Dear HICON readers,
dear partners,
Ladies and Gentlemen.

In this issue, I am very pleased to announce that the EBNER Group continues to grow.

EBNER Industriefenbau has acquired 51 % of HPI High Performance Industrietechnik GmbH, based in Braunau-Ranshofen, Austria. With this acquisition, we have taken another step toward our strategy of becoming “the most innovative and competitive full solution provider in thermal processing”.

HPI is a small but excellent company, and is also a classic family-owned operation. It is managed by its two founders and current shareholders, Herbert Hubbauer and Rainer Edtmeier, and has enjoyed much success in the market over the years.

HPI specializes in facilities for remelting scrap, horizontal continuous casting, and continuous homogenizing of extrusion billets. Other important products include ultrasound testing facilities as well as saws, marking units and packaging facilities.

Together with GAUTSCHI’s melting and casting equipment and EBNER’s heat treatment facilities, these new products allow us to offer our customers an even broader spectrum of high-tech industrial facilities – all from a single source.

Our goal is to strengthen each individual member of the group through efficient internal cooperation. Through the use of synergies, we can offer our customers an even more flexible and cost-effective range of products.

I hope you enjoy reading this issue of the Journal!

Yours sincerely,
Robert Ebner

EDITAL.

EBNER.

ROBERT EBNER.

CEO.

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INTERNET: These HICON® Journal articles can also be found on our website at www.ebner.cc. Click News & Press / HICON® Journal to download this and past issues of the magazine.

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HPI joins the EBNER Group.

EBNER continues to broaden its product portfolio for the aluminum industry.

At the end of 2016, EBNER Industriefenbau welcomed another member to the EBNER Group by acquiring 51% of HPI High Performance Industrie-technik GmbH, based in Branau-Ranshofen, Austria.

We talked to Managing Director Herbert Hubbauer and Sales Manager Rainer Edtmeier about how the small Austrian technology company complements EBNER’s range of products, and what the future holds for the group.

HICON®: To start with, could you introduce HPI and its history to our readers?
Hubbauer: HPI was founded in 1988 and is based in Ranshofen, Austria. Everything began with four young engineers, in the Hubbauer family home.

Right from the start, we specialized in mechanical and plant engineering for the aluminum industry. We are proud that customers around the world place their trust in us.

HICON®: How did the acquisition by EBNER come about?
Hubbauer: A restructuring of our previous parent company put us in a new situation. We view the acquisition by EBNER as a positive development for our company.

The acquisition of GAUTSCHI in 2010 added melting and casting to the EBNER Group product range for the aluminum industry. HPI’s product line further underscores EBNER’s guiding principle of being a “full solution provider” for aluminum products.

HICON®: What advantages do you see for HPI in joining the EBNER Group?
Edtmeier: There are many advantages to being part of the EBNER Group: the EBNER R&D lab, access to new markets and new customers, the many partners/subsidiaries and service centers across the globe – and the ability to work in concert with the market leader. Combining our technology with that of EBNER and GAUTSCHI results in a true full solution provider.

HICON®: What developments do you predict in the aluminum sector?

Hubbauer: The automotive industry is increasingly turning to forged aluminum components. Horizontal continuous casting lines are one of our core products, efficiently producing the starting material for forging. Due to increased use of aluminum in both the automotive and aerospace industries, we have a positive outlook on developments.

HICON®: Are there any joint projects on the horizon? What might such a project look like?
Edtmeier: Through the integration of HPI into the EBNER Group, our customers have even more options to choose from when planning a facility, and all from a single source. A melting facility from GAUTSCHI, a casting facility from HPI, a heat treatment furnace from EBNER and a testing unit from HPI – or any other combination of our proven products: our customers have a wide range of possibilities.

Every project can be refined to suit the unique needs of each customer even more closely than before. Our customers can choose the “full solution provider”.

HICON®: Thank you and welcome to the EBNER Group!
When C. S. Aluminium was looking for a partner to supply a floater-type furnace as part of a 2013 project to expand their product portfolio, it was clear which manufacturer would be able to keep their promises.

**DEBUT AS CONSORTIUM LEADER.**
For EBNER, this project was something of a first. With Tenova as the strip handling equipment supplier, this was the first time EBNER headed a major project as consortium leader. The challenges EBNER faced proved interesting. For example, the customer specified that a single process control system be implemented for the entire facility, so EBNER and Tenova had to create a custom software solution to meet this requirement.

**INNOVATIVE SOFTWARE REDUCES SCRAP.**
This project was innovative not just in terms of the consortium leadership role, but also in the HICON® floater-type furnace facility itself. An online calculation model was integrated into the process control system, ensuring that the strip is always being processed at ideal parameters, leading to top quality material.

Scrap is also reduced, as the model calculates an ideal changeover from one coil to the next, particularly in the case of differing cross-section dimensions and changes in alloy.

In the mid 1980s, C. S. Aluminium ordered a pusher furnace facility for aluminum ingots from EBNER. After 30 years of operation, the EBNER furnaces have proven their quality and EBNER has been awarded an order for a new floater-type furnace facility.

EBNER’s partnership with C. S. Aluminium began nearly 30 years ago, with a HICON® pusher-type furnace facility to heat treat aluminum ingots. At the same time, C. S. Aluminium also placed an order with a competitor for several furnaces, which led to a long-term comparison between the two brands.

The true quality of EBNER’s furnaces became apparent over the years, as the competitor’s furnaces have not aged quite as gracefully.

**Quality pays.**
After 30 years, C.S. Aluminium orders a new furnace from EBNER.
EBNER customers across the globe know what EBNER quality means. EBNER can guarantee this quality thanks to its in-house workshops on three continents, equipped with state-of-the-art machinery.

Behind every high-quality product stands a chain of people and equipment. EBNER believes in in-house production, and is investing in all of its workshops. The best machinery available today enables our employees to build the best possible facilities for our customers.

NEW WELDING MACHINE IN AUSTRIA.

At EBNER Asia, investment is still in the planning phase, but it is already reality at our Austrian works. After almost 30 years of faithful service, it was time to replace the plasma-arc keyhole welding machine at EBNER Leonding. As a replacement, an Oerlikon welder with a clamping bench was selected; one year earlier, an Oerlikon welder for circumferential seams had been purchased, and the two use the same technology and control systems.

This drastically reduced the time required to train our employees. At the same time, each of our specialists is able to operate both pieces of equipment, and spare part requirements are reduced due to the similarity of design.

On the new machine, the welding procedure is monitored by cameras to allow better supervision. Welding errors are now a thing of the past.

The machine is used to make longitudinal weld seams, e.g. on sheet casings for inner covers, workbases, diffuser floors, outer shells and inner casings. Yet another improvement to manufacturing quality!

NEW LATHE IN USA.

At EBNER Furnaces USA, the aging Zerbst lathe had served its time and was replaced by a Toshiba vertical lathe. Fabrication programs are created using state-of-the-art CNC technology and CAD/CAM software, making optimal use of the new Toshiba machinery. The new lathe can fabricate parts up to 5.5 m (18 ft) in diameter, with far less work involved due to the horizontal position of the workpieces. The Toshiba lathe provides far more precise and efficient machining, drilling, and thread cutting - using a single piece of equipment and in a single procedure.

With this state-of-the-art unit, EBNER Furnaces will have an advantage in fabrication for years to come, ensuring that our customers maintain their leading positions in the market.
Facility and test parameters, once entered, are saved for each specific furnace and can be used for subsequent tests. Required documentation such as calibration certificates, the measuring equipment itself, and (of course) the test reports can be clearly managed with this single module.

Using a tablet, measurements can be made by a technician directly at a furnace. The module allows multiple tests to be carried out in parallel by splitting up the measuring points. Optimized, fast testing sequences shorten facility downtime.

In order to meet the needs of the aerospace and automotive industries, heat treatment facilities must provide a high degree of temperature accuracy and temperature uniformity. EBNER facilities are able to meet or exceed these needs, opening these attractive markets to our customers.

In order to ensure the long-term quality of heat treatment, the standards of both the aerospace and automotive industries (AMS2750 for aerospace, CQI-9 for automotive) demand regular checks of required characteristics. These checks must, of course, be documented and traceable.

Using the Instrument Test (IT) and System Accuracy Test (SAT), the accuracy of temperature measurement systems, e.g. instrumentation and thermocouples, can be assured. The Temperature Uniformity Survey (TUS), as the name implies, is used to check the temperature uniformity in the furnace. Testing procedures, acceptable tolerances and test intervals are specified in AMS2750 and CQI-9, and must be adhered to.

The high frequency of these tests (monthly or even weekly) and the extensive documentation required of test results lead to high personnel requirements and can restrict production.

SURVEYperfect – the new EBNER software module – is here to help.

SIMPLE. CLEAR. FAST. PERFECT.
...that is how testing should be - and that is what we demanded from our development team.

The module unites these characteristics, allowing tests to be carried out using menu-guided, simple procedures. The operator is led through the test procedure chronologically, from the entry of test-specific parameters and selection of testing equipment (from an equipment database integrated into the module) on through the measuring points themselves to final documentation.

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Procedures that are as perfect as possible naturally require a high degree of automation. With a direct link to the furnace control system and full integration into the VISUAL FURNACES® process control system, all required data is available. Calculations as well as the transfer of values and corrective factors are done automatically. This minimizes errors caused by manual entries.

The fact that filling out reports and documenting tests takes at least as much time as the actual measurements is something that any technician can talk about at length. This is where the module offers significant assistance: a test report, complying with all requirements of the standard, can be created at the push of a button. In addition, an integrated graphics module allows TUS measurements to be quickly evaluated and displayed.

ONE TOOL FOR EVERYTHING.
Along with the optimization of testing procedures and their documentation, the module includes additional useful functions such automatic reminders of testing intervals, calibration of testing equipment and - last but not least - documentation required by the industry standards on thermocouple use.

SURVEYperfect gives you perfect conditions for successfully passing audits.
As a full solution provider, EBNER is known worldwide for its large-scale, turnkey projects. In this case, 7 major work groups involving a total of 23 companies and an on-site crew of around 80 people were coordinated by a single source: EBNER. The result was a highly-efficient HICON/H₂® bright annealing line.

In 2014, Outokumpu initiated their NiFO – Nirosta Ferrit Optimierung or “stainless ferrite optimization” project, comprising extensive modernization that would expand the company’s capacity at its German works. This will increase the company’s long-term competitiveness in its most important market. Production became leaner, with the Düsseldorf-Benrath plant closing and the Krefeld plant expanding to become a state-of-the-art cold-rolled strip works.

Investments were also made in a bell annealing shop, a bright annealing line, a pickling line and a cold rolling mill. To produce special grades of stainless steel strip in bright qualities (2R and BA), an EBNER HICON/H₂® bright annealing line was the perfect choice.

To meet the high expectations of Outokumpu Nirosta in the shortest possible time, EBNER pulled out all the stops.

AMONG OTHER FEATURES, THE NEW BRIGHT ANNEALING LINE WILL:

» be integrated into the existing workshop structure in the same location as the old vertical annealing / pickling line for cold-rolled strip.
» provide enough production capacity to completely replace both electric heated "brick-type" furnaces from the Benrath works while improving performance.
» be capable of producing high-quality ferritic, martensitic and austenitic stainless steel grades with bright surface finishes.
» be highly efficient, consume a minimum of energy and have minimal emissions.
» be equipped with a new welding machine, new strip cleaning section, new heat treatment section and new control system.
» refurbish and reuse various mechanical components of the existing strip handling gear.
» be installed and commissioned while nearby facilities remain in operation.

The most powerful bright annealing line in the world.
A GREAT CHALLENGE, METICULOUS IMPLEMENTATION.

Despite the challenge of building a new state-of-the-art, energy efficient and high-performance bright annealing facility and integrating it into existing infrastructure, modernizing existing machinery and coordinating a large number of subcontractors, the facility began operation after only 25 months.

The new bright annealing line, equipped with EBNER’s proven muffle technology, is designed to heat treat cold-rolled stainless steel strip with widths up to 1600 mm (63 in) and thicknesses between 0.2 and 3.2 mm (0.008 - 0.126 in).

Heat treatment takes place in 100% hydrogen atmosphere, at lowest possible dewpoints. This ensures a bright (oxidation-free) strip surface, even with steels containing alloying elements with a high oxygen affinity. The passivation section Outokumpu had previously used downstream of the bright annealing line was not needed, as the extremely pure atmosphere made it superfluous.

The highly dynamic operation of the heat treatment section and the precise tuning of the other facility components results in throughputs of up to 28 t/h (31 USt/h). This is the best performance of any bright annealing line in the world.

Outokumpu Nirosa values the outstanding quality, consistency and reproducibility of the processed strip, as well as on the excellent productivity and energy efficiency of the facility.

TECHNICAL DATA.

| materials: | cold-rolled stainless steels (AISI 200, 300, 400 series) |
| strip width: | max. 1600 mm max. 63 in |
| strip thickness: | 0.2 – 3.2 mm 0.008 – 0.126 in |
| speed of heat treatment section: | max. 80 m/min max. 262 ft/min |
| speed of inlet/outlet sections: | max. 120 m/min max. 394 ft/min |
| throughput capacity: | max. 28 t/h max. 31 USt/h |
| heating system: | natural gas |
| process atmosphere: | 100% H2 |
| dewpoint: | < -60°C < -76 °F |
| fuel gas consumption (furnace): | abt. 270 kWh/t |
| electrical consumption (furnace): | abt. 13 kWh/|
| project implementation: | turn-key installation |
Optimizing a pusher-type furnace facility for aluminum ingots.

The innovative VISUAL FURNACES 6® TREATperfect computer model (part 2).

ERICH STELZHAMMER

In the last issue of the HICON® Journal we described the conventional method of measuring and recording ingot temperature in pusher-type furnaces: the use of penetration thermocouples.

To take advantage of overshoot temperatures without using penetration thermocouples, operators can now upgrade to the EBNER TREATperfect computer model. The model is supervised by a single penetration thermocouple in the furnace floor or roof, which double checks the temperature at intervals during the heating up phase.

HOW TREATperfect WORKS.
The computer model was originally developed to determine the temperature of every ingot in every zone, especially ingots not located above a penetration thermocouple. Because ingots are often not pushed into the furnace at regular intervals, they have different dwell times and are affected differently by the overshoot temperature. The computer model ensures that every ingot is heat treated correctly.

The calculation is based on the actual temperatures measured in each zone and the speeds of the recirculation fans. In this two-dimensional approach, the ingot is viewed as a cross-section of its width and thickness (through the center of the ingot, when viewed lengthwise).

In this model, the ingots are divided into 5 whole elements and 2 half elements across their width and thickness: a total of 49 elements across the entire cross-section. Heat transfer within a certain time period is calculated for each element.

The heat transfer from the furnace atmosphere to the outer elements is calculated based on jet nozzle geometry, ingot dimensions, recirculation fan speed and the measured furnace temperature. The computer model takes into consideration all material-dependent parameters such as specific weight, specific heat or thermal conductivity.

BASED ON ACTUAL MEASUREMENTS.
The EBNER R&D lab determines these temperature-dependent parameters for each alloy based on practical measurement and calculation. All parameters are saved as data blocks.

By recording the starting temperature, ingots of differing preheated temperatures can all be heated up with best results. Perfectly fine-tuning the model parameters results in such high precision that a program using overshoot temperature can be run without the typical penetration thermocouples.

TREATperfect ALSO PROVIDES AN INTEGRATED VALIDATION FUNCTION.
The temperature of the furnace wind beyond the ingots is measured and compared to the gas temperature calculated in the PLC. If the difference is too great, a safe state is initiated.

In modern HICON® pusher-type furnaces, penetration thermocouples are only used for supervision; the temperature is controlled solely by the thermal computer model. This allows the thermocouple measuring interval to be much larger.

These sample measurements mainly ensure that the ingot data transferred from the MES matches the actual ingots in the furnace, preventing the temperature from rising above the material’s melting point. Less frequent measuring intervals also increases the service life of the thermocouples, which reduces maintenance.

The calculation is carried out at the PLC, as it offers increased availability and does not depend on communication with other systems. Because the PLC is required to operate the facility, it is always available for the calculations. Advances in performance allow increasingly complex models to be depicted in the PLC.

Solutions that were developed in Mathcad or Matlab/Simulink can now be compiled for a PLC.

TREATperfect – AN INCREASING NUMBER OF APPLICATIONS.
In the future, the computer model will be implemented not only at HICON® pusher-type furnaces for aluminum ingots, but also at FLEXBATCH® batch-type facilities for ingot heating. Because these furnaces can be charged and decharged flexibly, the ingots have differing dwell times in the furnace. Calculating the temperature of every single ingot makes it much easier to keep to the required temperature tolerances.

TREATperfect has also been in use at our roller-hearth furnaces for heat treating aluminum plates for years, greatly increasing throughput as a result.

We would be glad to discuss how TREATperfect could be implemented at your facility. Contact us at sales@ebner.cc
Trust is good, but automatic verification is better.

The new SMARTFLAT® system for hardening and tempering lines.

Risse + Wilke, a mid-sized family-owned company, has modernized part of an existing EBNER hardening and tempering line at their Iserlohn-Letmathe works in Germany.

Risse + Wilke is one of Germany’s leading cold-rolling operators. Over the past few years, the company has specialized in products such as hardened and tempered carbon steel strip. Alongside several bell anneal-ers, Risse + Wilke operates three EBNER hardening and tempering lines to produce martensitic and bainitic carbon steel strip.

During processing, continuous supervision and correction of the strip geometry is essential. Any deviation can lead to a loss of quality in the product as well as issues in downstream processes. A relatively large number of personnel is unavoidable at conventional hardening and tempering lines, as any necessary adjustments to the production process must be made manually by experienced operators.

FLEXFLAT® + SHAPEFLAT® = SMARTFLAT®.

To increase automation at the nearly 30-year-old EBNER hardening and tempering line, the customer decided to invest in a new martensite cooling section incorporating automatic flatness measurement and control systems: the EBNER SMARTFLAT® system.

The strip first runs through a FLEXFLAT® martensite cooler in which the strip geometry can be adjusted with infinitely variable settings, a system which has been successfully implemented in many facilities. Beyond the downstream martensite cooling section equipped with water-cooled cooling dies, the strip geometry is scanned by the SHAPEFLAT® laser. Thanks to precise measurement and the high sampling rate, the exact strip geometry is registered.

In a final step, the SMARTFLAT® software automatically links the SHAPEFLAT® laser data with the FLEXFLAT® plate in a closed loop system. Depending on the strip geometry measured by SHAPEFLAT®, the FLEXFLAT® unit automatically adjusts itself to optimize the strip. Manual interventions during strip processing are thus no longer necessary.

The results are clear: optimal flatness with reproducible top quality.

ONE STRIP, MANY STRIPS, SMARTFLAT®.

The SMARTFLAT® system is well-suited to multi-strand operation, and can also be used to measure strip widths. To assure continuous quality of the strip produced at Risse + Wilke, a second, autonomous SHAPEFLAT® flatness measuring system was installed immediately downstream of the final cooling section.

The facility was commissioned in 2016, and since then has been producing hardened and tempered strip with flatness of consistently improved quality.

For more information on the SMARTFLAT® system and its advantages for your facility, please feel free to request our new brochure by emailing us at marketing@ebner.cc


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We look forward to seeing you there!

New orders.

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