90TH ANNIVERSARY – CEREMONY AND FURNACE CONVENTION
Dear Reader,

An eventful and successful new year lies behind us, and already we are up against new challenges. Apart from the past year’s business success, the memorable celebrations of our 90-year anniversary marked an important milestone in our company’s history. Let me at this point thank our customers and partners for their keen participation in both the anniversary festivities and the Furnace Convention. Another cause of great satisfaction in 2014 was the placement of the largest equipment contract in our company’s history. Once again, our engineering approach and experience won the day. Although cyclical fluctuations in the steel casting sector were experienced, we managed to put them to use by modernizing our high-grade steel foundry’s melting operations. In two energy efficiency competitions, our coil annealing lines developed jointly with Alunorf were honoured with prizes – another success for us in the development of innovative, energy saving systems. And the foregoing is just a brief glimpse of some of our highlights in 2014. In 2015, our industry is looking expectantly to Duesseldorf where the leading trade fairs, GIFA / THERMPROCESS / METEC / NEWCAST, will be held in late June.

We, too, are deep in preparations for this event. At our 345 m² stand in Hall 10, we will display interesting exhibits and will inform about major innovations and developments so as to showcase our company’s capabilities and performance. We are looking forward to many expert talks and discussions with customers and visitors at these events, and we are positive that these meetings will yield important feedback and suggestions for our future work. As a matter of principle, our company’s focus is placed on generating customer satisfaction by delivering innovative, cost-efficient and reliable equipment and castings. In order to achieve this goal, we must prevail in an economically difficult environment. Thanks to our creative and highly committed workforce and the extensive experience and broad expertise they bring to their tasks, we see ourselves well equipped to meet these challenges.

I hope you will enjoy reading this issue.

Sincerely,

Markus D. Werner
President and CEO, OTTO JUNKER GmbH

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New after-sales service proposal for thermoprocessing equipment

In order to maximize the availability and service life of industrial systems, regular inspections and maintenance are indispensable. We are determined to provide competent support to our customers in this respect, over and above the services rendered as part of our successful maintenance agreements. The basic idea is to offer supplementary after-sales service relating to the individual equipment types of our range in the form of individually combinable modules. These modules may include, e.g., a one-year spare part package, training at the OTTO JUNKER Academy, efficiency/feasibility analyses, etc.

You will thus be able to select a tailor-made program matching your needs. We are at your disposal for any further information you may require. Please do not hesitate to contact us:

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Start of seminars at the OTTO JUNKER Academy

Starting in 2015, the OTTO JUNKER Academy will be holding training seminars twice yearly (spring/autumn) in two categories, i.e., induction melting systems and thermoprocessing equipment, in both German and English. The courses are aimed at managers and staff of the respective manufacturing, maintenance and investment planning departments. They are designed to provide both advanced training to proven employees and basic or induction training to newly hired staff. Course participants will acquire basic and advanced technical skills, in addition to receiving operating and maintenance training on demonstration and pilot plants. For more up-to-date information and time schedules please refer to the enclosed brochure or consult our website at www.otto-junker.de.
OTTO JUNKER GmbH successfully celebrates its 90th anniversary

Ceremony: tradition and innovation

Stolberg in the Rhineland, where the history of OTTO JUNKER GmbH has its origins, was deliberately chosen as the location for the company’s 90th anniversary celebrations. In 1913, Otto Junker’s father, Andreas Junker, who worked in a Stolberg brass plant, developed the water-cooled mould for manufacturing brass rolling slabs; a ground-breaking invention that provided the financial basis to found the OTTO JUNKER GmbH in 1924.

With its exhibits telling the story of brass and zinc processing, the location chosen for the event – the industrial museum Zinkhütter Hof – also represents the technical link to the products made by OTTO JUNKER GmbH. With distinguished participants from politics and the economy and over 250 guests from 15 different countries, the celebration – which was held the day before the Furnace Convention – was a complete success. Despite a tight schedule, the President of the European Parliament, Martin Schulz, managed to find the time to make a short opening speech.

Garrett Duin, Minister of Economics for the Bundesland of Nordrhein-Westfalen, talked in detail about the relevance and position of medium-sized enterprises such as OTTO JUNKER in society and acclaimed the company’s 90-year old success story. Dr. Schindler, Chairman of the OTTO JUNKER Foundation, underlined the company’s principle of maintaining a close relationship with science and technology, and gave a report on the foundation’s history and results.

The importance of OTTO JUNKER industrial furnaces for a wide range of modern high-tech products was the focus of the speech given by Markus D. Werner, Chairman of the Board of Otto Junker GmbH. He talked at length about the ongoing success story of innovations in Junker furnace construction and about the present and future demands placed on the company.

After the ceremony, a varied buffet and musical accompaniment guaranteed a relaxed atmosphere that held plenty of opportunities for interesting discussions.

Furnace Convention: a meeting for professionals from the trade

The following day, over 150 participants attended the Furnace Convention held at the company’s headquarters in Lammersdorf in the Eifel region.

Speeches, presentations and demonstrations of furnaces and their sub-assemblies gave people the chance to extend their expert knowledge and hold in-depth, fruitful talks. Due to the high number of international participants, talks and demonstrations were also given in English.

OTTO JUNKER Academy foundation

At the start of the event, the newly founded OTTO JUNKER Academy was presented, which pursues the following aims and objectives: Acquisition of technical fundamental knowledge, or expansion of knowledge regarding the planning, modernization, operation, servicing and maintenance of induction and heat-treatment furnaces. Cost-effectiveness, reliability, energy efficiency and safety form the core of the courses held. Training under near-production conditions is given using demonstration equipment and test facilities. The plan is for the OTTO JUNKER Academy to become a permanent institution with courses being held on a regular basis. To find out their views on the concept, participants were asked to fill out a short questionnaire: the analysis of the feedback obtained was very positive.

The convention was divided into two parallel blocks: one on topics concerned with induction furnaces and the other on
thermoprocessing plants. In both blocks, not only introductory talks and presentations but also demonstrations were given using available test facilities and prototypes. Therefore, apart from theoretical explanations, the design and operation of real equipment were also presented and tested.

Talks and workshops

The talks held in the block on thermoprocessing plants ranged from issues concerning equipment for heat-treating aluminium ingots and explanations of the innovative billet heater concept “Kombigas”, through presentations on customized roller hearth furnaces for heat-treating copper and copper alloys right up to the state of the art of strip flotation furnaces and de-greasing, pickling and surface treatment systems.

The research and development possibilities offered by computational process modelling were also shown by way of examples. After the morning presentations and a country-style buffet, in the afternoon the participants visited the Tech Center to be shown around the test facilities installed there and receive a demonstration of their mode of operation. As pointed out, the quench pilot unit enables a wide range of cooling rates to be selected when quenching aluminium strip and plate, thus allowing the optimum technical solution to be ascertained for each product.

A model of the new strip flotation furnace “2VX” was used to explain the advantages of this new concept and its strip carrying characteristics.

This innovative strip joining technique was demonstrated by means of an assembled eyeletting machine, a further in-house development.

An induction billet heater with a modern IGBT frequency converter for the power supply completed the range of equipment that was demonstrated during the thermoprocessing plant workshop.

The other block held in parallel all about induction furnace equipment started with an overview of new developments in induction furnace manufacture and presentations on the important aspect of safety technology.

The second theme was concerned with cost-effectiveness and energy efficiency in melting and pouring processes, with process-orientated furnace technology also being discussed.

A highlight of the subsequent workshop was doubtlessly the presentation of the metallurgical possibilities of advanced circuit configurations, as demonstrated using the new pilot melting facility in the development department. Each participant could see for himself how frequency, power and phase angle of a split coil influence the strength and state of bath movements in aluminium melting plants.

The practical demonstration of a model crucible furnace showed just how quickly highly-localized hot spots, which can cause coil damage, could be displayed and recorded using the OCP crucible monitoring system. Participants were able to see for themselves how a localized rise in temperature caused by a movable hot-air blower could be accurately displayed by the integrated OCP system and how fast an alarm message was triggered if temperatures increased too much.

The design, operation and technical features of the two basic types of frequency converter, thyristorized and IGBT, were explained in a further workshop. The converter cabinets on display made it easier for the observer to understand their structure and different modules. Short video sequences used for
training purposes demonstrated how to change the various modules.

On the subject of pouring furnace technology, the operating principle of the new linear stopper actuator and a method for control of the pouring rate by means of a camera sensing the metal level in the sprue cup were demonstrated on a test facility. The set-up of a pouring furnace spout system including a complete control panel made it possible to show quite realistically how the system works combined with a water model.

At the end of the Furnace Convention, there was also an opportunity to go on a guided tour of the works, which many of the participants took advantage of.

Family's day: bouncy castle, show grill, etc.

On the Saturday evening after the Furnace Convention, nearly 700 employees and family members made the most of the chance to celebrate the jubilee in a family setting. Lots of good food and drink was laid on, the kids had a great time and anyone who wanted to could visit Mum’s, Dad’s or their partner’s place of work, or even take a peek at another of the company’s departments. People especially enjoyed and appreciated the guided tours of the high-grade steel foundry. The event also gave the families of work colleagues the opportunity to get to know each other better.

Altogether a successful end to the three-day jubilee event!
Early this year Ludwig Frischhut GmbH & Co. KG placed an order with OTTO JUNKER for delivery, installation and commissioning of two totally independent medium-frequency melting furnaces using MonoMelt technology. The new furnaces are meant to replace the existing mains-frequency coreless induction furnaces. The scope of supply of the two complete melting units essentially comprises:

- Coreless 5-tonne furnace with extraction hood and weigher
- 3,200 kW IGBT frequency converter system of 12-pulse configuration with high-voltage transformer
- Multi-frequency technology for 125/250 Hz
- Water recooler with air-to-water cooler
- Charging machine
- M2F Touch Control System for visualization and operation

The decision was made for two independent furnace plants because this redundancy makes it possible to run both furnaces simultaneously without any restrictions. Moreover, stoppage of any one furnace would not stop the whole melting operation. Due to the weakness of the high-voltage supply mains both transformers were designed to minimise the system load (transformer phase shifting).

The multi-frequency technology is provided for optimum carburizing or alloying of the melt by switching the frequency from 250 to 125 Hz. This intensifies bath movement and thus accelerates stir-down.

Compared to the mains-frequency furnaces the new medium-frequency melting units have a much higher melt output and can be started-up without a heel - with higher efficiency and thus lower energy consumption.

Each of the two medium-frequency melting furnaces is designed for a maximum melting rate of 5.9 tonnes/h with an energy input of 500 kWh/t related to 1,450 °C.

As the two furnaces are independent, delivery and installation was scheduled in two steps: The first unit was to be delivered in week 31, the second in week 40.

For the first unit, user training, supervision and complete installation have meanwhile been completed on schedule. In very close cooperation with the professional staff of Ludwig Frischhut GmbH & Co. the furnace was handed over to the foundry following successful commissioning in early September. In agreement with the customer the second furnace plant including charging machine was presented at the Furnace Convention held in Lammersdorf on the occasion of the 90th anniversary of OTTO JUNKER GmbH. Despite this interim presentation the agreed delivery date in week 40 was not at risk and has meanwhile been met. This project was and still is characterized by the excellent support by the customer and a very good working atmosphere so that any arising problems were solved quickly and in a target-orientated manner.

Meanwhile, the second plant has been commissioned successfully.

Dietmar Trauzeddell (+49 2473 601 342)
Polish foundry ordered a 90 t holding furnace after a pouring furnace

Following the successful commissioning of a 10 t pouring furnace in the spring of this year, OTTO JUNKER also received the order for the delivery, installation and commissioning of a 90 t channel induction furnace from the Polish foundry Odlewnia Zeliwa Lisie Katy; this will be used as a storage and holding furnace as part of the company’s cupola melting operations. The furnace should also allow for closer temperature tolerances and improved analysis accuracy.

The furnace has a useful capacity of 75 tonnes and is heated by a water-cooled inductor. The power supply (800 kW) is provided by an IGBT frequency converter system, which allows for stepless control of the power input.

This power allows superheating of 14t/h by 100 K, starting from a temperature of 1,400 °C. The furnace design and the selected refractory lining ensure a low holding power consumption of 230 kWh/h.

The furnace will be equipped with a weighing device; in conjunction with the JOKS furnace processor, this ensures exact calculation and input of the necessary heating power. The system also supervises and monitors all units, meaning that refractory erosion of the inductor is also monitored. The program also includes the saving of all data and the acquisition of shift and day protocols.

The water cooling circuit of inductor and switchgear includes an evaporative cooling tower. The furnace’s hydraulic unit is equipped with two pumps, and an emergency air cooling device is delivered for the inductor. In order to prevent the furnace from freezing should the electrical system fail, the furnace benefits from a 350 kW mains-frequency emergency power supply system which is identical in design with the one already provided for the pouring furnace.

Delivery of the furnace to the polish customer took place in early 2015.

Andreas Liffmann (+49 2473 601 208)

Identical channel furnace in a cupola melting operation
AL INVEST Brdičná a. s. is the largest manufacturer of packing materials and semi-finished rolled stock of aluminium in the Czech Republic and enjoys a high reputation in Europe. The company’s history goes back to the beginning of the 20th century. Today’s workforce exceeds 800 people. Over the last 10 years a total of five annealing furnaces made by OTTO JUNKER GmbH were installed at AL INVEST Brdičná, which made the company a major customer in the Czech Republic.

The conceptual design of the new furnace is unchanged. As the customer is highly satisfied with the technological properties and operation of the OTTO JUNKER furnaces and with the support by our subsidiary, JUNKER Industrial Equipment s. r. o., a contract was signed on June 19, 2013 for delivery of an indirectly gas-fired aluminium strip annealing furnace with cooling chamber scheduled to be commissioned in April 2014.

Furnace specification: Batches of 4 coils; batch weight of aluminium max. 60 t; operating temperature up to 650 °C. Strip coil specification: Thickness 0.05 - 8.5 mm; width 880 - 1350 mm, weight 10 - 15 t. Based on customer’s good experience with the previously supplied furnaces an identical but mirror-inverted furnace design was chosen.

OTTO JUNKER GmbH (OJD) shared the scope of supply and services with JUNKER Industrial Equipment s. r. o. (JIE). OJD provided the active key components, project documentation and control software and commissioning of the equipment. JIE’s scope comprised the manufacture, assembly and installation, procurement of installation materials and preparation of the equipment for commissioning. The scheduled time for implementation of the project was 10 months. An important part of project management was the communication both among the project team and with the ultimate user. All this was completed successfully. Almost one year to the day after contract signing, the furnace was solemnly handed over on June 17, 2014 in the presence of the Top management of AL INVEST Brdičná a. s., the management of JUNKER Industrial Equipment s. r. o. and representatives of other contractors involved in the project. Taking this opportunity the parties evaluated the project.

Technical issues were also discussed relating to the implementation of a new project covering two new foil annealing furnaces. While the new annealing furnace was commissioned the negotiations could be finalized with order placement to OTTO JUNKER.

Long-term continuous cooperation is a prerequisite to customer satisfaction. The key requirement for us is to meet our obligations and responsibility as a supplier without any compromise. Quality work and ongoing efforts to improve our performance are essential. Our proposal of an efficient service contract was very favourably received by the customer because it ensures continuous equipment operation with independent checking of maintenance and operating procedures.

Jan Straka (+420 606 601 092)
The Energy Academy, an organization founded by Handelsblatt (the German business and financial newspaper) and General Electric, gave out its Energy Awards – also referred to as “Oscars” of the power industry – in five categories for the second time in 2014. According to a Handelsblatt report of Monday, 27 October 2014 (No. 206), the prize in the “Commercial Installation of the Year” category was won by Alunorf’s new innovative strip coil annealing plant designed and built by Otto Junker GmbH. The plant’s five new furnaces are the result of a successful cooperation between Alunorf engineers and Otto Junker experts. Just a few weeks later, the same company scooped up another first prize in the energy efficiency competition organized by the German Energy Agency (dena).

The reason for these awards lies in the successful use of energy-efficient annealing furnaces in the company’s cold-rolling mill. “We have developed an all-new concept,” explains Olaf Trepels, project manager at Alunorf in charge of the new furnace installation. “With this innovative technology we are able for the first time to anneal hot strip coils of different temperatures directly as they come off the rolling mill. This makes it possible to utilize the residual heat from the rolling process.”

Thanks to an online process control system based on a mathematical model these most advanced furnaces support the energy-saving method of charging the aluminium strip coils at their “as-rolled” temperature instead of cold. In the prior art, strip was cooled down after rolling, losing its residual heat in the process. The new plant performs a computer-based real-time heat balance calculation which permits “need-based” heat input into the annealing furnaces. Extensive reference annealing experience confirms the substantial energy savings achieved while maintaining an accurate, repeatable compliance with specified annealing regimes. Thanks to these new furnaces, Alunorf is cutting its energy demand by over 30 million kWh per year – a figure corresponding to the power demand of 8,800 private households. The overall energy efficiency enhancement features of the new furnaces specifically comprise the following:

- utilization of residual rolling heat in the annealing cycle by charging the furnaces with hot strip coils;
- preheating of the protective furnace atmosphere by utilizing the exhaust gas heat;
- real-time model based annealing control of each aluminium strip;
- installation of variable-speed motors on all fans and blowers.

We heartily congratulate Aluminium Norf GmbH on these remarkable awards. Our gratitude for and recognition of this excellent engineering achievement is due to the working teams of both companies.

ALUMINIUM 2014

From 7 – 9 October, OTTO JUNKER GmbH presented itself at the Aluminium 2014 trade fair in Düsseldorf. The show was a great success, drawing a total of 24,000 visitors. We, too, managed to attract numerous experts at our stand and were able to conduct many interesting discussions.

The highlight of our stand, and in fact a genuine crowd puller, was a 1:25 scale model of an innovative plant for pre-heating and homogenizing aluminium ingots before hot rolling. It should be noted that equipment of this type is already successfully in use at some renowned customers’ facilities. Following the end of the trade fair, the model was placed on display at our Lammersdorf headquarters site where it remains available for viewing.

We would like to thank everybody who contributed to the success of this event. Our special thanks go to all colleagues in Lammersdorf and China who helped, through their efforts, to put the model on exhibit at the show.

© S. Dobler
KME AG of Florence/Italy and the Golden Dragon Precise Copper Tube Group Inc., a manufacturer of copper tube based in Xinxiang, signed the contracts for a joint venture last spring.

In December 2014, the joint venture company placed an order with OTTO JUNKER for the supply of an entire hot-dip tin-coating line plus a strand annealing line for copper and copper alloy strip.

Below we give some additional information regarding the supply of this hot-dip tinning line, which is being designed and built in close cooperation with KME Stolberg as the know-how holder.

Tinned copper alloy strip is used chiefly in the electrical and electronics industry. The tin coating makes for a low contact resistance, low extraction and insertion forces and a good protection against oxidation and corrosion – important characteristics for plug-in cable connectors. As regards the tinning process, the challenge lies in achieving good coating adhesion and an accurate and uniform tin layer presenting a high-grade surface finish.

The new line is designed to apply 0.15 to 1.5 mm thick coatings onto 150 to 300 mm wide copper strip at strip speeds variable between 5 and 100 m/min.

Before the tinning operation the strip is passed through a so-called flux bath in which its surface is activated in preparation of the coating step. Thereafter, the strip is dried and pre-heated to a temperature of 50 to 130 °C.

The strip enters the tin bath via a dip roller. The desired coating gauge is controlled with adjustable blow-off nozzles forming part of the so-called air knife.

The tin pot has a capacity of 8 tonnes, and the melt temperature can be set with a 2 K tolerance in the 200 to 280 °C range to match the alloy. A second pot is maintained on standby to minimize changeover times in the event of an alloy change. The electrical heating system is designed to heat the metal from room temperature to 270 °C in four hours.

A coating thickness gauge is used to monitor and control the tin layer for accurate setpoint compliance. Since the strip heats up quickly as it enters the tin bath and the tin coating is formed, it is then cooled with air and subsequently with water to reduce the strip temperature from approx. 170 °C to 40 °C. The strip is then dried and coiled after having passed a series of additional stations.

Our contractual scope comprises the entire line with all machinery and with the requisite hydraulic, pneumatic, electrical and automation equipment.

**Delivery of the plant is scheduled for summer 2015.**

Paul Klinkhammer (+49 2473 601 251)
Modernizing our melting operation, with a focus on top material quality and process reliability

Quality demands on the special alloys produced in our high-grade steel foundry are growing steadily, calling for the use of a tailor-made, individualized melting furnace technology which embodies the latest state of the art and supports the production of innovative alloys of superior performance. This includes the ability, e.g., to conduct melting operations at various frequencies adapted to the alloy or, increasingly, under vacuum. The need to handle different charge sizes and growing casting weights, especially in the field of vacuum processes, must likewise be addressed.

Following constructive discussions between experts from our high-grade steel foundry and furnace manufacturing divisions, an interesting solution was derived which optimizes both investment needs and the cost-benefit balance. The result is a sustainable combination of new equipment and upgraded existing systems.

The project comprises the installation of an additional coreless induction furnace with a capacity of 750 kg plus the relocation of the present 600 kg vacuum furnace to an area directly adjoining the existing coreless units. Moreover, an advanced IGBT power pack using double-power technology is to be installed for power supply to these two furnaces; its operating frequency can be alternately set to 150 or 500 Hz. To monitor and control this configuration, a new control and operating cabinet with an integrated JOKS melting processor will be set up.

Furthermore, another central control desk is to be fitted for the remote-tilting operation so that pouring into the ladle can be carried out and supervised from a convenient position.

The package also comprises a new vacuum system and a common hydraulic power pack for both furnaces which will also serve to raise the vacuum hood and to swing it out of the way. The existing water recooling system will not need to be expanded or renewed but merely remains to be interfaced with the new furnace configuration.

Needless to say, the subassemblies and systems already in use are to be modernized and thoroughly reconditioned in order to obtain a safe and reliable overall production system out of this investment project.

The civil engineering work and foundations including the work on the emergency tapping pits were finished in autumn. At the time of this report, equipment installation has been completed and commissioning was about to start.

The overall investment also comprises a 4-tonne vacuum melting system due to be installed in the period to follow.

Elmar Westhoff (+49 2473 601 400)
Come and visit us in Hall 10, Booth E18