We understand Metals
From old to new – Successful upgrade saves time and money
Dear Customers and Business Partners,

Dear Employees,

The 2010 business climate indicators established by renowned business associations are pointing upwards by now – and yet, nobody can tell how long the crisis is actually going to last. Many industrial enterprises remain pitched against weak demand in their markets and uncertainties on the financing side.

At OTTO JUNKER GmbH we had launched a drive as early as in 2008 to focus our activities on core business areas, to streamline the corporate and location structure decisively, and to make our cost base more flexible.

For all that, cost cuts and business process improvements – although they enable us to adjust to current and expected business volumes – will hardly suffice to shape future developments. Accordingly, we continue to aim for sustainability and innovation, for there will be a time after this crisis.

On this route, we can build on our strong market presence and on our many years of expertise in the international project business, as well as on engineering excellence in the fields of heat treatment equipment, melting furnaces and our high-grade steel foundry. But also our company is not exempt from the rule that nothing is so good that there isn’t room for improvement.

Thus, for example, we are currently developing new heating strategies for semi-finished metal products in our technology centre. The main criteria addressed, over and above the targeted operational efficiency and saving of resources, are furnace engineering feasibility and the physical limits of heat transfer. The test results obtained so far are encouraging.

For use in the production of wind power plants we are developing induction melting furnaces specifically for large volumes. Moreover, we are concentrating on innovative solutions for steel mini-mills. Investment, particularly at our Lammersdorf site, is directed mainly at enhancing the infrastructure with a view to offering induction coil services and replacement furnace units to our customers.

Not least significantly, our confidence is reflected in the fact that we have maintained above-average apprentice levels in our company, thus offering a sound professional perspective to 29 young people.

Sincerely,

Dr. Hans Rinnohofer

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Dear Customers and Business Partners, Dear Employees,

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We will be attending the following trade fairs and conventions in the first half of 2010 and would be glad to meet you there:

**Tube 2010**
12 - 16 April 2010, Düsseldorf, Hall 7a, Stand F 14

**Metal + Metallurgy China 2010**
11 - 14 May 2010, Beijing, German Pavilion, Hall W 1, Stand C 22

**Metallurgy-Litmash Russia 2010**
24 - 27 May 2010, Moscow, at the Guss-Ex stand

**German Foundry Day 2010**
10 - 11 June 2010, Dresden
New CFO at OTTO JUNKER

The supervisory board of OTTO JUNKER GmbH has appointed Markus D. Werner (41) as new Chief Financial Officer effective 1 February 2010.

"We are very glad to have found a proven expert in strategic management and innovation processes in Mr. Werner. With his sound background in financial affairs, accounting and controlling, his experience in human resources, materials management and IT, and his extensive international experience he will bring valuable new momentum to our company from which our future development will benefit," notes Heinz Keweritsch, Chairman of the Supervisory Board.

Markus D. Werner studied business administration and mechanical engineering with a focus on process engineering at the Technical University of Aachen (RWTH) from where he graduated, and at the Technical University of Braunschweig, where he completed his intermediate degree examination. He started his career in financial management in 1993 at Roland Berger Strategy Consultants. After five years in North America as CFO and COO (responsible for R&D and Sales) of SaarGummi, an automotive component supplier and RAG group company, he returned to Fulda/Germany in 2005 to become chief financial officer at EDAG, an equipment construction and engineering company serving the automotive and aerospace industries. Before joining OTTO JUNKER, he served as CFO with paragon AG, a listed Delbrück-based supplier to the automotive industry with approx. 500 employees who managed to free itself from its bank debt burden through insolvency proceedings.

"Joining the management team of a world-renowned, successful furnace manufacturer and high-grade steel foundry operator such as Otto Junker is a challenge for me which I gladly take up, and I am determined to make an effective contribution to the company's advancement", says Markus D. Werner, who welcomes his return to a part of Germany in which he spent much of his student days. "I trust that I will soon be able to convince my partner, too, of the beauty of the Eifel region."

Award of honorary freemanship of the RWTH and of Otto Junker prizes 2009

For many years, attorney-at-law Werner Stegemann worked for the Founders’ Association for German Science. In this function, he managed to win over Dr. Ing. e.h. Otto Junker for the establishment of the Otto Junker Foundation in 1970. Its main task is to promote research and science, with the Technical University of Aachen being the sole recipient of funds. The Foundation is one of the largest individual promoters of the Technical University of Aachen and, amongst other things, promotes research projects, awards the Otto Junker prizes and grants scholarships. When the founder passed away in 1982, the Foundation inherited sole ownership of the OTTO JUNKER company. As Chairman of the sole associate and President of the Otto Junker Foundation’s board of trustees, attorney-at-law Werner Stegemann managed to substantially promote research and science and ensure the success of the OTTO JUNKER GmbH. Thanks to his huge commitment on behalf of the Otto Junker Foundation, Mr. Stegemann also rendered a great service to the promotion of research and science at the Technical University of Aachen. For this reason, Aachen University awarded him the title of honorary freeman in October 2009.

Since 1992, the OTTO JUNKER prizes are awarded once a year to excellent graduates of the Faculty of Geo Resources and Materials Science as well as the Faculty of Electrical Engineering and Information Technology at the Technical University of Aachen. In 2009, four students – Dipl.-Ing. Kirsten Baston, Dipl.-Ing. Johannes Morscheiser, Dipl.-Ing. Stefan Post and Dipl.-Ing. Kai Schoulen – received the distinction for their outstanding diploma degree theses.
INDUGA moves to a new site – all induction melting furnace manufacturing operations now concentrated at Lammersdorf

The cooperation between OTTO JUNKER and INDUGA, which is already very close and successful, promises to become even more efficient by the move to Lammersdorf. Since INDUGA has no manufacturing facility of its own, its direct access to OTTO JUNKER’s induction furnace manufacturing resources and the resulting technical dialogue will be of great benefit. Thus, as of May 2010, the facilities for making coils, inductors and capacitors, building and testing frequency converters and mains frequency switchgear, and pursuing INDUGA’s induction furnace upgrading and repair business will be right at the company’s doorstep. Furthermore, the move will yield important additional synergy effects in the fields of sales, design and administration.

It is important to note that INDUGA will continue to be an independent company and there will be no change to the contact persons in charge. New contact data will be released as soon as all requisite information is available.

New managing director at OTTO JUNKER Industrial Equipment s.r.o.

After 12 years of successful service to the company, Mr. Antonín Kužel has been appointed managing director of our company in Boskovice, Czech Republic, as of 18 March 2010. With his valuable expertise and experience, Mr. Antonín Kužel has made a significant contribution to the company’s establishment and business growth. He last held the position of Production Manager. Along with Mr. Knut Engelbrecht, Managing Director, he is responsible for the management of the company and its close and constructive cooperation with the parent company’s departments in Lammersdorf.

Once again, we have a number of employees celebrating their 40th or 25th employment anniversaries this year

Congratulations and heartfelt thanks for their many years of commitment to the company are due to the following:

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Braun Raimund, Cremer Dieter, Gabbert Walter, Hürtgen Karl-Heinz, Jakobs Josef, Krings Viktor, Lambertz Georg, Mertens Karl-Josef, Schmitz Bruno, Stollenwerk Walter, Thomas Bernhard

25
Hürtgen Petra, Nellessen Sigrid, Bartsch Andreas, Kubala Josef, Mertgens Dietmar, Niessen Ralf
Orders from Sweden

Pouring furnace for ITT Flygt AB

Following our delivery of a medium-frequency melting furnace system to ITT Flygt AB in 2003, OTTO JUNKER was awarded a new order in late 2009 for the supply of an induction-heated pouring furnace to this customer. With a total capacity of 13 tonnes and a power rating of 350 kW, the equipment is intended to replace an existing unheated pouring system and to provide additional buffering capacity to help boost the performance of the casting line. The average pour weight per grey iron casting is 70 kg, but castings of as much as 250 kg may be produced as well. The pouring furnace will be equipped with a laser system to ensure precise positioning in the varying pouring positions. Optimum pour weights will be accurately maintained by sensing the melt level in the sprue cup with the aid of a Koins laser system. Our scope of supply will include an inoculating system as well as a hydraulically tiltable filling station. Work is now proceeding energetically in the manufacturing of this furnace. Its delivery is scheduled for May 2010.

Medium-frequency melting system for Vestas Castings Guldsmedshyttan AB

For the Swedish foundry of Vestas, the world's leading manufacturer of wind power plants, OTTO JUNKER will supply a complete turn-key medium-frequency melting plant this year for the production of large iron castings. The melting installation will comprise two 25-tonne furnaces. Its DUOMELT frequency converter system will have a rated output of 6,000 kW and operate at 180 Hz. Two shaker chutes for charging the furnaces, a 20° furnace back-tilting system and powerful extractor hoods will ensure the safety and environmental compatibility of these large melting furnaces. The water re-cooling system will have separate circuits for the furnaces and the switchgear system and will rely on the use of water-to-water heat exchangers. A JOKS melt processor will control and monitor the entire installation. At OTTO JUNKER, activities are progressing in line with the agreed objective of handing the system over to the operator, ready for production, on 11 June 2010. By making this investment, Vestas aims at optimizing its melting technology at Guldsmedshyttan Works while improving environmental conditions as well as health and safety at work.

Georges Frings (+49 2473 601 404)

News

Second "Customer's Day" in Thailand on 25 + 26 January 2010

The second Customer's Day in Thailand (Bangkok) was once again held in cooperation with King Mongkut's University of Technology, Thonburi. In their papers, experts from OTTO JUNKER informed the audience about interesting developments and upgrade options for existing induction furnaces. Moreover, various types of heat treatment equipment for semifinished products were presented and their application conditions explained. The lectures were attended by more than 70 representatives of Thai foundries and semifinished product manufacturing companies, who took part actively in the technical discussions.
Melting furnace system for ENERCON's new foundry successfully commissioned

GZO Gusszentrum Ostfriesland of Georgsheil had been established to meet the growing demand for structural castings of ENERCON, the Aurich-based manufacturer of wind power plants, in the long term. As reported in an earlier issue, the first soil for Gusszentrum Ostfriesland (GZO) had been turned at Südbrookmerland-Georgsheil on 4 April 2008 by Christian Wulff, the Minister-President of Lower Saxony. The ambitious goal at the time was to produce the first castings in the new foundry as early as in 2009. This was achieved last October, when the first components for wind power plants were indeed cast at the site.

OTTO JUNKER's contract called for the delivery of a complete DUOMELT installation comprising two melting furnaces with a capacity of 16 tonnes each, plus a state-of-the-art converter switchgear system rated for 10,000 kW. At a power consumption of 505 kWh/tonne, the system can thus deliver a theoretical melt output of over 20 tonnes/h with a tapping temperature of 1,500 °C.

Even allowing 12 minutes for diverse ancillary tasks such as deslagging, correction of the melt composition and temperature measurements, the equipment is still able to melt and superheat 16.5 tonnes of liquid iron per hour.

A glycol-free water recooling system with provision for connection to a heat recovery circuit, a slag gripper and OCP crucible monitoring on both furnaces complete the package.

The JOKS melt processor which controls and monitors the entire system was expanded by adding a charge make-up and analysis computer. The latter is interfaced with the charge make-up crane and the spectrometer to support on-line process management.

Moreover, an independent second control panel for the melt processor was fitted to provide access to all system functions from a point outside the operator's stand.

The overall construction work of the new foundry, and specifically the extensive civil engineering work, imposed particular demands on installation of the new melting furnace system. These challenges were successfully resolved in joint enterprise.

As a result, the entire furnace installation could be commissioned in early October 2008, and an important prerequisite for the start of casting operations for ENERCON was effectively met.

Rudolf Schwarz (Tel. +49 2473 601 261)
Second pusher furnace for TLM (Croatia)

Throughout several years of production, the OTTO JUNKER pusher furnace supplied to Messrs. TLM in 2002 has proved its reliability and efficiency. Which better way to demonstrate that than by placing an order for a second plant? However, the new plant is not just a copy of the first one. Latest technical findings have been taken into account in the design of the new furnace plant representing current state-of-the-art technology. Apart from optimized energy consumption, this refers to many technical details both on the furnace and on the machinery for slab handling.

The TLM order, placed in early 2009, covers delivery of one complete fully automatic pusher furnace plant with integrated handling equipment for the heating and homogenization of aluminium rolling slabs. The second furnace will be arranged right next to the first one and will be connected to the discharge equipment of the first furnace which is already prepared for a future extension.

The plant is designed for short rolling intervals and can accept a total of 20 slabs with an overall weight of 220 tonnes. The slab length is 3,000 – 5,000 mm with a slab width of 800 – 1,800 mm. The max. slab weight is 11 tonnes.

With its short heat-up times, the furnace achieves excellent throughput rates.

On OTTO JUNKER pusher furnaces, the heating system as well as all the other details are tailor-made to match the requirements of a particular order. If, for example, natural gas is not available or not of sufficient purity, the furnaces are equipped with recuperative burners for LPG or light oil.

With their high recirculating rate and in conjunction with the OTTO JUNKER high convection system, the fans ensure a rapid and uniform heating of the slabs. A temperature uniformity of + 0/- 6 °C is maintained throughout the entire homogenizing period. The air temperature in each control zone and the slab temperature in the last slab position in each furnace zone are continuously measured in order to achieve uniform heating.

The thermal furnace losses are kept at a minimum by the high performance insulation. The selected insulation material combination has proved successful in many other projects. The insulation design ensures that no insulation particles are released and get in touch with the rolling slabs.

Manufacture of the individual components of the plant is progressing rapidly, and the inspection by the customer is scheduled for April 2010.

Bernd Deimann (Tel. +49 2473 601 241)
Pictures of aluminium extrusion works equipment under shop assembly

Gas-fired billet heater

Profile run-out system

Induction billet heaters
The exacting standards imposed by the automotive, electrical and electronics industries today call for surface treatment in the form of a tin coating on copper and copper alloy strip. The objectives of this treatment are three-fold:

- ensuring good long-term electrical characteristics, even under adverse environmental conditions (atmosphere, temperature)
- protection against oxidation and corrosion
- improved soldering properties

From a visual appearance viewpoint, a coating thickness of around 1 micron is basically sufficient for corrosion protection purposes. However, if the aim is to prevent a deterioration of the material’s good electrical properties through corrosion and oxidation while also preserving its good solderability, thicker layers are necessary. It is advisable, therefore, to use tin coatings of 2, 3 or even 5 µm on the strip.

A general distinction is made between three tin coating methods, i.e., hot-dip galvanizing, galvanic tinning, and galvanic tinning followed by a reflow treatment.

In Europe, most of the strip now marketed is of the hot-dip galvanized type, while in Asia, reflow tin-coated strip is sold almost exclusively.

A reflow tin-coating line consists essentially of a conventional galvanic strip coating system with an added reflow furnace.

The galvanic section is designed to permit the creation of an interlayer between the strip and the tin coating. This interlayer serves to slow down diffusion processes between the strip and its tin coating. In the reflow furnace, the tin coating is heated beyond its melting point to 280 °C and then cooled down. The step of melting the tin coating results in the formation of an intermetallic layer and creates a pore-free, dense surface.

For the galvanic tinning line of Minchali in Taiwan, OTTO JUNKER designed and supplied an indirectly gas-fired continuous reflow furnace. The heat is transferred to the strip by convection using hot air.

The furnace is designed for the treatment of copper, brass and bronze strip at a maximum strip speed of 24 m/min. With strip widths of up to 305 mm and strip thicknesses of between 0.15 and 0.80 mm the throughput capacity reaches 3.1 tonnes an hour.

The furnace has two heating zones, and its advanced temperature control system provides an accuracy of +/-3 K at a furnace temperature of 500 °C. Once the tin surface has melted, the strip is quenched to room temperature in water.

The reflow furnace was installed by the customer’s own experts relying on technical documentation supplied by OTTO JUNKER. For commissioning of the furnace and water cooling system, a JUNKER specialist was despatched to the site to provide support for about 3 weeks.

This successful pooling of efforts resulted in successful performance tests, whereupon the system was handed over to the Taiwanese customer.

Manfred Kolle (+49 2473 601 386)
Messrs. SMS Meer placed an order with INDUGA for one pressurized induction pouring furnace to be arranged on a twin-strand horizontal continuous casting machine for the production of brass billets at the new factory of Nippon Shindo Co. in Sakai/Japan.

The furnace has a total capacity of 23 tonnes and a useful capacity of 14 tonnes. The channel inductor integrated in the furnace casing has a rated power of 450 kW and is fed by an OTTO JUNKER converter plant of IGBT technology.

The customer has already inspected the equipment at INDUGA’s assembly shop in Cologne/Germany, and the furnace plant is ready for shipment.

The installation and commissioning are scheduled for mid-2010.

INDUGA channel melting furnace for DHP copper

In the course of a future relocation of the existing continuous casting machine for DHP copper, Messrs. MM Kembla in Wollongong, Australia, placed an order with Induga for a channel induction furnace for melting DHP copper in early November 2009.

The new channel melting furnace feeds a twin-strand horizontal continuous casting machine, make Wertli. The furnace has an overall capacity of 22 tonnes and, with its two 1,400 kW inductors, achieves a theoretical melting rate of approx. 9 tonnes per hour.

Once per hour, the channel melting furnace will supply 5 to 6 tons of molten DHP copper to the Wertli pouring furnace through its tilting bearing and an attached heated and covered launder.

Adjustment of the retained oxygen content relevant for the final product is by supplying a copper/phosphor master alloy to the channel melting furnace.

The scope of supply includes an OTTO JUNKER IGBT converter as well as a state-of-the-art control system with visualization. INDUGA shall also advise the customer on the selection of a suitable charging device for copper cathodes and return scrap and of a suitable refractory lining for the furnace vessel and the channel inductors.

Delivery of the furnace plant will take place in early June 2010 with the commissioning being scheduled for late November 2010.

Wilfried Spitz (+49 221 95757-60)
When the AlpHaSet process was first described in the technical literature in 1981, it soon emerged that AlpHaSet is particularly suitable for casting steel. OTTO JUNKER’s high-grade steel foundry at Lammersdorf adopted the new system as early as in 1990, with support from Hüttenes-Albertus, and became one of the first foundry operations in Germany to use this technology.

Over the years, the AlpHaSet system was optimized in collaboration with Hüttenes-Albertus in order to stay abreast of ever-growing demands on casting quality and productivity, labour safety and ecological compatibility.

The new limit values imposed under TRGS 900 as of June 2008 called for a reduction in foundry workplace concentrations of certain compounds including, e.g. benzene. To achieve tangible cuts in benzene emissions during and after the pyrolysis phase of the casting process, the development of a new resin-activator combination had thus become necessary.

Reducing benzene emissions from alkaline resols proved a very complex task. First, the optimum pyrolysis temperature was determined. It was found that AlpHaSet systems, within a 700 to 1,100 °C temperature range, release their peak benzene emissions at around 900 °C. Product development was therefore based on this temperature, with a focus being placed on pyrolysis/decomposition reactions and their catalysis.

Upon completion of their development work, Hüttenes-Albertus reviewed the trial-phase laboratory results of the new binder system against those of the standard volume-produced system. It emerged that the new product is superior even in terms of technological performance (Fig. 1).

Following successful initial testing, the benzene levels released with the newly developed AlpHaSet system were measured by the Association of Workmen’s Compensation Insurers. The readings taken in the laboratory were confirmed, i.e., benzene emissions were actually lower by up to 30 % (Fig. 2). These results even permit comparison with a nitrogen-free cold-setting furan resin.

Given these encouraging measurements and the experience gathered with HA’s newly developed AlpHaSet system, OTTO JUNKER’s high-grade steel foundry has switched over entirely to the new system. With the new generation AlpHaSet, the high-grade steel foundry possesses a binder system which not only meets present-day ecological and technological challenges but also points the way into the future.

Elmar Westhoff (Tel. +49 2473 601 400)
From old to new!
Successful upgrade saves time and money

Industrial furnaces have a long service life, given their rugged design and build. However, aside from wear – which can never be fully avoided – a system will cease to be fully 'state of the art' after a number of years in production as R&D continues, yielding technical improvements of individual parts or subassemblies. Indeed, technical progress almost never extends to the entire installation but concerns selective component groups which are key to its performance.

As an example one may quote the development of new control technology, electrical switchgear and frequency converter systems, gas burners and burner control equipment, and safety and monitoring solutions. Much the same holds true for the use of advanced auxiliary and ancillary devices. In favourable cases, a replacement of such component groups, combined with an overhaul or renewal of worn parts, may restore an installation to a performance level which comes very close to that of a modern new system.

Accordingly, upgrades and expansions of existing plants offer a great opportunity for implementing energy-saving solutions, boosting system output, cutting unscheduled down times, and reducing maintenance and repair needs. As the costs will be much lower and erection times much shorter than those associated with a new investment, this option is therefore well-worth examining.

The point of departure for all deliberations should always be an analysis of the condition and weak points of the existing system. Moreover, the objectives of modernization must be clearly defined. It would not make much sense to install new electrical equipment on a technically obsolete furnace, at the cost of accepting substantial compromises, if the furnace has been scheduled to make room for a new one in two years’ time anyway.

It is also important that the analysis includes an evaluation of maintenance and repair costs for the existing system, and of its spare parts availability.

In deciding whether a new investment or a partial upgrade is more recommendable, the best solution can only be developed by looking at the specific installation and its current condition. Our experience enables us to provide expert support and advice to our customers faced with this decision.

An appropriate modernization concept may yield good results – as the examples of numerous recent upgrades demonstrate, up to 20 - 30 % more output and energy savings in the same order of magnitude are by no means an exception.

Dietmar Trauzeddel (+49 2473 601 342)

OTTO JUNKER GmbH
P. O. BOX 11 80 • D-52147 Simmerath
Phone: +49 2473 601-0 • Fax: +49 2473 601-600

Electrical equipment before and after upgrade