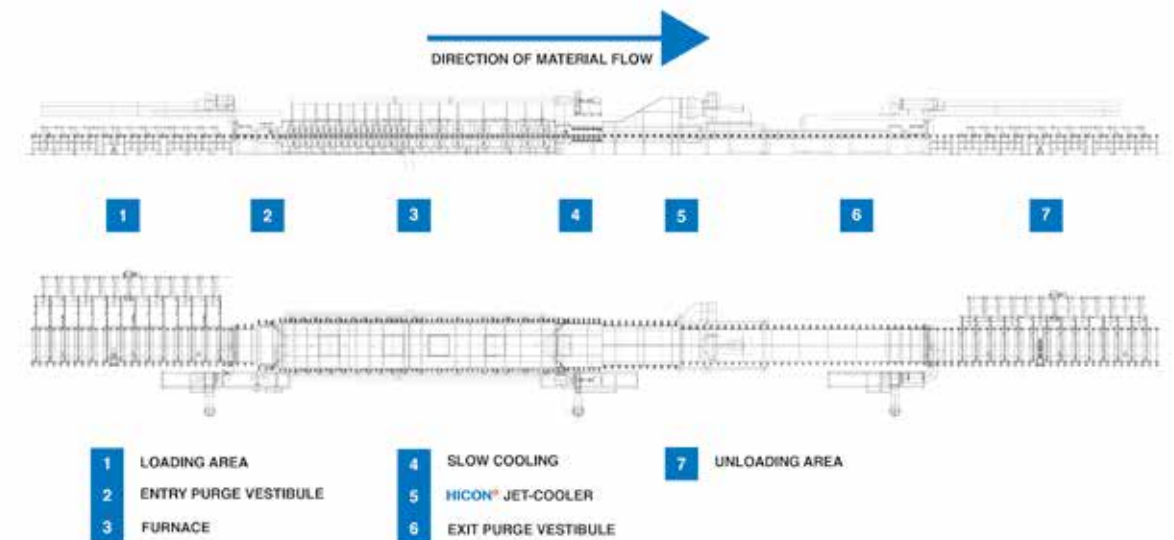
Different types of process atmospheres are used in these roller-hearth furnaces; e.g. from nitrogen up to HN-R, endothermic gas, exothermic gas and 100 % hydrogen. Roller-hearth furnaces that use 100 % hydrogen as process atmosphere are ideally suited for bright annealing Cr/Ni stainless steel tubes.

Continuous monitoring of the process atmosphere is ensured by special oxygen, dewpoint and CO₂ analyzers. The required process atmosphere flowrate is calculated automatically and regulated accordingly. The pressure inside the furnace is maintained slightly above atmospheric pressure by pressure transmitters in order to prevent ambient air from entering the furnace chamber.

Process atmosphere consumption is reduced to an acceptable level by the sealing curtains installed in the entry and exit purging locks. In addition, eductor hoods are installed in the entry and exit areas in order to safely remove any process atmosphere escaping from the work area and vent it out into the open via a stack. As an added safety feature, pilot burners are located below the entry roller table in order to burn off the process atmosphere escaping from the tubes before they are annealed.



Roller-hearth furnace facility for copper tubes and bar stock



Layout of a roller-hearth furnace for tubes

A COMPACT AND FLEXIBLE SOLUTION AT THE HIGHEST TECHNICAL LEVEL

One of the main advantages of this solution is that it offers an inexpensive concept with a compact and flexible layout. In addition, the material to be processed is preheated when passing through the entry purge lock. The time/temperature profiles are optimized for the different types of heat treatment (annealing temperatures between 400 °C and 950 °C are possible for carbon steel and up to 1200 °C for stainless steel). They are regulated by separate temperature controls for each heating zone in order to achieve very tight temperature tolerances in the material during the soaking phase.

Very low fuel consumption is achieved by using highly efficient recuperative burners with ceramic tubes for indirect heating, which, thanks to flameless technology, at the same time ensure minimum pollutant emissions. In case the heat treatment requires a high cooling gradient to obtain a ferrite/lamellar perlite structure and to avoid the presence of bainite (isothermal annealing), a **HICON®** jet cooler can be installed between the furnace and the soaking zones.

The same **HICON®** jet cooler technology can be installed at the end of the heat treatment line to enable the shortest possible cooler length (e.g. for bright annealing of tubes). The quality of the treated product delivers metallurgical and mechanical characteristics fully aligned with the most stringent standards demanded by the market (e.g. API 6A for the oil and gas industry and CQI-9 for the automotive industry); moreover, in the case of bright annealing tube, the best surface brightness is achieved. A straightforward operation via HMI control provides the entire line, including the loading and unloading equipment, with a fully automated and stable process.

The line is designed with a modular concept: modules are pre-assembled and pre-tested, to minimize installation and commissioning times on site. With this alternative technology, **EBNER** provides the market with a complete portfolio of roller-hearth furnaces with the aim of offering the state-of-the-art combined with maximum flexibility and the best possible ratio of investment and operating costs.

HICON® roller-hearth furnace for steel rods



NEWS

HICON®
Journal is
also available
by email!

Trade fairs. Conventions. 2019

14.05 - 16.05.2019	INTERWIRE ATLANTA	Atlanta	USA	Booth No.	1507
25.06. - 29.06.2019	THERMPROCESS	Düsseldorf	DE	Booth No.	9B41
25.06. - 29.06.2019	GIFA	Düsseldorf	DE	Booth No.	15D24
03.07 - 06.07.2019	AMTS	Shanghai	CN	Booth No.	W2 - A05
10.07. - 12.07.2019	ALUMINIUM CHINA	Shanghai	CN	Booth No.	1G20
12.09. - 13.09.2019	ALUMINUM USA	Nashville	USA	Booth No.	820
18.09. - 20.09.2019	WIRE SOUTHEAST ASIA	Bangkok	THA	Booth No.	tba

We look forward to seeing you there!

New orders.

SEBIR S.A.	ES	HICON/H₂ ® bell annealer facility for steel wire coils
ARANIA S.A.	ES	HICON/H₂ ® bell annealer facility for steel strip coils
MUBEAL TAILOR ROLLED BLANKS LLC	US	HICON/H₂ ® bell annealer facility for steel strip coils
ALERIS ALUMINUM (ZHENJIANG) CO., LTD.	CN	HICON ® roller-hearth furnace for aluminum plates
NISSHIN STEEL CO. LTD.	JP	HICON/H₂ ® bell annealer facility for steel strip coils
GIEBEL KALTWALZWERK GMBH	DE	HICON/H₂ ® bell annealer facility for steel strip coils
GLOBAL SPECIAL STEEL PRODUCTS S.A.U.	ES	HICON/H₂ ® bell annealer facility for steel wire coils
HENAN TONGREN ALUMINUM INDUSTRY CO., LTD	CN	HICON ® floater furnace for aluminum strip
A. AGRATI S.P.A.	IT	HICON/N₂ ® bell annealer facility for steel wire coils
SAAR-BLANKSTAHL GMBH	DE	HICON ® roller-hearth furnace for steel rod

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