



OTTO JUNKER

News ✓

Volume 15 | January 2009 | www.otto-junker-group.com

We understand Metals

OTTO JUNKER technology for renewable energy



Siemens press photo

OTTO JUNKER Group

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Imprint

Publisher: OTTO JUNKER GmbH
Jägerhausstraße 22, D-52152 Simmerath

Editor: Dr. Dietmar Trauzeddel

Photography: OTTO JUNKER Group Archiv, Siemens

Layout: Atelier Beißel, Schmithofer Straße 200, 52076 Aachen, Telefon: 0800 / 54 64 000 20

Publication interval: six-monthly

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Dear customers and business partners, Dear staff members!

As the new year begins, I wish to thank you for all the hard work done in 2008 and for the good cooperation we have shared.

A subject essential to us all, now as in the future, is the use and supply of energy. The development of technologies enabling us to benefit from renewable energy sources and hence, to ensure a reliable power mix for industry, domestic use and transport, is therefore a common goal.

Moreover, energy from sunlight, wind, biomass and water – as an alternative to fossil fuels – has an additional advantage: it is virtually CO₂ neutral and thus, climate-friendly.

By providing innovative melting technologies, OTTO JUNKER supports the cost-efficient production of photovoltaic cells from solar-grade silicon based on the purification of metallurgical silicon. We are partners to the international manufacturers pioneering this technology on a global scale. OTTO JUNKER melting equipment

supplies steel for the castings needed in wind power plants as the latter are being progressively increased in size to drive up efficiency levels.

High-grade aluminium plates for lightweight design are key to building weight-reduced low emission vehicles and aircraft, and their properties are controlled with the aid of OTTO JUNKER thermal processing equipment.

Not least significantly, we contribute to an efficient use of energy by engineering systems capable of operating at high thermal and electrical efficiencies.

In the present issue of OTTO JUNKER News, we are glad to present our technological activities undertaken in this field. Personally, I may wish you success and the best of health in the year 2009.

Yours



Hans Rinnohofer

Aluminium trade fair 2008 – Participation was a success

At this leading international trade fair in Essen, OTTO JUNKER, together with its Swedish subsidiary IUT, presented their extensive equipment range for the production of castings and forgings, plate and sheet metal, foils and sectional products.

The trade fair proved quite successful for us, both in terms of the very encouraging customer response and with regard to the number of technical discussions held on new projects and developments. Judging by the visitor frequency at our booth, we cannot but confirm the organizer's delighted conclusion that visitor attendance was up 10 % from the previous year.

Third 6-m vertical turning and boring mill commissioned

For years, our high-grade steel foundry has been investing into the expansion of its machining equipment pool. The company's evolution into a system supplier of highly sophisticated, ready-for-installation castings is thus being consistently strengthened. The third 6-m vertical turning and boring mill was put into service on October 17, 2008, and a small celebratory get-together was organized to hail this added capability for machining large-size castings.



Joint energy-saving project pursued by two companies from the Aachen region

At Stolberg near Aachen, copper and brass production and processing has a history of almost 500 years. For more than three decades, Schwermetall Halbzeugwerk GmbH & Co. KG has taken an active part in this tradition.

Established in 1972, the company has evolved from modest beginnings into the world's largest and most advanced manufacturer of reroll strip. Up to 1,000 metric tonnes of this commodity, of all copper-based alloys, are shipped out from here every day. The output of reroll stock is intended for processing into anything from consumer items to specialty products. Examples include the automotive, electronic and telecommunications industry, to name but a few. In addition, the Stolberg plant turns out 25 % of the European Union's total requirement of semi-finished material for the production of Euro coins.

The company's success has been promoted by a near-perfect synthesis of economic and ecological targets which have been applied to all production stages since its founding days. The location of the plant, on the edge of the Nordeifel nature preserve with its historic cultural landscape and much untouched nature, is viewed as an obligation by this manufacturer. Accordingly, the protection of the environment takes a high priority in the company's corporate philosophy. Saving of energy and reduction of CO₂ emission are major concerns.

Melting of the charge material and repeated heating and cooling cycles require large amounts of energy. Indeed, energy costs are the second highest cost factor in production of the strip.

Much has been done in recent years to optimize the energy consumption of the company's machinery and equipment (e.g., melting furnaces, walking-beam furnace). Some older installations have been equipped with computer control technology, and idling times have been minimized throughout. In the ongoing quest for further savings, a further potential was tapped in cooperation with OTTO JUNKER. ▶ ▶ ▶



Schwermetall Stolberg: Melting and pouring by means of coreless induction furnaces

News

Presentation of OTTO JUNKER awards

On November 18, the OTTO JUNKER Foundation presented its awards for outstanding academic achievement for the 16th time to students from two departments of the Technical University of Aachen (RWTH), viz., the Faculty of Geo Resources and Materials



LTR: Univ.-Prof. Winfried Dahl, Werner Stegemann, Dipl.-Ing. Tilman Philip Sanders, Dipl.-Ing. Kerstin Meisa, Manfred Nettekoven, Dipl.-Ing. Moritz to Baben, Dr. Hans Rinnhofer

Science and the Faculty of Electrotechnical Engineering and Information Technology. This year, three students – Dipl.-Ing. Kerstin Meisa, Dipl.-Ing. Moritz to Baben und Dipl.-Ing. Tilman Philip Sanders – received the distinction for their respective Diploma degree theses.

The award-giving ceremony was attended by Manfred Nettekoven, Chancellor of the Technical University of Aachen, and Dr. Hans Rinnhofer, Managing Director of OTTO JUNKER GmbH. The trustees, University Professor Winfried Dahl, chairman of the OTTO JUNKER Foundation's academic advisory council, and attorney-at-law Werner Stegemann, president of the Foundation's board of trustees, presented the winners with their awards. The honorees then gave a brief outline of the issues, solution approaches and results of their theses.

The OTTO JUNKER Foundation has been conferring its awards, each carrying EUR 2,500 in prize money, for outstanding academic achievements since 1992. As one of the Technical University of Aachen's largest individual funding sources, the Foundation has been supporting numerous RWTH projects over the years.

Despite this inherently high efficiency of OTTO JUNKER's industrial furnaces, it has proved possible to increase their energy efficiency even further and to reduce consumption figures accordingly.

At the Stolberg plant, several OTTO JUNKER coreless induction furnaces are in use for melting the charge material for the various copper materials. These furnaces have demonstrated their reliability over many years in service and operate very efficiently.

The electrical efficiency of the coil, taken by itself, is equal to about 64 %, i.e., 64 % of the electric power fed into the furnace is transferred into the charge via the electromagnetic field. This input accounts for both useful (melting) energy and heat losses of the coreless induction furnace. Compared to other thermal processes, this is a good efficiency level. Nevertheless, OTTO JUNKER does not cease in its efforts to further improve the efficiency of its equipment.

The coil losses (ohmic loss) produced by the coil current vary between 20 and 40 %, depending on the charge material. This electrical energy needs to be removed from the induction coil by intense cooling and cannot be put to use in the melting process itself. The most promising approach for achieving further energy savings, therefore, is to go for this unproductive potential.



Coreless induction furnace retrofitted with energy-saving coil

The theoretical point of departure was to reduce the ohmic resistance of the induction coil through suitable measures.

Over many years of hard work, OTTO JUNKER developed a new coil design which subsequently underwent long-time trials.

The next step was to test the new coil under production conditions. At OTTO JUNKER's own high-grade steel foundry in Lammersdorf, one furnace was equipped with the innovative coil. The new coil has been in use for several years now, and its energy-saving performance has been impressively demonstrated.

As early as in 2005, experts from Schwermetall Halbzeugwerk and OTTO JUNKER started discussing additional energy saving potentials of coreless induction furnaces which might be tapped through the use of the new coil design.

The theoretical investigations conducted addressed the relevant copper alloys and the specific production conditions prevailing at Stolberg. The electromagnetical calculations and optimization steps applied to the new coil yielded a reduction of coil losses by approx. 25 % resulting in over 9 % savings in energy consumption of the melting process proper. In absolute terms, these figures translate into savings of approx. 35 to 40 kWh/t.

The next step now was to lay the foundation for a precise comparison, obtained through comparative measurements, of the existing furnaces' energy consumption in 2006 and early 2007. In mid-2007, the time had come for deciding whether or not the melting furnaces at Stolberg should be equipped with the new energy-saving coil. A first coreless induction furnace with a capacity of 24 metric tonnes received a coil of the new design in November.

The calculated energy savings were confirmed through various measurements. The revamped furnace needs 40 kWh/t less energy to melt the charge materials.

In mid-2008, Schwermetall Halbzeugwerk resolved to equip all melting furnaces with the new energy-saving coil. The move adds to the success story of the new technology.

Dietmar Trauzeddel (+49 2473 601 342)

OTTO JUNKER 40-tonne melting plant for casting wind power plant components

PROKON Nord Energiesysteme is a company based in northern Germany which has been successful for many years in planning, financing and operating wind power plants, industrial power stations and bioethanol systems utilizing renewable energy sources.

With its production of rotor blades and large industrial iron castings for wind power plants, turbine and transmission housings etc., the company is now breaking new ground. For its new foundry to be erected at Stade (PN Casting Technology GmbH), they entrusted OTTO JUNKER with the contract for supply of the entire melting system.

Since wind power plant components tend to be very large and heavy, a solution had to be adopted that would make molten iron available for pouring in large quantities while ensuring a high degree of flexibility at the same time.

The new melting installation consists of two furnaces, each having a capacity of 40 tonnes. The rated power is 10,000 kW and the rated frequency is 150 Hz. The DUOMELT stepless power distribution system allows both furnaces to run in melting and holding mode simultaneously.

The entire 40-tonne charge of each furnace can be melted to a temperature of 1,500 °C within 125 minutes. This corresponds to a melting rate of nearly 20 tonnes an hour. Auxiliary process times and idle times are not taken into account in these figures. To minimize mains perturbation, the switchgear system is of 24-pulse design.

The furnaces, with an inside crucible diameter of almost 2 m, are equipped with a back-tilting capability allowing the vessel to be positioned at an angle of up to 20 degrees. to facilitate slag skimming. Each furnace features an extraction hood which can be hydraulically adjusted in two directions so that all furnace gas can be collected in any operating position.

The JOKS melt processor will receive a second operating station which allows the furnaces to be monitored and controlled from outside the furnace platform as well. Coil monitoring is provided by the OCP optical coil protection system which possesses its own computer.

A water re-cooling system relying on OTTO JUNKER's patented freeze-proof, glycol-free air cooler technology forms part of the complete melting installation. At outdoor temperatures over 30 °C, water will be cooled down to the required return line temperature via an additional plate-type heat exchanger using industrial water.



The 40-tonne furnaces under shop assembly

The system was delivered in the autumn of 2008. At the time of writing, installation of the melting system was in full swing.

Elmar Neumann (+49 2473 601 312)

News

New ENERCON foundry to be equipped with OTTO JUNKER furnaces

ENERCON, the manufacturer of wind power stations, is determined to meet its growing cast-iron demand in the long-term perspective by establishing its own foundry for the series production of castings for wind power plants in the 2 MW range. Flow production, a high degree of automation, favourable logistical conditions in the form of a direct railway link, and a high level of environmental compatibility characterize this advanced serial hand-moulding operation. The first soil was turned on the ENERCON Guss-Zentrum Ostfriesland (GZO) site at Südbrookerland-Georgsheil on Friday, 4 April 2008, with Lower Saxony's Minister-President Christian Wulff presiding at the groundbreaking ceremony. The first castings are scheduled to leave the new foundry as early as in 2009. The order awarded to OTTO JUNKER calls for the supply of a complete DUOMELT installation comprising two furnaces with a capacity of 16 tonnes each, plus an advanced switchgear system based on a frequency converter rated for 10,000 kW. A glycol-free re-cooling system, a melt processor with charge make-up and analysis computer, a slag gripper and an OCP crucible monitoring system for both furnaces complete our scope.

Eisenwerke Fried. Wilh. Düker GmbH & Co. KGaA – Solemn commissioning of new melting plant

The joint, dedicated work of the experts of Eisenwerke Düker and OTTO JUNKER GmbH has come to fruition: On November 4th 2008, the new medium frequency coreless induction furnace in the Laufach foundry was officially commissioned and started up in a dignified, ceremonial hour. During the short ceremony, Mr Ulrich R. Hezel, Managing Director of Düker, acknowledged the successful work of the partners involved.

Following a tradition, a remembrance badge was cast for this occasion, while Mr. Neumann, Sales Manager of OTTO JUNKER, provided further spiritual support by handing over a statue of Saint Barbara. It is with reason that the partners take pride in their joint work: Realizing the enormously difficult construction and preparatory work placed the highest demands on flexibility and commitment of the partners.

Their efforts have resulted in a powerful, comprehensive, and modern melting plant which reliably covers the demand for molten iron, operates in an energy-efficient manner and provides very good working conditions:

- **Powerful** – since the two 8-tonne furnaces and the 6 MW medium-frequency power pack of 24-pulse DUOCONTROL design achieve a melting rate of up to 11.9 tonnes of cast iron per hour.
- **Comprehensive** – since, starting from the charge make-up computer through to the switchgear room, an overall plant was realized.
- **Modern** – since the entire melting process is perfectly controlled and monitored by the digital converter control system in connection with the JOKS melting processor, a charge make-up computer and an analysis calculation software.
- **Reliable** – since, for example, the glycol-free air-to-water cooler and the visualization of the individual cooling water temperatures prevent any faults in the recooling system.
- **Energy-efficient** – since furnace consumption is as low as 500 kWh/t to melt the charge materials to a temperature of 1,530 °C.

- **Good working conditions** – since the work of the operators on the furnace platform is facilitated by the back-tilting capability of the furnaces (up to 20°) and by the hydraulic adjustability of the exhaust hoods in two directions.

Dietmar Trauzeddel
(Tel. +49 2473 601 342)



Cast remembrance badge



RTL: Dr. Bald (Foundry Director), Ulrich R. Hezel (Managing Director of Düker), Elmar Neumann (Sales Manager of OTTO JUNKER) during the solemn inauguration.

Dual recuperation saves energy, boosts efficiency and protects the environment – a new approach to strip annealing

Aluminium strip is heat-treated after rolling, i.e., with rolling oil in varying amounts still adhering to its surface. The heat treatment step is usually carried out using indirectly gas-fired chamber furnaces in which coils are annealed for several hours under protective atmosphere at temperatures of up to 600 °C. This process is associated with an evaporation of rolling oil, which is absorbed by the furnace atmosphere and will normally be removed from the furnace during protective gas purging.

The use of recuperative burners, high-convection heating, optimized flow management and temperature control technology plus a superior thermal insulation of the furnace ensure a low energy consumption and uniform temperature distribution across the load. The large number of international reference customers relying on these OTTO JUNKER furnaces attest to the merits of our advanced equipment.

However, OTTO JUNKER's experts were not satisfied with the state of technology achieved but went in search of further improvements. Their efforts gave rise to a design which involves a preheating chamber that is heated by exhaust gases.

The exhaust gas flow from the recuperative burners is still 350 - 400 °C hot, i.e., it contains a substantial amount of thermal energy which can be used, and is indeed sufficient, for preheating purposes.

In the newly designed system, the strip coils are preheated to a maximum of 150 °C using the exhaust gas from the recuperative burners in a separate preheating chamber before they enter the actual heat treatment cycle. In the preheating chamber, any rolling oil still present on the strip surface will evaporate but the product never reaches or exceeds the 200 °C threshold at which surface oxidation becomes a critical issue.

The preheating chamber can be accommodated within the footprint of any standard set of chamber furnaces (e.g., in lieu of a load park), and the coils are loaded and removed by the existing charging machine.

This approach provides the following specific benefits:

- Energy savings of 30 to 55 % in terms of natural gas, which means a reduction in consumption by 4 to 6 Nm³ per tonne (depending on final annealing temperature);
- Easy removal of rolling oil;

- Protective atmosphere savings in the downstream chamber furnace due to reduced annealing time;
- Increased throughput capacity of the main furnace system.

All of the foregoing ensures that the cost of the preheating chamber will be quickly recovered.

We are looking forward to customer enquiries and will be glad to carry out a cost/benefit analysis based on specific application needs. For this, please contact Mr. Deimann.

Bernd Deimann (Tel. +49 2473 601 241)



Chamber furnace for strip coils

OTTO JUNKER modernizes aluminium extrusion works

At OTTO JUNKER Extrusion, the intake of new orders in 2008 was marked by extensive modernization drives and performance upgrades in a number of European aluminium extrusion plants. With four induction billet heaters, one gas-fired billet heater, parts of one profile runout system and six revamping projects relating to diverse equipment, OTTO JUNKER once again helped to preserve and expand its customers' technology leadership.

The orders for induction billet heaters comprised one 420 kW unit for full heating of billets in an extrusion line producing heat exchanger sections, two 750 kW units for full heating of billets in a 19 MN extrusion line, one 800 kW unit for re-heating of billets downstream of a gas-fired preheater in a 35 MN extrusion line, and one 1,200 kW unit for re-heating logs downstream of a gas-fired ELHAUS

preheater which also forms part of a 35 MN extrusion line. Only one induction heater is provided with conventional mains frequency technology and thyristor switches. All other heaters feature the IGBT frequency converter technology developed by OTTO JUNKER.

The gas-fired billet heater is to be installed along with a new extrusion press. It is designed to heat 30 billets an hour to the requisite extrusion temperature. The billets measure 272 mm in diameter by 1,350 mm in length.

Thanks to the combination of a two-zone high-convection preheating chamber with swirl burners and gas/air mixers of the most advanced design, it is ensured that the billets will be preheated efficiently, rapidly and uniformly. A lambda control capability can be retrofitted if necessary. Other technical features include live conveyor rollers, a billet head heating

zone and a furnace pressure control system.

This installation can be viewed at our Simmerath-Lammersdorf site as of mid-January 2009.

In the case of a profile runout system for a 40 MN extrusion press line, the area downstream of the existing finishing saw will be supplemented with a second finish-sawing line, a profile stacker and scrap shears including scrap conveyor. A profile destacker is also included in the scope of this project. Thanks to the new equipment our customer will be able to handle finished profiles of 1.5 to 16.5 metres in a fully automatic manner in single to triple lengths.

Dirk Menzler (+49 2473 601 420)



Shop assembly of a 16.5 m stacker of improved ELHAUS design

News

Concentration of know-how in aluminium equipment made by the OTTO JUNKER Group

Following the integration of our two former subsidiary companies ELHAUS and THERMCON into the OTTO JUNKER Group, another step forward has been taken towards achieving an optimum concentration of know-how and expertise.

The new arrangement in place at the Lammersdorf headquarters will add further efficiency to the implementation of the entire value-adding chain of planning and manufacturing our products and providing the associated engineering services. We shall thus meet our standard of

New ETP copper line for Oriental Copper/Thailand

Oriental Copper Ltd. of Thailand is a leading Southeast Asian manufacturer of high-quality bus bars made of ETP copper for the electrical industry.

ETP copper is produced by electrolytic refining and contains oxygen. The company currently intends to expand its capacity from now 20,000 to 40,000 tonnes/year by building a new production facility. In order to meet the 2009 completion deadline, new manufacturing equipment has been ordered exclusively from Europe.

INDUGA has received the contract for a deslagging furnace and a pressurized sidewell-type pouring and holding furnace for this project. Melting shop equipment for the new facility will include a gas-fired shaft furnace for melting down copper cathodes at a

maximum rate of 10 tonnes/hour. The molten copper will be transferred to the deslagging furnace via a gas-fired launder and from the deslagging furnace into the pouring furnace by direct overflow. From the stopper-controlled sidewell of the pouring furnace, the copper is to be poured into the moulds of the fully automatic dual-strand vertical continuous caster.

The deslagging furnace, which ensures complete separation of slag and copper melt, has a total capacity of 4 tonnes and is heated by a 150-kW sandwich-type channel inductor.

The sidewell-type holding and pouring furnace can hold a total of 26 tonnes and its useful capacity is 15 tonnes. It is fitted with a 550-kW channel-type inductor. Inductor power is supplied via an OTTO

JUNKER IGBT converter system with an operating frequency of 55 Hz. In addition to many other advantages, this IGBT converter permits a stepless control of the power input.

Given the very high air humidity prevailing at the intended operating site, the metal must be kept under controlled atmosphere to achieve the specified final ETP copper quality. This is why a pressurized type of pouring furnace was selected in which the liquid copper will be held in a nitrogen atmosphere, virtually without exposure to air, until it is poured.

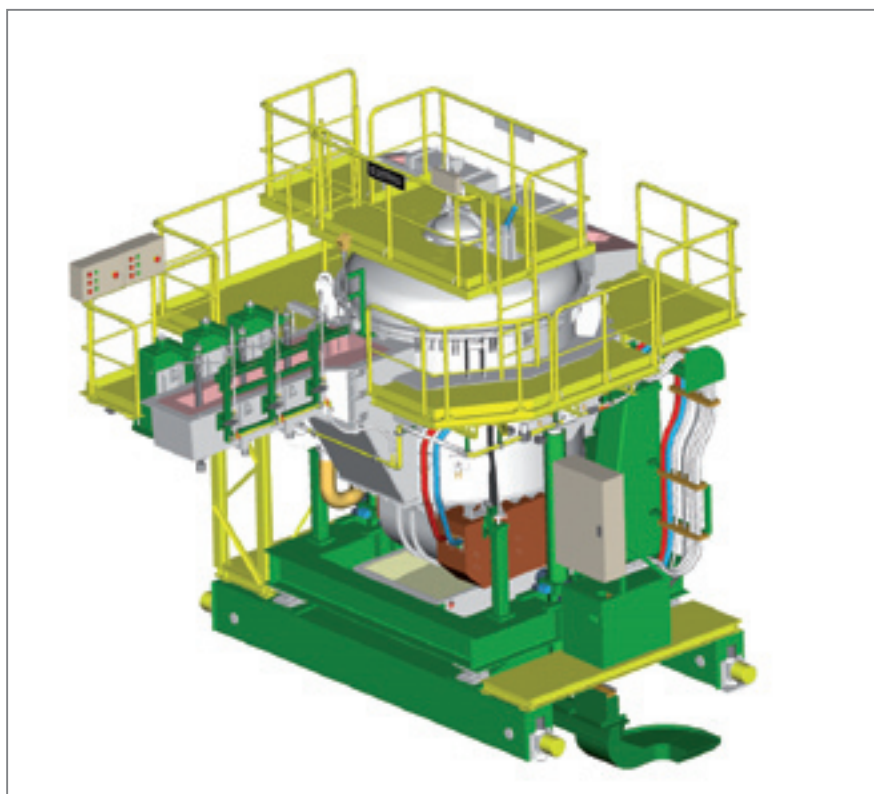
The furnace equipment for this project is to be shipped out as early as in late May of 2009. Commissioning of the entire line has been scheduled for August 2009.

Alejandro Hauck (+49 221 95757 24)

competence and reliable partnership to the customer.

Both the THERMCON products for the aluminium casthouse (i.e., melting furnaces and pouring equipment) and the ELHAUS materials handling systems will be carried as individual product groups within our aluminium technology activities. They will thus perfectly supplement OTTO JUNKER's business unit dedicated to heat treatment equipment for the aluminium semi-finished products industry.

The activities in the fields of aluminium and copper equipment manufacturing are managed by Dr. Dirk Menzler (Project Planning and Sales) and Günter Valder (Engineering and Project Management).



Pressurized pouring furnace with stopper control system

Continuous strip annealing lines – Further orders from China and other countries

Three contracts from Chinalco Luoyang of China for continuous strip annealing lines and for one degreasing and pickling line are already carried in our order book. The first of these annealing lines has by now reached the commissioning stage.

Below are some details regarding the new orders:

In addition to the abovementioned continuous strip annealing lines with flotation furnaces for the processing of copper and copper alloy strip, **Chinalco Luoyang** ordered another degreasing line for cleaning light-gauge copper strip.

Chinalco Shanghai awarded a contract to OTTO JUNKER for a continuous strip processing line with flotation furnace for the annealing of copper and copper alloy strip. The system is rated for strip widths of 660 to 880 mm and strip thicknesses of 0.1 to 1.5 mm at a maximum line speed of 100 m/min. Its throughput capacity is up

to 12 tonnes/hour, depending on the alloy being processed.

The furnace system can operate with or without controlled atmosphere. In controlled atmosphere mode the maximum hydrogen content is 5 %.

The system is of a space-saving double-deck design, with the decoiler and recoiler groups directly adjoining each other.

From the **Chinalco Group** we won an additional order for supply of a complete continuous strip annealing line for the **Chinalco Daye** company. This system forms part of the second expansion stage of the 100,000-tonne project. For the first stage we had already delivered a degreasing, annealing and pickling line for 880 mm wide strip, as well as a separate degreasing and pickling line for the same strip width.

The newly ordered installation is suitable for annealing thin-gauge strip measuring only 0.08 to 1.0 mm in thickness and max.

650 mm in width. The maximum strip speed in continuous annealing mode is 100 m/min. Designed for all common types of copper and copper alloy strip, the line provides treatment temperatures up to 800 °C.

Further to the above lines, an order for a continuous strip annealing line with strip flotation furnace was placed with us by Shangdong Tian Yuan. This system will likewise be a double-deck line and is intended to anneal strip with a thickness of 0.1 to 1.2 mm at a strip width of 300 to 440 mm.

All of the foregoing orders are being processed in cooperation with OTTO JUNKER Metallurgical Equipment (Shanghai) Ltd. However, all key components as well as the engineering, installation supervision and commissioning services will be supplied ex OTTO JUNKER's headquarters in Germany. This method of burden-sharing with our Chinese subsidiary has grown out of many years of successful cooperation and forms the basis for our success in China.

However, OTTO JUNKER not merely performed well in China but also won contracts for continuous strip annealing lines with flotation furnaces from Termomecanica of Brazil and from the Kirov Nonferrous Metal Processing Plant in Russia.

All of which goes to show once again that customer satisfaction, experience and competence are the keys to success.

Manfred Kolle (+49 2473 601 386)



Continuous strip annealing line of double-deck design

Use of double-walled pouring ladles brings decisive benefits – A successful joint development

A radically new pouring ladle type for transferring molten metal has been developed and tested in close cooperation between Foundry Service GmbH and OTTO JUNKER's high-grade steel foundry division.

Thanks to the high personal commitment brought to the project by Stefan Brands of Foundry Service and Dr. Elmar Westhoff, head of the high-grade steel foundry division, work progressed very effectively and a practically viable, successful solution was quick to emerge from the first blueprints. The innovative nature of this technology has since been conclusively confirmed by the grant of a patent.

The new ladle type consists of two basic elements – a normal pouring ladle body and a replaceable insert ladle that is placed inside the ladle body and locked to it via the top flange.

The interspace between the two vessels contains a 10 or 20 mm thick layer of refractory insulating material as well as an insulating air cushion. The system thus utilizes the good heat insulating properties of air to provide thermal insulation between the two vessels. This thermal effect is the basic principle of the double-walled pouring ladle. The use of an interior and an exterior ladle body represents an altogether new approach.

The replaceable insert ladle is covered with a refractory hot face layer and can be re-lined, heated-up and wrecked independently of the pouring ladle body.

Thanks to the low heat loss, this innovative engineering solution specifically provides the following benefits:

- Lower melt temperature loss in holding mode.
- Reduction in pouring ladle shell temperature by 80 to 130 °C
- Up to 50 % shorter heat-up cycle for the replaceable pouring ladle inserted into the ladle body.



Double-walled pouring ladle ready for operation



The new ladle type: pouring ladle body with replaceable insert ladle

In addition, the new ladle type is characterized by the following features:

- The replaceable insert ladle can be treated as a fully independent unit for re-lining, heating-up and wrecking.
- The outer pouring ladle body is subject to lower thermal and mechanical stresses, which cuts bearing assembly and transmission wear while also reducing the risk of operator burn injuries.
- Improved safety is achieved in the event of a break-through of the replaceable insert pouring ladle, and the service life is increased in addition.

Every standard crucible-shaped pouring ladle can be equipped or retrofitted with the new system. It is even possible to use pouring ladles with differently sized replaceable inserts. Thus, a 5-tonne ladle can be alternately operated with pouring ladle inserts having a capacity of 3 to 5 tonnes. This makes it easy to set optimum pouring parameters. The system is also suitable for larger holding and transfer vessels with a capacity of up to 40 tonnes of molten metal

The new ladle technology has been successfully used in OTTO JUNKER's high-grade steel foundry for about a year now.

Elmar Westhoff (Tel. +49 2473 601 400)



TOPIC:

OTTO JUNKER technology for renewable energy

The fact that our equipment is employed in highly energy-intensive technological processes makes it a priority objective to improve the energy efficiency of OTTO JUNKER's industrial furnaces. This is in addition to our commitment to help boost the use of renewable energy sources, even though this latter goal can only be achieved indirectly at present. In the final analysis, both approaches will bring down carbon dioxide emissions while reducing the consumption of fossil fuels.

Although the cost burden associated with the use of renewable power sources and their shifting availability resulting in part from natural influences are undisputed issues, the progressive uptrend in renewable energy utilization has become an inevitable reality.

As specific examples illustrating our contribution to renewable energy use we may quote the development of a melting technology for high-purity silicon and the construction of a large-scale furnace installation ensuring the liquid iron supply for a foundry producing castings for wind power stations (see page 5 for details).

The operating principle of solar cells is critically dependent on



the use of high-purity multicrystalline silicon. OTTO JUNKER was therefore faced with the task of developing a suitable and cost-efficient melting furnace technology for the production of this material. Induction melting technology suggests itself for this application in view of its process advantages.

One particular challenge lies not merely in the specified purity of the silicon, but in the fact that it is not electrically conductive in its solid state and requires a very high input of energy for melting.

Extensive tests were conducted to design and optimize an induction furnace technology that meets the demands of this application. Several pilot systems are already in operation. Others, as well as a full-scale production facility, are currently under construction or awaiting commissioning.

We shall also be looking closely at ways of employing renewable energy sources directly in our industrial furnaces, e.g., in the form of biogas.

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