EBNER.
Even more service for our customers.

Dear business partners,
Dear employees,

EBNER’s customers constantly face the most intense competition. Providing our customers with custom solutions and the world’s leading technologies for a decisive competitive advantage: this has been the passion of every employee of the EBNER Group, day in and day out, for decades.

Research and Development is an integral part of the EBNER company philosophy. The resulting advantages for our customers include comprehensive know-how, smart technologies and efficient total solutions.

Another key to success these days: speed. EBNER recognized this early on. The EBNER group has already implemented all the necessary changes in personnel and organization to respond even more quickly to our customer’s needs. In combination with a balanced price-performance ratio, these are the ingredients that let our customers stay head and shoulders above the rest on the global market.

In this issue of the HICON Journal, we take a look behind the scenes. What personnel changes have taken place at EBNER, who has taken over which responsibilities, and how are we better able to serve our customers? All this, and of course the latest from the world of heat treatment technology, in the current HICON Journal.

Enjoy reading this issue!

Robert Ebner
CEO
Dr. Alfred Heinz is EBNER's new CTO.

HICON®: Mr. Heinz, what is your personal impression of EBNER?

Heinz: I have known EBNER as a reliable supplier of outstanding heat treatment facilities for over 15 years. Previously, I was employed in the technical department of a global aluminum producer. That company manufactured semi-finished products for the aircraft, automotive, shipbuilding and rail industries. Those industries have the strictest requirements regarding quality and safety, which naturally also apply to heat treatment processes.

EBNER was always the first choice among suppliers, due to their technology, quality and reliability. To put it bluntly: EBNER is THE supplier for high-end products in the furnace sector. I am very happy to have the opportunity to help shape the future of a company with such a reputation, in a team that has led technological development for years.

HICON®: What are your goals at EBNER, and what are the first steps?

Heinz: In the short term, we would like to revise our structures and processes for both innovation management and product/process development, placing an even greater focus on technological development. Our goal is to remain or become the technology leader in the most important markets and applications.

In the middle to long term, this new focus on our ability to innovate should allow us to reliably identify future technological challenges and future customer requirements, and to react by developing appropriate products. The definition of our innovation and development goals is based on product and technology roadmapping. These maps show the path along which EBNER products and services must develop in the future, together with associated technologies. The parameters for this development are created in collaboration with customers, as well as with other partners in the value-added chain.

A broad spectrum of end products become apparent when one considers the great variety of metal products we encounter daily: from eating utensils through cars, ships and planes, electrical cables and household appliances, to construction both above and below ground.

HICON®: Can you be more specific regarding technological change?

Heinz: Most importantly, we will meet the challenges posed by the increased digitalization, automation, and process integration in our customers’ works head-on. For example, the idea of performing maintenance work on a customer’s facilities without a service technician actually needing to be on-site.

Or concepts such as the integration of a facility into a customer’s production planning, or simplifying the operation and supervision of our facilities with state-of-the-art digital technology. Our main goal is ensuring that these developments provide tangible advantages to our customers. By that I mean lowering costs, increasing productivity and also improving process stability.

HICON®: It seems you have a great deal planned.

Heinz: Yes, we intend to do a great deal to further establish EBNER’s position. I am really looking forward to this challenge and to working together with an innovative and globally-successful team.

HICON®: Mr. Heinz, thank you for the interview, and we wish you the all the best at EBNER!
In 2010, the city of Nanning began expansion of an existing industrial park, in order to fire up yet another engine behind the regional economy. The grounds were greatly expanded, and a state-of-the-art complex was built. Hundreds of new jobs were created, and the cornerstone for one of the world’s most advanced aluminum plants was laid.

With the ambitious goal of becoming one of the world’s leading producers, Alnan turned to the most technologically advanced suppliers of industrial equipment to outfit the plant. EBNER was selected to supply the industrial furnace facilities.

"Alnan was building a completely new plant here, and needed experts with as much experience as possible for the process. Machinery from a number of well-known manufacturers is located alongside ours, so we are in very good company," VP of Sales Wolfgang Dimster explains.

To begin production of flat products - plates, sheets and strip - Alnan ordered three EBNER facilities: a HICON® roller-hearth furnace for solution heat treatment, a HICON® batch-type furnace for aging and a HICON® floater furnace to solution heat treat aluminum strip. With the contract signed in 2012, the batch-type furnace was handed over at the end of 2013 and the roller-hearth furnace in 2014. The third facility from EBNER workshops, the floater furnace, began operation in the summer of 2015. The strip handling section could be built and installed in such a short time. "The creative force at work there is quite impressive," Kirchmayr reminisces about his visits to the customer in Nanning. He was especially pleased with the cooperation between experts from EBNER Austria and EBNER Asia.

"The furnace facilities were designed in Austria, and the key components were also manufactured there. The large components and electrical control center were fabricated at our Chinese subsidiary. Colleagues from both locations worked together to commission the facility," says Kirchmayr. He personal experience was of excellent communication between Alnan and EBNER.

"After all, that is the best foundation for a long-term and mutually beneficial relationship," Kirchmayr reminds us.
In 2007, EBNER China introduced their GOLD SERVICE PROGRAM. The basic idea is simple: our customers agree to having our service personnel perform a preventative maintenance service visit one a year for several years. In return, we offer reduced, fixed field personnel rates. There is no sign-up fee or yearly fee, and all work is billed based on time and material actually spent.

A typical GOLD SERVICE PROGRAM contract runs for 3 years. The value of the field rate discount effectively increases each year because we freeze the rates at the time the agreement is signed, for the time period agreed. For example, if we were to increase our rates 5% each year over the next 2 years, the savings would be 16% in the third year of the agreement.

The customer can not only be sure of real savings, but also that his EBNER facility is always running at its best. With our sophisticated, state-of-the-art analyzers and measuring equipment, we can fine-tune the facility to optimum productivity and lowest possible emissions. In addition, our service team will point out upgrade opportunities or recommended spare parts in the final report.

Mr. Miao Jianlin, Maintenance Manager of voestalpine Böhler Welding (China) Co., Ltd., was kind enough to sit down with us and talk a bit about his company’s experience with EBNER’s GOLD SERVICE PROGRAM.

HICON*: Mr. Miao, since when has voestalpine Böhler Welding run a production facility in Suzhou?

HICON*: And when did you start annealing your materials?
Mr. Miao: The EBNER HICON/H₂ bell annealer was installed and started up in 2007.

HICON*: How long have you been a GOLD SERVICE PROGRAM member?
Mr. Miao: We joined the GOLD SERVICE PROGRAM right after the end of the facility warranty in 2009 and have been a member ever since.

HICON*: What are the benefits for your organization?
Mr. Miao: The EBNER GOLD SERVICE PROGRAM ensures that the facility is always in safe and optimum running condition. Over the years, we have developed close working relationships with the EBNER service engineers and can benefit from their experience whenever we have questions throughout the year.

HICON*: Thank you!
Customer Services: individual solutions for every situation.

EBNER Customer Services is fully aware of the special demands our customers place on existing facilities.

With individual solutions for facility rebuilds, we are now responding even better to the needs of our business partners.

Bernhard Dellekart
EBNER Customer Services

“Our goal is to keep our customers’ facilities up-to-date and highly productive throughout their entire service life. EBNER’s ‘Upgrades & Rebuild’ team continues to develop to reflect customer requirements,” reports Bernhard Dellekart, Executive Vice President Customer Services.

Since the Customer Services Department was reorganized, much has changed. The team, composed of employees with years of experience, is able to use its collective experience and know-how to meet the challenges posed by our industrial customers. It should come as no surprise that the potential for modernizing existing facilities plays a major role. "With individual solutions for facility rebuilds, we are now offering our customers a whole new level of value," says Dellekart.

EBNER offers a 1:1 rebuild of the control system, in which particular care is taken to ensure the optimal use of control and remote I/O components and that current standards of safety are maintained," says the Executive Vice President.

Customers response has been enthusiastic. A further advantage has been that no new risk analysis is required, as the replacement control system is a spare part and no new hazards are created.

PROCESS CONTROL SYSTEMS: MADE BY EBNER. "With our proprietary Visual Furnaces 6® system, EBNER offers a process control system perfectly tailored to the individual needs of each bell annealer facility owner," says Dellekart as he describes potential upgrades for EBNER’s customers. Along with the standard functions of an off-the-shelf application, Visual Furnaces 6® offers additional functions necessary for any bell annealer.

The special features EBNER has integrated into Visual Furnaces 6® bring a customer’s bell annealer up to the highest standards of available technology. "The upgrade is, of course, tailored to each individual customer and furnace requirements," says Dellekart.

HIGH-END MODERNIZATION. EBNER offers individual modernization packages to allow our customers to take advantage of the latest developments and newest technologies with an existing furnace facility. In these cases, EBNER focuses on a risk and control system analysis of existing equipment, due to the high demands placed on safety systems by modernization. From optimization of workload space control to atmosphere burnout systems and emissions (NOx reduction), solutions in this area range up to the modernization of individual control circuits with updated sensors and actuators or replacing the heating bell insulation.

THE GOAL OF THE CUSTOMER SERVICES TEAM. The goal is to keep a customer’s facility up-to-date for years to come. The team has set itself a high bar, too, “We’d like to know what a customer needs even before he himself knows - that’s our ambition,” says Dellekart, describing the challenge facing his team.

The Customer Services Team looks forward to receiving your enquiries, and would be happy to discuss the modernization possibilities for your facility.

EBNER EXCLUSIVE SOLUTIONS.

- TREATperfect calculation of annealing temperatures
- OEEperfect facility efficiency
- STACKperfect optimization of stack handling
- MOBILEperfect mobile visualization system for tablets
- WEBperfect web access to production data from anywhere
- INFOperfect status reports via text or e-mail

Control System as a Spare Part.

Dellekart knows that customers sometimes do not need to modernize an entire facility. However, many need to replace their control system - often due to the fact that a new generation of technicians has not been trained to work with older control systems.

Another common problem is that spare parts are no longer available, as is currently the case with Siemens S5 systems. "For these customers, EBNER is proactively offering a 1:1 rebuild of the control system, in which particular care is taken to ensure the optimal use of control and remote I/O components and that current standards of safety are maintained," says the Executive Vice President.

Customers response has been enthusiastic. A further advantage has been that no new risk analysis is required, as the replacement control system is a spare part and no new hazards are created.

The special features EBNER has integrated into Visual Furnaces 6® bring a customer’s bell annealer up to the highest standards of available technology. "The upgrade is, of course, tailored to each individual customer and furnace requirements," says Dellekart.

VISUAL FURNACES 6®.

- Process data recording
- A clear overview of current processes, including graphical display:
  • Utility supply
  • Process and protocol data for each workbase
  • Status display for each workbase
- Quality data, including anneals and logbook
- Maintenance module
- Scheduling & management tools (stack handling)
- Statistics

Bernhard Dellekart
EBNER Customer Services
The new works of the privately-owned steel producer - a family-owned company that has been in the steel industry for generations - was built on the Black Sea coast, in an area that had previously been undeveloped. "The conditions we faced in this project were unique. At that time there were almost no accommodations for EBnEr personnel in Karasu, so it was a real logistical challenge," says Project manager Josef Breitenfellner - referring to the limited infrastructure in the Turkish province at the time.

Since the construction of this steel complex was a "green-field" project, all negotiations took place at the offices of Gazi Metal in the Turkish capital of Istanbul.

"In 2012 the customer placed an order with us for a bell annealer facility with 14 workbases, but the foundation is designed for a total of 20 bases. Annealing of electrical steels is one of the most important factors giving Gazi Metal a competitive advantage. This is a classic HICON/H2® bell annealer facility," says Breitenfellner as he describes the project. Gazi Metal saw EBnEr’s in-house laboratory as a real advantage.

"This is a big difference between us and our competitors. We can carry out test anneals on steel strip when a customer requests it, and show what properties the material will have after processing. None of our competitors have such a lab for testing," points out the Project Manager.

Companies that opt for high product qualities and premium segments like the automobile industry know how valuable such benefits are. As Breitenfellner recalls, "Gazi Metal was satisfied with the test results from our lab, and the bell annealer facility in Karasu has been in operation since the fall of 2014."

RESEARCH AND DEVELOPMENT.
Research and development has always been a priority at EBnEr, and that for good reason: only through constant effort to improve and innovate is it possible to offer state-of-the-art technology and maintain the high standards of our furnace facilities. The EBnEr R&D team is comprised of 50 people, all of whom are dedicated to experimental research, process development and facility optimization.

"The competition never sleeps, of course," says Breitenfellner. "But with the laboratory available for testing at EBnEr’s headquarters in Austria, our customers can use test anneals with production charges to judge the performance of our facilities for themselves - even during the planning phase."

For customers like Gazi Metal, a new player in high quality steel production, the advantage is clear.
Mutual trust.

Novelis Corporation and EBNER have long seen eye-to-eye in their business relationship. At their plant located in the Chinese province of Jiangsu, Novelis once again turned to the know-how of the experts in industrial furnaces.

“Novelis has high expectations both of itself and of its business partners. That is why it is not surprising that EBNER had previously been selected to develop a new cooling section for the HICON® floater furnace at their American works in Oswego,” reports Sales Manager Robert Schmidt.

The EBNER design met the high expectations of the Americans, who, depending on the alloy, wanted to cool the aluminum strip with either water or air (as reported in the Fall 2013 HICON® Journal). Today, a similar facility incorporating state-of-the-art technology has been installed at the works located in the Changzhou National Hi-Tech District.

The selection of a floater furnace facility is a sign of the customer’s long-term view of the very competitive field of aluminum, as it is in the vehicle sector that sales figures for aluminum products are growing. Novelis is the first foreign company that will supply the Chinese automotive industry with strip.

“Well-known automotive companies are now manufacturing in Asia, and are turning to aluminum alloys more and more frequently,” explains Schmidt. With the high-end furnace facility from EBNER, Novelis can easily meet the needs of premium car manufacturers.

Novelis Corporation and EBNER have long seen eye-to-eye in their business relationship. At their plant located in the Chinese province of Jiangsu, Novelis once again turned to the know-how of the experts in industrial furnaces.
To say that the scale of things is different in Russia than in Europe is nothing new. Still, the order placed by Russia’s OAO KUMZ is a new dimension for EBNER.

“This project, a new rolling mill, will be completed in two phases. During both, EBNER Industriefenbau is working closely together with Russian aluminum producer OAO KUMZ,” Senior Sales Manager Reinhard Leithner explains. The first phase was completed in May 2015, with the opening of the cold rolling mill. During this phase, EBNER designed, produced and installed ten HICON® single-chamber overhead furnaces to heat treat strip coils. This number will rise to eighteen overhead furnaces by 2017, and when the mill is complete a total of 30 EBNER industrial furnaces will be operating. “It would be hard to find another order to compare with the scale of this one, and - as reported in the Fall 2013 HICON® Journal - it is unique in EBNER’s company history.

Due to the complexity of the project, almost four years passed before the contract was actually signed. Still, with EBNER’s assistance, the Russian company is well on its way to becoming one of the world’s top producers of aluminum semi-finished products. KUMZ wanted to implement Western standards in the new mill, so these facilities are being fabricated exclusively in Austria. The end customers value this quality,” stresses Leithner. These end customers include manufacturers of high-quality components for the aerospace industry, for precision machinery, and manufacturers of high-speed trains.

THE FIRST STEP IS THE HARDEST.
The beginnings of the excellent professional relationship between EBNER and KUMZ can be found in 2007, when KUMZ opened a new plant to produce plate to the highest international quality standards. “At that time we constantly had to prove to people that we were better than the competition,” Leithner recalls. “But, in the end, it was the quality of EBNER equipment that convinced the Russians to go with us.”

While at that time individual components were supplied by other manufacturers, in the current project all heat treatment facilities are being supplied by EBNER alone. “In 2017 at the latest, when the second construction phase is completed, the Kamensk Uraljskij works will be the most modern aluminum plant in all of Russia,” says Leithner – underlining the high technical standards of the aluminum producer.

OPENING CEREMONIES.
Representatives from EBNER were invited to Kamensk Uraljskij for the opening of the cold rolling mill by OAO KUMZ. “We found ourselves mingling with local celebrities and politicians,” recalls Leithner. The opening ceremony was broadcast nationwide on Russian television. “During another business trip to Russia I was asked about the broadcast. It was great exposure for our company,” says Leithner. When asked about the relations between KUMZ and EBNER, he emphasizes the effectiveness and ease of communication. “We have been working together with KUMZ for almost ten years, and it is a real pleasure to work so well with a customer.”
HICON/H₂® bright annealing technology for high-alloyed steel strip.

The most economical facility designs in comparison (part I).

Thanks to our commitment to research and development, EBNER has been the technological leader in heat treatment for decades. This report is a “sneak preview” of our latest technical paper on the topic of continuous bright annealing. Look for the complete article in the upcoming issues of Heat Processing (issue 4/2015) and Gaswärme International (issue 5/2015).

SASCHA EPPENSTEINER

THE FUNDAMENTALS.

To manufacture flat products, the starting material is formed into the desired strip shape by hot and cold rolling. Cold forming work hardens the material. In order to enable further processing (e.g., rolling to final thickness, deep drawing, bending, pressing, etc.), this hardening must be reduced.

Depending on the application of the end product, different heat treatment equipment may be appropriate. This article review the case of continuous annealing of high-alloyed steel strip in process atmosphere.

Typically, this applies to grades of stainless steel with austenitic, ferritic or martensitic microstructure, whose alloying elements (Cr, Ni, Mn, Ti, Mo, etc.) have a high affinity to oxidation and are therefore heat treated in a hydrogen atmosphere in order to maintain a high-gloss surface.

Such products have a wide range of applications. They may be used in the construction industry (cladding, street furniture), automotive industry (catalysts, exhaust components), food industry (wine tanks, beer kegs), petrochemical industry (heat exchangers, pipe-work) and medical supply industry (scalpels, needles), as well as in the household goods industry (washing machine drums, cookware, razor blades).
The diagram reveals the problems associated with bright annealing steel with alloying elements that have a high affinity to oxygen. It shows the connection between atmosphere dewpoint and annealing temperature in 100% hydrogen atmosphere.

**Influence of Dewpoint and Temperature on Oxidation of Metals in Pure H₂ Atmosphere.**

Pure hydrogen has the following advantages compared to nitrogen or nitrogen/hydrogen mixtures containing only 4% hydrogen:

- 7 times the thermal conductivity
- 60% higher rate of thermal transfer
- Stronger reductive effect to prevent oxidation, particularly in combination with lower dewpoints
- Improved lubricant decomposition due to hydrogenizing effect
- 1/14 the density, meaning decreased energy consumption in cooling gas circulation
- No nitriding of strip or furnace components

In a modern HICON® bright annealing facility the use of a pure hydrogen process atmosphere with the lowest possible dewpoint (-60°C / -76°F) is standard technology, ensuring the best possible quality of the annealed products. With a high H₂/H₂O ratio, the following reaction is suppressed and a high reduction potential is created in the atmosphere: Me + H₂O → MeO + H₂.

Such a high atmosphere reduction potential is only possible with a metal-encapsulated workload space and a well-engineered sealing system. In EBNER’s muffle design, the heating system and lining are separated from the workload space by a metal shell.

**Excellent Strip Geometry and a Flawless Strip Surface.**

In order to achieve flat, ripple-free strip geometry, strip tension must be kept low and precisely regulated during annealing. This is particularly important with thin strip (e.g. precision steel strip up to 0.03 / 0.001” mm thick). To protect the strip surface from mechanical damage, heat treatment must be contact-free - either in a vertical (vertical strand annealer) or horizontal (catenary furnace) arrangement. Once past the dancer roll installed beyond the inlet seal, the strip moves through the heat treatment section muffle and cooling zone contact-free.

Part 2 of this article, in which a description of how the underlying concept of a heat treatment facility is implemented in both vertical and horizontal designs, as well as a comparison with other heat treatment designs, will follow in the next issue of the HICON Journal.
Most recently, in 2012, Shandong Nanshan placed yet another order for two additional pusher-type furnaces, bringing the total number up to the lucky number 7.

All the furnaces have been running at peak efficiency ever since. Nanshan continues to trust in EBNER quality, but also places no small value on prompt and efficient services. In fact, Shandong Nanshan is so convinced of EBNER’s products and services that they also ordered a floatertype furnace for aluminum strip from EBNER which is currently being installed.

A long service life is EBNER’s goal. We interviewed Mr. Wang Tao of Shandong Nanshan to get his feedback about EBNER’s products and services. Mr. Wang Tao, Plant Director of Nanshan Group Light Alloy Co., Ltd., has been working with Nanshan for 12 years, and is therefore quite familiar with the EBNER HICON® pusher-type furnace facilities.

**HICON®**: Mr. Wang, when did Nanshan start up its first production facility in the Yantai plant?

**Mr. Wang**: October of 2006.

**HICON®**: What kinds of material do the EBNER HICON® pushers treat? What are the end products?

**Mr. Wang**: We use EBNER HICON® pusher-type furnaces to heat treat 1, 3, 5 and 8 series aluminum alloys, which are mainly used as can body material, can cover material and aluminum foil stock.

**HICON®**: Does your company have any regular maintenance plan? Weekly, annual, and overhaul?

**Mr. Wang**: We carry out minor maintenance during plant downtime. Every year, we check shoes, rails and moving parts. We also plan to update the old circulation fan motors.

**HICON®**: How have the furnaces been running since production began?

**Mr. Wang**: The performance of the facility is excellent.

**HICON®**: What expectations do you have of your furnace supplier? What is most important to you?

**Mr. Wang**: A quick response and feedback to the customers’ problems as well as efficient and high-quality servicing.

**HICON®**: EBNER is developing a Charge Planning system so that our customers can utilize the full capacity of the furnace in the most efficient way. Would your company be interested in such a charge planning system?

**Mr. Wang**: We would like to hear more about this system!

**HICON®**: Thank you.

Shandong Nanshan Aluminum Co., Ltd., is one of China’s leading aluminum suppliers. EBNER’s relationship with the customer began almost ten years ago, in 2006. After an order for two pusher-type furnaces was successfully installed and commissioned, Nanshan ordered another furnace, followed by an order for two more to complete the set of five.
**NEWS**

**EBNER. Trade fairs. Conventions. New orders. Addresses.**

### Trade fairs. Conventions. 2015 / 2016.

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<td>10.-13.11.2015</td>
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We look forward to seeing you there!

### New orders.

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<td>THYSSENKRUPP PRESTA DE MEXICO S.A. DE C.V.</td>
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<td>VOESTALPINE TRAFILERIE INDUSTRIALI S.P.A.</td>
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<td>AVON ISPAT &amp; POWER LIMITED</td>
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<tr>
<td>MAGNA COSMA INTERNATIONAL EAGLE BEND MANUFACTURING, INC.</td>
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<td>AMAG ROLLING GMBH</td>
<td>AT</td>
<td>HICON® batch-type furnace facility for aluminum plates</td>
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<td>NISSHIN STEEL CO. LTD.</td>
<td>JP</td>
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<td>HICON® batch-type furnace facility for aluminum plates</td>
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