

HICON®

EBNER Journal for Progress in Industrial Furnace Technology.



70
YEARS OF
EBNER
IN MOTION

**A CELEBRATION LOOKING BACK AT 7 DECADES
OF TECHNOLOGY AND INNOVATION
AND LOOKING FORWARD INTO THE FUTURE**



EBNER.

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

An anniversary, extremely interesting presentations and enriching discussions: this is how we will remember 2018 in the years to come, and we hope that our guests will do the same. Our 2½ day symposium with the motto "Future Trends in Mobility" brought over 80 interested companies and their employees from 25 countries to Leonding in the second week of September. Our headquarters were transformed into a vibrant center of international and intercultural exchange between experts in many fields.

As a part of our drive to be a full-solution provider, we strove to ensure that the symposium agenda was useful for our customers, and that our guests could attend interesting, high-quality presentations. It was important to us to use our anniversary as an opportunity to choose a path into the future and face the challenges and changes it will bring alongside our customers. Among the high-caliber speakers were numerous leaders of business and industry, including CEOs from major global companies. Guest speakers from internationally-recognized institutions such as the University of Leoben, the Graz University of Technology, the Friedrich-Alexander University of Erlangen-Nürnberg, RWTH Aachen University and the University of Vienna provided the audience with fascinating insights during their presentations.

Future trends in mobility, the role of digitalization in the mobility sector, its effects on the entire value-added chain and its repercussions for aluminum and steel manufacturers were subjects of intense debate. The event program was rounded out on Thursday afternoon with presentations by representatives from the **EBNER** Group. We look forward to working with our customers to make these new insights a reality in the near future.

I was particularly happy to see how impressed many attendees were by our research and development laboratory and the possibilities it offers. Our guests were able to see with their own eyes that **EBNER** does not just talk about research, but actively lives it. We are proud to invest 8 % of our annual turnover in R&D!

Yours, Robert Ebner

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No crane? No problem!

Fully-automated bell annealer facilities for wire and strip, no crane needed



ALEXANDER KUGEL

EBNER news
from Austria

A hallmark of bell annealers is their flexibility. Over the past 40 years, EBNER has installed over 4600 bell annealer workbases throughout the world. The development of an innovative charging technology allows for fully-automated operation of bell annealers, marking a new era for heat treatment.

EBNER HICON/H₂ bell annealers are used throughout the world to heat treat steel, copper base metal and aluminum strip or wire coils. Our customers value the flexibility of being able to heat treat charges of a variety of alloys and microstructure types, paired with outstanding availability.

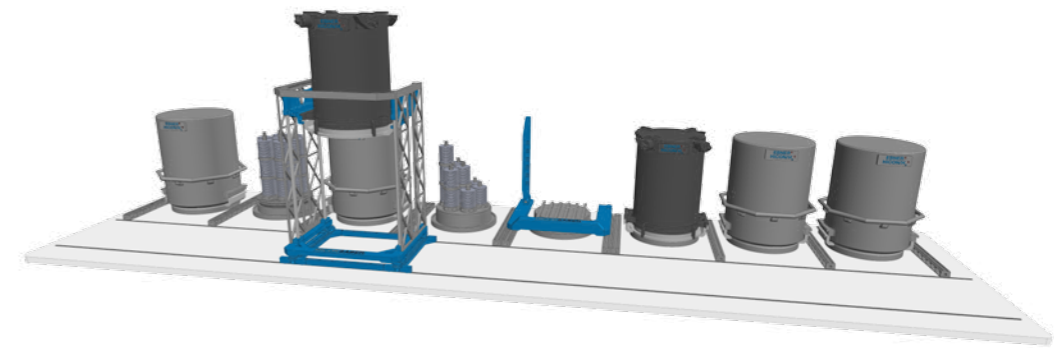
For years, EBNER bell annealers have been heat treating materials fully automatically. Charging the workbases and shifting the bells, however, has generally been carried out by crane. In this area there is potential to increase capacity.

DISADVANTAGES OF USUAL DESIGN

Coils are stacked on top of each other on the workbase or, in the case of a wire annealer, several coil carriers are charged. The inner cover, heating bell and cooling bell are then placed over the stacked coils (or carriers) in the correct order, and heat treatment is carried out.

All handling movements (coils/carriers and bells) are performed by large, manually-operated overhead cranes. An operator must accurately place each coil or coil carrier on the workbase or on the coil below it, and then center, raise and lower the bells using the crane and a good eye. Cleanly placing the coils and bells requires an exceptionally fine touch.

Currently, charging and discharging the coils takes about 10 % of the total processing time. Any improvements to these operations would have measurable effects on the entire process sequence.



Classic facility layout with HICON SABER®

HICON SABER® TO THE RESCUE

With the patented HICON SABER® system, a large overhead crane is unnecessary. A fully-automated charging car collects the entire charge from the charging station, and transports it to the workbase in a single step. In comparison, an operator must make up to 14 crane movements to fully charge a workbase using an overhead crane. Heating bell, cooling bell and inner cover handling is also carried out by HICON SABER®. The combination of bell annealer facility and the fully-automated HICON SABER® handling system is another full system solution by EBNER.

HICON SABER®: THE DETAILS

The HICON SABER® system is comprised of a transport car that runs on rails and two handling units: a forklift-style charging unit to shift strip coils and coil carriers, and a bell lifting unit. The charging unit is capable of transporting up to 150 t (165 US t) at once, meaning that it can be used at even the largest bell annealers.

All bell movements are carried out by the bell lifting unit. A heating or cooling bell is raised up off of an inner cover and transported either to an automatically-selected parking area or to the next scheduled workbase. In the same way, inner covers are placed over the charges before heat treatment starts and lifted away when heat treatment has been completed.

HICON REVOLVER® - CIRCULAR LAYOUT

Removing the crane from the equation of production sequences opens possibilities such as non-linear workbase layouts. In the HICON REVOLVER® layout, the

HICON SABER® transport car is located in the center. The workbases are arranged around it, in a circle. This means that charge and bell movements can be carried out even more efficiently.

INNOVATION FOR OUR CUSTOMERS

Without an overhead crane, the planned stack height of the charge can be increased by up to 3 - 4 m (9'11" - 13'1"). Or alternatively, the workshop building can be smaller or lower and thus cheaper to build. The HICON SABER® system is also much faster at charging. The result: throughputs of wire annealing facilities can be increased by up to 7 %, while throughputs of steel strip coil facilities can be increased by up to 25 %!

INCREASED SAFETY

Another major advantage is the increase in process safety and reliability through automated production. The potential for damaging the material waiting for heat treatment is also reduced, as the charge can be assembled under ideal conditions, outside the workshop. The facility layout and all other systems are perfectly suited for autonomous, automatic operation.

The design phase for these products has already been completed, and both HICON SABER® and HICON REVOLVER® made their debut in April 2018 at the WIRE Düsseldorf trade fair. A great deal of interest was shown in both systems by our customers at the fair. We have already received the first order and look forward to reporting on the first projects soon, here in the HICON® Journal!

HICON SABER®



STEP 1

The entire charge is transported to the workbase.



STEP 2

The charge is set down on the workbase in a single step.



STEP 3

HICON SABER® withdraws, leaving a perfectly centered charge.



STEP 4

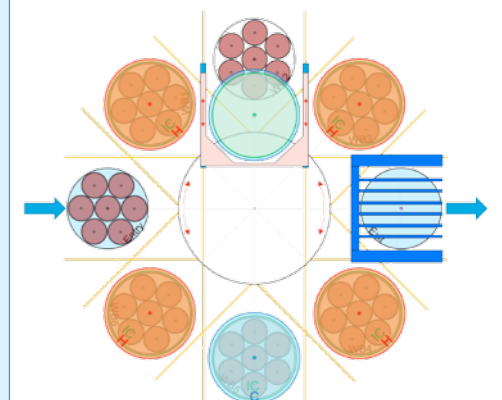
After heat treatment, the bells are removed ...



STEP 5

... and moved to their next job.

HICON REVOLVER®



70 years of **EBNER** in motion

The future of mobility



GILES TILLING

EBNER news
from Austria

In September of 2018, **EBNER** held a three-day technical symposium on the future of mobility to celebrate our 70th anniversary as a company.

In 1948, exactly 70 years ago, **EBNER** was founded as Elektrowärmebau Ing. Josef Ebner KG in Linz. **EBNER** originally sold state-of-the-art (at the time) electric heated furnaces to the growing Austrian industrial sector, but soon expanded worldwide.

With Peter Ebner as the second generation of leadership, **EBNER** became a real innovator and a global player. The invention of hydrogen annealing technology for brass set new standards in the industry.

Today, Robert Ebner is the third generation at the helm of a company now offering more than 10 different product lines. **EBNER** is a global market leader in heat treatment facilities.



© Barbara Ebner, b. exclusive

To celebrate the company's 70th anniversary, **EBNER** hosted a series of events, including a technical symposium entitled "70 years of **EBNER** in motion". This symposium focused on the future development of the transportation sector, especially the automotive and aerospace industries. Renowned presenters from consultants (such as PWC and accilium) presented the development of these markets from the end consumer's point of view. OEMs such as BMW, Toyota, Audi and Airbus gave high-caliber presentations on their assessment of the direction of development. Additional presentations from **EBNER** customers which supply these OEMs either directly or through partners, rounded out the picture. The steel and aluminum industries were well-represented.

Presentations by well-known professors from the academic world, such as the RWTH Aachen, Friedrich-Alexander University of Erlangen-Nürnberg and the Mining University of Leoben covered future technical

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developments and challenges. Representatives of the FOGI (Research Institute for Industrial Furnace Technology) and CECOF (European Committee of Industrial Furnace and Heating Equipment Associations) discussed future legal aspects, regulations and guidelines. With this portfolio of presentations, **EBNER** offered the audience a true 360° view of the future along the entire value-added chain.

DAY 1 – FROM SELF-DRIVING CARS TO A CRUISE ON THE DANUBE

The first day was opened by our host, CEO Robert Ebner with a brief introduction of the companies in the **EBNER** Group. He handed over to automotive expert Alexander Rauscher, who set the scene for further discussion, suggesting that there are many technical and ethical hurdles on the road to implementing battery vehicles and shared autonomous vehicles. Christoph Stürmer gave us some predictions from the view point of Autofacts (Price Waterhouse Coopers). Countering

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Alexander Rauscher's arguments, he pointed out that we already use taxis, busses and share car journeys, and agreed that realistically, there is no reason to rely on the internal combustion engine any longer.

Representing BMW Group, Matthias Loidl was proud to present BMW's range of electric cars, convincing us that sustainability is not a sacrifice. Michael Hahne (Novelis) focused on sustainability in recycling, a trend that was underlined by Andreas Gondorf from Alaris.

Scaling down to the microscopic, Dr. Ronald Schnitzer (University of Leoben) talked us through the analysis of steel at atomic level, demonstrating how strength can be pinpointed in steel alloy components.

A more hands-on approach was presented by Hermann Steffan from the Technical University of Graz. He gave a highly entertaining guide to destructive testing of cars. The audience learned how B pillar test rigs are built so that they do not have to demolish a whole car each time they run a test, although that is obviously what Mr Steffan enjoys doing most. As he said, "you can innovate all you want, I will break it!"

After a long but fascinating day, our guests were treated to a relaxing and entertaining cruise up the Danube, enjoying a beautiful late summer sunset with dinner, music and dancing.

The audience used the Mentimeter app to ask questions of the presenters



DAY 2 – TALENT, TENSILE STRENGTH AND CLASSICAL MUSIC

The opening lecture on day 2 was entitled "The average trap: how to (not) manage a talent" by Markus Hengstschläger from the Medical University of Vienna. The examples he provided of how to ignore talent by conforming to set ways – from grade school through to executive level – had everybody laughing from experience. His key message: you will be most successful if you dare to form a team with people who do what you can't do.

Stefano Cicale (RINA Consulting) gave a fascinating talk on increasing the efficiency of grain oriented electrical steels by reducing impurities. During his work over the past 20 years, efficiency has risen from 96 % to 97 %, a difference that seems insignificant until he asked us to look at it from a different angle: losses have been reduced from 4 % to 3 %, which is a massive 25 %!

The **EBNER** team was proud to listen to Ferragone Corporation's Ed Gonzalez, who recently started up the world's first **HICON/H₂Q[®] CAL** (designed and built by **EBNER**, with major components tested not 10 meters from the location of the symposium). Ferragone is leading the industry in the lightweighting of automotive steel strip. His line produces almost zero scrap, which is extraordinary in an industry where up to 25 % scrap is a common figure.

Wilhelm Fischer from our neighbor, voestalpine Stahl, was up next with a timeline of their projects working together with **EBNER** on modernizing furnaces and cooling lines. Then it was over to the car industry, and Johan van Zyl (CEO of Toyota Motors Europe), who took to the stage with a brand-new Toyota Mirai ("future" in Japanese). He explained Toyota's bold plans to commit to investing in hydrogen fuel cell technology. Despite the global success of the Prius hybrid, Toyota is certain that generating hydrogen from water using electrolysis is a more sustainable way to use electricity than storing it in batteries. In the meantime, Toyota has discontinued diesel engines on all their cars worldwide.

Ed Gonzalez takes the stage



70 YEARS OF EBNER IN MOTION



“The program was informative and covered a wide scope of interesting topics. Your team members and facilities support the professionalism and quality commitment of EBNER. You should be very proud of this!!!!”

“It was a pleasure, as always, and I learned a lot. I'm not worried about the future of "smart mid-sized companies" at all now.”

Our guests sent their compliments

Hot stamping has a clear future in the automotive world. Marion Merklein (Friedrich-Alexander University Erlangen) presented a highly informative paper on hot stamping of high strength steels. She provided details on how to optimize surface topography while quenching blanks at up to 90 K/sec, reducing the transition zone on tailored tempered components to as little as 10 mm and explained why the way the stamping die is cooled is just as important to the geometry of the finished part as the way in which the part is heated up before stamping.

After lunch, it was time for the EBNER Discovery Tour, on which our guests were shown around the production plant, R&D lab and museum to get a first-hand impression of how we manage to be the most innovative and competitive full solution provider in thermal processing.

The Discovery Tour makes a stop in the EBNER R&D lab



The last speaker of the day, Franz Beneke (Research Association for Industrial Furnaces) laid down a very clear path that the industry needs to follow to increase efficiency and fulfill its commitment to the environment. His research shows that we won't be able to meet the goals of the Paris agreement unless each individual plays a part, both at work and in their private lives: if you are only going to drink one cup of tea, only boil enough water for one cup.

The evening of day 2 was spent at the famous baroque St. Florian monastery, with a sit-down dinner and entertainment by classical singers and accompaniment.

DAY THREE – CARS, AIRPLANES AND A FLIGHT THROUGH THE R&D LAB

Christian Engel, representing Airbus, revealed that only 15 % of the aluminum produced for the aerospace industry actually makes it into the air. Carbon fiber reinforced plastics now make up around 50 % of wide-body aircraft, followed by aluminum at around 35 % (titanium 10 % and steel 5 %). However, Matthias Miermeister, another attendee from Alaris, reminded us that single-aisle airplanes are still built mainly using aluminum, and that the challenge for the industry is to reduce recycling costs.

Bernard Grange (Constellium Technology Center) presented their range of innovative Airware® aluminum-lithium alloys with the aim of keeping the percentage of aircraft components manufactured from aluminum as high as possible.

The symposium shifted focus back to the automotive sector with a lecture by C.D. Wälzholz representative Heino Buddenberg. C.D. Wälzholz is a long-standing EBNER customer and manufacturers 85 % of the world's seat belt springs. Mr Buddenberg is optimistic about the future of steel in cars, but is not confident that hydrogen cell technology has a promising future because of the difficulties in storing this gas.

A brief history of steel in car manufacturing was provided by Thomas Hebesberger from voestalpine Steel Division. He also outlined his company's work in the development of advanced high strength steels such as transformation induced plasticity grades (TRIP) with bainitic ferrite.

On to EBNER's favorite subject: heat treatment. Wolfgang Fasching and Peter Gruber of voestalpine Wire Technology have invented a thermo-mechanical rolling system that completely bypasses the annealing stage. Bad news for EBNER? No, because there is still a need for annealing furnaces with all the new types of steel wire being produced.

From the Institute of Industrial Furnaces and Heat Treatment Technology in Aachen, Germany, Herbert Pfeifer is considered to be a leading academic expert in industrial furnace engineering. He detailed the evolution of his understanding of thermal processing – whereas he used to think he knew everything about heating, he now understands that cooling and quenching are just as important in virtually every process.

To wrap up the last day of the symposium, Alfred Heinz, EBNER CTO, introduced the products and technology



The audience is all ears

manufactured by EBNER Group. Rainer Edtmeier represented HPI, joining Robert Schmidt and Tom Jumelet of Gautschi to present their companies' aluminum cast house products.

Then it was back to EBNER and Peter Seemann, who amazed the audience with a fly-past (literally: it was filmed by a drone) of how EBNER innovates. He handed over to Günter Knogler, who gave us a walk through of EBNER's plans in digitalization, followed by Peter Gosch with our Customer Service package and Bernhard Dellekart with his vision of the future of Customer Services at EBNER.

All-in-all, an exhilarating three days that provided a great deal of food for thought. The presenters' multi-faceted points of view can help all the symposium participants, especially EBNER, better prepare for the future of mobility. With these opportunities and challenges, EBNER is looking forward to the next 70 years of EBNER.

Guests posted their congratulatory messages





Quench smarter with SMARTQuench®

Maximum quenching flexibility in floaters furnaces



ULRICH PSCHEBEZIN
EBNER technical report

In floaters furnaces for aluminum strip, quenching plays perhaps the most important role in fine-tuning material properties. Until now, quenching could only be carried out using air or water. This left a significant gap between the possible cooling gradients. With the **EBNER SMARTQuench®**, a market-ready solution is now available.

A significant gap lies between the highest possible quenching rate in air and the lowest possible quenching rate in water (see graph). These gradients, which are interesting when processing sensitive alloys or very thin strip, used to be very difficult if not impossible to achieve. In cooperation with our customers, the **EBNER R&D** department has been able to take a quantum leap forward in quenching technology.

SMARTQuench® in the EBNER R&D Lab



FLEXIBILITY FOR CHALLENGING STRIP

The **SMARTQuench®** section of an **EBNER HICON®** floaters furnace facility is a combined air/water quench, in which strip temperatures can be controlled. That is, the quenching process can be interrupted at any time or at any position in the quench, and the temperature maintained. The quench is divided into individually-controllable zones, not only to avoid premature cooling when transitioning between the furnace and the quench but also to ensure that any deformation during sensitive quenching processes is kept to a minimum.

The **EBNER** control system supplies quench codes suited to each alloy and each set of strip dimensions from a database, meaning that the strip leaves the facility dry and as flat as possible.

GREATEST RANGE OF COOLING RATES

If a special cooling rate is required, the combined air/water quench can be extremely precise: individual water headers can be controlled in such a way that the exact temperature required in the strip as it exits the **SMARTQuench®** is achieved.



Keeping an eye on the details

With this extremely high degree of flexibility, **HICON®** floaters furnace facilities are capable of fulfilling the requirements for heat treating and quenching an even wider range of alloys. To put it simply, the **SMARTQuench®** offers our customers the greatest possible range of cooling rates to achieve the required product characteristics every time.

ATTENTION TO DETAIL

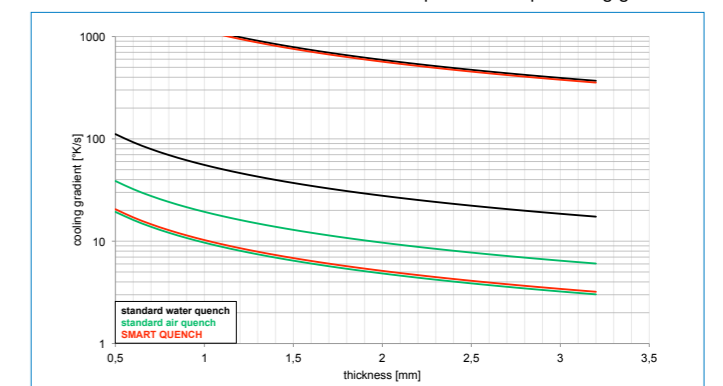
In order to keep the process as well-defined as possible, it is important to both monitor and control all variables. In the case of **SMARTQuench®**, this applies not only to the obvious variables but also to environmental conditions like ambient temperature. Any resulting changes to the quenching process can be compensated for by controlling the air temperature within the quench.

SATISFIED CUSTOMERS

This type of development could never succeed without customer feedback. The trial phase included a series of tests in conjunction with the customers themselves, using the customer's material. In these tests, the difference between target and current values, strip flatness and strip stability were closely monitored.

Several major customers are currently enjoying increased strip stability during processing and great flexibility in the selection of cooling rates - allowing them to meet the demanding standards of the automotive and aerospace industries.

SMARTQuench® covers a broad spectrum of quenching gradients.





First time's a charm

First EBNER furnace facility in Nigeria



SURESHRAM MAIER

EBNER news
from Nigeria

A new cold rolling mill, an international investment. And in the midst of it all, an EBNER HICON/H₂® bell annealer facility.

For more than 40 years, the WEMPCO Group has been investing in a variety of industries in Nigeria. The Hong Kong owners see the most populous country in Africa as an important developing market with a lot of potential for industrial growth. After all, Nigeria has a wealth of natural resources such as petroleum, tin, iron ore and coal, but very little industrial capacity to process these resources into value-added products.

With this background, the owners of the WEMPCO Group decided on a new investment. The new cold-rolling mill for steel strip was inaugurated in Ibafo in 2013 by the then-president of Nigeria, Goodluck Jonathan. The works will be able to produce up to 700,000 t (770,000 USt) of steel strip per year, which could cover 65 % of the domestic demand.

ORIGINAL HEAT TREATMENT FACILITY NOT SATISFACTORY

The first heat treatment facility installed at WEMPCO was not able to produce a bright surface finish. Further processing into products such as galvanized or coated sheet required a pickling and cleaning step, which in turn affected costs and efficiency. Soon it became clear that a higher-quality facility was needed.

INTERCONTINENTAL ADVANTAGES

As the market and technology leader in bright annealing steel strip, EBNER was the logical choice to supply a replacement for the original annealing facility. But EBNER's quality wasn't the only thing: our subsidiary in China and our Chinese technicians were also a factor in this order. Because the owners of WEMPCO are

Brand new facility



Gas engineering by EBNER

based in Hong Kong, they also employ many Chinese technicians, who were able to easily communicate with the EBNER Asia specialists.

The order comprised a HICON/H₂® bell annealer facility with six workbases, three heating bells and three cooling bells as well as hydrogen and nitrogen generators and a coil tipper. The foundation was also prepared for a final expansion to 12 bases.

In April 2016, the facility was commissioned on schedule. Installation and commissioning went smoothly and on time thanks to the excellent cooperation between the WEMPCO technicians and the EBNER Asia and EBNER Austria teams.

CONTINUING PARTNERSHIP

WEMPCO has ordered a service from EBNER every year to keep the HICON/H₂® facility running like new. The customer appreciates the ease of communication with the Chinese technicians. The first six workbases process up to 100,000 t of steel strip per year in EBNER quality.

EBNER is looking forward to a continuing Austrian/Nigerian/Chinese collaboration.

TECHNICAL DATA

Material	CQ and DQ grades
Clear furnace diameter	2000 mm (6'7")
Clear furnace height	5400 mm (17'9")
Net charge	5 coils and 80 t (88 USt) total



Nacobre trusts **EBNER** furnaces



Multi-stack workbase

Quality takes priority

Superior material quality from top furnaces



MICHAEL MEISCZUK

EBNER news from Mexico

Nacobre, part of the Elementia Group, is a Mexican company with a long tradition and a global reach. Nacobre's copper and copper alloy products are not only used in the usual HVAC applications, but in a variety of forms in very diverse industries.

GLOBAL PLAYER

Industries in more than 60 countries around the world count on highest quality tube, strip and wire products from Nacobre. These include the automotive industry, mints, key and lock manufacturers, electronics and

electrical industries, even hospitals and other health care facilities. Quality is Nacobre's top priority. And the main contributors to quality are careful processing and using state-of-the-art production methods. That's why Nacobre has been relying on **EBNER HICON/H₂** bell annealers to heat treat their copper and brass strip for nearly 40 years.

EBNER quality refers not only to the final material, but also to the robust equipment itself and its excellent ROI. The **HICON/H₂** bell annealer facilities that were installed in the 1980s are still in operation!

THE LATEST ORDER

In 2017, rising demand required a 5th expansion phase for the original bell annealer facility to be ordered. A cheap furnace would have jeopardized the quality of the final product, which goes against Nacobre's fundamental values.

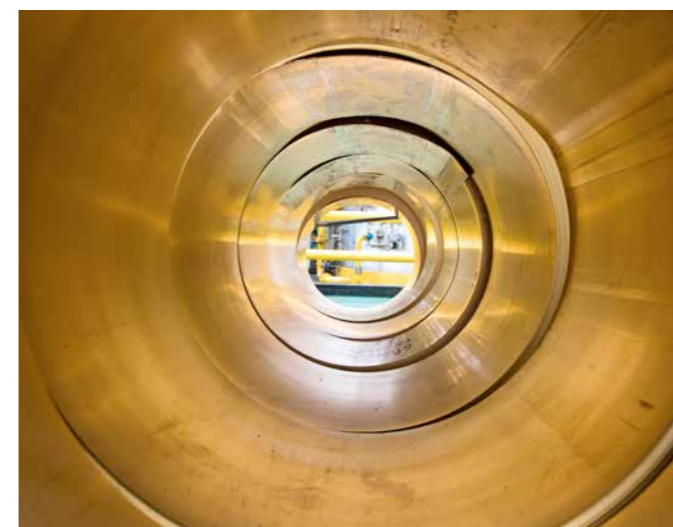
HICON/H₂ technology has proven itself time and again over the decades, at Nacobre and other well-known manufacturers around the world.

Of course, it doesn't hurt that there is an **EBNER** representative located nearby in Mexico City, who can respond quickly and takes care of Nacobre's issues personally. In the end, **EBNER** was the obvious choice.

An order was placed for another multi-stack bell annealer furnace, in which smaller batches of sensitive special alloys are bright annealed in hydrogen mixed gas. With **HICON/H₂** bell annealers, Nacobre is flexible and efficient.

The expanded facility, comprising two workbases, a heating bell and a cooling bell, went into operation in 2018. **EBNER** would like to thank Nacobre for their trust and for allowing us to contribute to the quality of their products for nearly 40 years.

www.nacobre.com.mx



TECHNICAL DATA

Stack diameter	max. 2600 mm (8'6")
Stack height	max. 1600 mm (5'3")
Net charge weight	max. 19 t (21 USt)
Annual throughput	10,000 t/y (11,000 USt)



In with the new

hotPHASE® facility for press hardening blanks proves its quality



GERHARD SCHÖFL

EBNER news
from China

The **hotPHASE®** series of furnaces for heat treating steel press hardening blanks has been on the market for nearly 10 years. Compared to other makes, the more sophisticated **hotPHASE®** technology has proven itself.

Shanghai Superior Die Technology was founded in 2004 as a joint venture of SAIC HK Ltd and HUAYU Automotive Systems. In the past 14 years, they have turned out more than 20,000,000 car parts such as A-pillars, B-pillars and passenger compartments

with their press hardening process. SSdT has expanded to four locations and 2300 employees and continues to grow to serve OEMs such as the VW and GM Groups.

An expansion in 2017 involved setting up a new production line including a heat treatment facility and a press. In the past, SSdT relied on a different make of furnace, but was never 100 % satisfied. **EBNER's** **hotPHASE®** roller-hearth furnace for steel blanks set new standards for quality.

Press hardening blanks require quick, precise heating, high temperature uniformity and careful handling of the blank surface.

Down time must be kept to a minimum so that deliveries are not delayed. Maintenance and wear part consumption were the main issues of the existing facility. The **EBNER hotPHASE®** roller-hearth furnace is the answer.



Entry end

SIMPLE MAINTENANCE, MAXIMUM EFFICIENCY

Because of the extreme conditions inside the furnace, it is inevitable that rollers will occasionally break. However, **EBNER** furnaces are fitted with especially robust rollers to minimize breakage.

When the rollers in an **EBNER hotPHASE®** furnace do break, they remain seated in their bearings, without interrupting production. Other makes of furnace allow the broken rollers to fall to the furnace floor, where their extremely high residual heat destroys the furnace lining. After a few short years, the lining has to be replaced, a complicated and expensive process.

Replacing broken rollers in an **EBNER** furnace is fast and easy. The furnace does not need to be cooled and opened. The rollers are simply replaced during the next tool change – the replacement process only takes 4 minutes! The rollers bearings are located away from the housing, exponentially increasing their service life and making replacing a roller much easier.



Ready to press

The **EBNER hotPHASE®** roller-hearth furnace is designed for easy maintenance and efficiency from one end to the other. The drive for the lifting mechanism at the exit end of the furnace is located to the side of the roller table. It drives a fork resting in the gaps between the rollers, which carefully lifts the blanks off the roller table for the handling robot to grab. The mechanism is easily accessible for maintenance and the area below the roller table is kept clear to simplify retrieval of anything that might fall between the roller gaps.

The facility was installed and commissioned on schedule at SSdT in 2017. SSdT is clearly satisfied with the results, as evidenced by a follow-up order in 2018. We look forward to a productive partnership and thank SSdT for the trust they have placed in **EBNER**.

www.ssd.com.cn



Good design from **EBNER**

hotPHASE® FURNACE VS. NON-EBNER FURNACE

	EBNER hotPHASE®	OTHER MANUFACTURERS
Roller bearing	away from housing in cold area	in housing in hot area
Furnace lining service life	about 8 years	about 1-2 years
Blank centering system	robust servo centering system	problematic pneumatic centering system
Maintenance of lifting device	easy	difficult



Solar energy gives Avon Ispat a boost



View of part of the facility

The best for the best

Top product quality for the Indian market



SURESHRAM MAIER

EBNER news from India

"To give the best to the best" is one of Avon Ispat & Power's mission statements. In order to fulfill this mission, Avon recently ordered a fourth expansion phase of their HICON/H₂ bell annealer facility to heat treat steel strip coils.

Avon Ispat & Power Limited, based in Ludhiana, India, specializes in manufacturing cold-rolled strip for bicycles, rims and other car parts. Avon is one of the Indian bicycle industry's largest suppliers, with benchmarking practices of using best raw materials and best production equipment.

Like EBNER, Avon prioritizes continuous improvement of products and services by listening and reacting to customer feedback. By working together, innovative and modern solutions can be developed to meet the customers' needs.

Creating special solutions for special customers is also what tipped the scales in EBNER's favor for this order. Like the other expansion phases, Avon required this HICON/H₂ bell annealer facility to be heated with a rather unusual fuel: oil. Thanks to smooth cooperation between the EBNER sales team, our subsidiary EBNER

India, the EBNER R&D department and the Avon team, EBNER was able to deliver an efficient oil combustion system which is economical and also environmentally compatible.

EBNER quality is well known in India. Avon's website highlights their use of EBNER equipment as a sign of quality, and for good reason. The heat treated material is 95 % spheroidized with a bright surface finish, perfect for processing into high-quality end products such as rims, sheets and tubes.

Despite having the choice of plenty of local manufacturers of cheap furnaces, Avon is satisfied with the value for money they are getting from their existing EBNER HICON/H₂ bell annealer facilities. This led to EBNER winning the order for the expansion of two workbases, one heating bell and one cooling bell. EBNER India handled the installation supervision and commissioning. The new expansion phase has been producing quality annealed steel strip with the rest of the bases since summer of 2018.

Just before our editorial deadline, Avon placed yet another order with EBNER for two further workbases. EBNER would like to thank Avon for placing their trust in us once again.

We look forward to continuing to work together.

www.avonispat.com

TECHNICAL DATA

Workbase diameter	190 cm (6'3")
Stack height	360 cm (11'10")
Net charge	max. 60 t (66 USt)
Processing temperature	max. 750 °C (1382 °F)
Heating system	oil burner
Throughput	8 t/h (8.8 USt)

Several expansion phases of EBNER furnaces



Modernizing a time-tested facility

Waelzholz Brasmetal updates an **EBNER** hardening and tempering line.



SASCHA EPPENSTEINER

EBNER news
from Brazil

Readers of the **HICON**® Journal will be aware of the long-term relationship between **EBNER** and **Wälzholz**. Over the past few decades, orders have been placed for over 30 facilities. **EBNER**'s relationship with **Wälzholz**'s subsidiary in Brazil, **Waelzholz Brasmetal**, is just as established and successful.

Waelzholz Brasmetal produces a wide range of materials, including high-quality hardened and tempered steel strip. This martempered steel strip, with its homoge-

FlexFlat® unit to improve flatness



nous strength and hardness values and perfect flatness, is used to manufacture a variety of products such as saw blades (circular saws, band saws, head saws, etc.).

HICON® FACILITY FULLY MODERNIZED

The first **EBNER** hardening and tempering line for steel strip at Waelzholz Brasmetal was moved from the main **Wälzholz** plant in Germany to Diadema, in the region of greater São Paulo, in 2006. Since then, there have been continual upgrades. **EBNER** has also supplied bell annealer facilities to the Waelzholz plant in São Paulo over the years. Now, the **HICON**® hardening and tempering line has again been modernized.

When manufacturing saw blades, the high-carbon steel strip requires excellent flatness and narrow tolerances for mechanical values like hardness and strength. In order to continue to meet ever-stricter customer requirements and the demand for increased productivity, **EBNER** and Waelzholz devised a plan for modernization. In the end, the facility was equipped with several new modules.

NEW FlexFlat® MARTENSITE COOLING SECTION

FlexFlat® technology directly influences strip geometry in the second cooling phase (during martensite transformation). The strip is prepared for tempering in a way that results in perfect flatness in the end product.

NEW LEVELING FURNACE

The new leveling furnace provides direct, zone-controlled heating of the leveling plate, as well as precise control of the pressure on the strip. The strip exiting the **FlexFlat**® martensite cooling section receives optimized leveling treatment, improving flatness still further.



HICON® jet tempering furnace

NEW HICON® JET TEMPERING FURNACE

The jet heating nozzles of the tempering furnace feature rapid and even heat transfer, so the furnace is only half the length of a usual tempering furnace design – even as it provides better product characteristics (extremely narrow tolerances for mechanical properties). This shortened section provided more room for modernization potential in the cramped facility space.

KEYWORD: AUTOMATION

To improve reproducibility and reduce the workload on the operators, a variety of measures were implemented to increase the degree of automation.

These range from the automatic pre-selection of process parameters to linking operating steps with weld seam tracking (e.g. automatic release of cooling plates and leveling plates).

AN INCREASE IN PRODUCTIVITY

By eliminating existing “bottlenecks” in the facility and adding powerful new units, the productivity of the facility was significantly increased.

With the modernized **HICON**® hardening and tempering line, Waelzholz Brasmetal has taken quality yet another step forward – creating a decisive competitive advantage for itself in the Brazilian and Latin American markets.

www.waelzholz.com

TECHNICAL DATA

Technology	martempering
Materials	medium and high-carbon steels, non-alloyed and low-alloy
Strip width	10 – 650 mm (0.04" - 2'2")
Strip thickness	0.3 – 3.5 mm (0.01" - 0.14")
Number of strands	1 – 11
Throughput capacity	1400 kg/h (1.5 USt) (new facility components)

Leveling furnace



Martempering section



The right tool for the job

weba places order for a **hotPHASE®** furnace for R&D

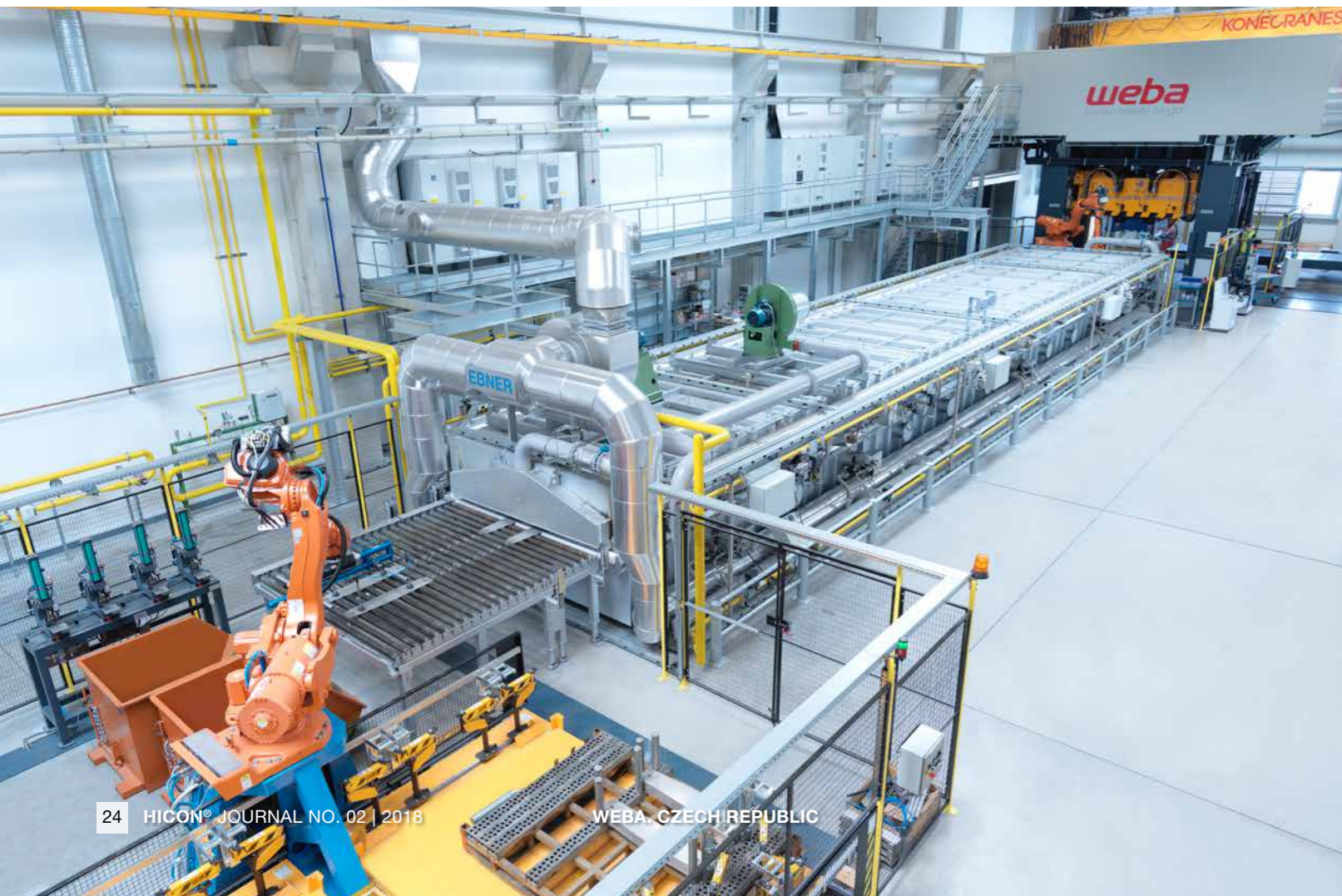


GERHARD SCHÖFL
EBNER news
from Czech Republic

For over 25 years, Austrian toolmaker weba has been setting standards in hot forming. For their research and development center in Olomouc, Czech Republic, weba went looking for the best equipment – and found EBNER.

High-tech toolmaker weba was founded in 1982 near Steyr, the historic Austrian center of automobile production. With unique competence in tools for hot forming, as well as in other complex forming tools for high-strength and safety-related structural components, weba has established itself across the globe as an important player in the automotive industry.

Brand new facility



A valuable partnership

AN EXISTING RELATIONSHIP

At first glance, weba may not appear to be the classic purchaser of an EBNER hotPHASE® facility. That is, the globally-active company does not supply material to the automotive industry – it produces tools for companies who do.

weba manufactures hot forming tools and has already been involved in projects alongside EBNER: the EBNER hotPHASE® roller-hearth furnace at Nanjing Y-Tec was paired with weba tools to produce complex car body parts with finely-tuned material properties for automotive manufacturers.

weba is, however, the classic EBNER customer in another way: the company places great value on high

FEEDBACK FOR PRODUCT IMPROVEMENT

Feedback is crucial for both companies. weba uses feedback from its customers as an important basis for meeting requirements more successfully. The same held true for this order as well, which relied on two-way feedback and ongoing exchange of experience. EBNER receives feedback about the performance of the facility during tests, while EBNER technicians can provide tips on fine tuning parameters of the hotPHASE® facility to optimally suit every hot forming tool.

This project allowed both buyer and seller to gather experience, improving both of their individual product lines and setting standards for the future.

www.weba.at



Red-hot blanks ready for the press

quality and on continuous development. weba has been actively involved in promoting the trend toward ever-lighter and ever-stronger components by supporting the development of hot forming tools, a development that still continues today.

To continuing developing and testing new processes and tools for weba's customers, an order was placed for a hotPHASE® roller-hearth furnace for press-hardening blanks, to be installed at the R&D department at the Olomouc plant in the Czech Republic. The tools can also be optimally prepared for the customers.

TECHNICAL DATA	
Heated length	2292 cm (75'2")
Max. operating temperature	980 °C (1796 °F)
Time between charge movements	12 seconds
Annual throughput	15,000 t (16,500 USt)

Drive side



EBNER quality for every facility

Four success stories



JÜRGEN RANNER

EBNER

Customer Services news

Does a muffle need to be replaced? Is the workbase on its last legs? Does that old furnace finally need to be modernized?

The EBNER Upgrade & Rebuilds team has EBNER quality spare parts and modernization packages for both EBNER and non-EBNER facilities.

NEW MUFFLES FROM EBNER

Not every furnace is created equal. This is most obvious in the quality of muffles installed in bright annealing lines for CrNi stainless steel strip after a few years of service, as they are subjected to extremely harsh conditions.

Prominent customers turn to EBNER when they need to replace muffles, even at their non-EBNER facilities. Our customers know they can count on EBNER spare and replacement parts. It starts with the material itself, which has to pass strict quality control tests in the EBNER in-house lab. Muffles are manufactured by experienced employees in the EBNER Austria workshop. Finally, the new muffle is installed and commissioned with the help of EBNER experts on site. Everything from one source: EBNER.

Muffle in the EBNER workshop



NEW MOBILE CHARGING DEVICES FOR COILS

Wanting to reduce handling time, a customer came to EBNER and requested a solution. EBNER designed a brand new type of charging rack to accept the charge before annealing, go through the anneal cycle and allow transport by a forklift after heat treatment.

The customer was very satisfied with the solution, in particular due to the CE certification and acceptance on site by EBNER quality assurance personnel. The charging racks are stackable to save space in the production area.

Charging device



Workbase repair kit for EBNER and non-EBNER workbases

WORKBASE REPAIR KIT

Bell annealer facilities can be upgraded or modernized in a variety of ways: software upgrades, heat exchanging systems, automation packages, and so on. The workbase repair kit for EBNER and non-EBNER workbases is an all-in-one package for easy and economical repairs. Thanks to the EBNER R&D department, workbase technology has continued to evolve. With the repair kit, old workbases are refurbished and upgraded with new technology:

- » flat floor instead of dished diffuser floor
- » support rings to carry the load rather than support posts
- » diffuser/load plate assembly as a single combined component instead of separate pieces

This new workbase design has several advantages for our customers:

- » floating floor (cover) allows more movement during annealing and cooling
- » the charge is supported across a greater area, preventing deformation or wear on the support structure
- » use of automated manufacturing and modern robotic welding
- » diffuser/load plate assembly is optimized for best gas flow and largest coil support area

The EBNER workbase repair kit can be installed in just six working days.

MODERNIZATION FOR SMALL AND LARGE

Minor upgrades to older or smaller furnaces can keep them in working order for longer: the pot furnaces shown in the photo below are a good example. At every job, EBNER technicians assess the current situation on site to see what needs to be done. Components are measured, temperature and process values are evaluated, and a custom upgrade package is designed in consultation with the customer. Trained, experienced EBNER service technicians visit customers around the world for these modernizations.

We would be glad to discuss the upgrade options for your facility in person!

Small modernizations can really pay off!



NEWS

HICON®
Journal is
also available
by email!

Trade fairs. Conventions.

9. - 11.10.2018	ALUMINIUM DÜSSELDORF	Düsseldorf	DE	Booth No.	10 E 15
17. - 19.10.2018	INDOMETAL	Jakarta	ID	Booth No.	D1 - C09
23. - 26.10.2018	EUROBLECH 2018	Hannover	DE	Booth No.	27 F 166
5. - 10.11.2018	CHINA INTERNATIONAL IMPORT EXPO	Shanghai	CN	Booth No.	5.2 C02
13. - 16.11.2018	METAL EXPO 2018	Moskow	RU	Booth No.	75 2D-11
27. - 29.11.2018	WIRE / TUBE METALLURGY INDIA	Mumbai	IN	Booth No.	G 56

We look forward to seeing you there!

New orders

MAX W. CLAAS GMBH & CO. KG	DE	HICON/H₂® bell annealer facility for steel wire coils
TUBE PRODUCTS OF INDIA LTD.	IN	HICON/H₂® bell annealer facility for steel strip coils
KOELNER LANCUCKA FABRYKA	PL	HICON/H₂® bell annealer facility for steel wire coils
BUNTMETALL AMSTETTEN GMBH	AT	HICON® bell annealer facility for copper-base metal tubes
GIEBEL KALTWALZWERK GMBH	DE	HICON/H₂® bell annealer facility for steel strip coils
GUANG XI ZHENG RUN NEW MATERIAL TECHNOLOGY CO., LTD	CN	HICON® bell annealer facility for aluminum strip coils

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