



OTTO JUNKER

Publication

A lead over the state
of the art

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A lead over the state of the art

OTTO JUNKER supplies renowned extrusion plant operators with innovative log and billet heating solutions.

For many years, OTTO JUNKER has been the sole vendor capable of supplying both induction-type (IBE) and fuel-fired (GBE) log or billet heating solutions, including the latest generation KombiGAS systems.

Many customers were won over by the advantages of OTTO JUNKER's technology in the recent past. An overview of major current contracts and their specific characteristics is given in this article.

SAPA OFFENBURG

After a turnaround time of just eight months, a complete billet heating line comprising a vertical magazine, a fuel-fired preheater based on the new KombiGAS principle, a hot shear plus an induction heater were accepted by and handed over to the customer in early 2012.

What merits special mention is the innovative OTTO JUNKER – KombiGAS – approach (patent pending) which provides an exceptionally high energy efficiency at regular throughput rates, i.e., at the actual operating point of a typical billet heater. Therefore, the determination of the system's energy consumption at full throughput and at 50% throughput was an important part of the performance test conducted as part of the acceptance process. The preheater is engineered to achieve full throughput in both its conventional and KombiGAS mode, so its energy consumption in both modes becomes directly comparable, **Fig. 1**. The two upper curves plot the measured energy consumption at various throughput rates for a conventional preheater (blue curve) and for the KombiGAS preheater (red curve), respectively. It emerges that down to a throughput rate of 75%, the energy consumption is the same for both designs in the present configuration if measuring tolerances are taken into account. Below this throughput level, the energy consumption of the conventional preheater increases progressively. This characteristic tallies with empirical observations. The energy consumption of the KombiGAS preheater, on the other hand, continues to decline with decreasing throughput. This is due to the fact that the part of the heating job taken over by the actively heated preheat chamber 1 increases with decreasing throughput rate. As a consequence, the portion of the energy flux transferred with high fuel efficiency goes up while the flame zone ON time decreases proportionally. This effect becomes even more pronounced if several KombiGAS preheat chambers are fitted instead of one. The two dashed lines in **Fig. 1** show the calculated energy consumption with two and three KombiGAS preheat chambers, respectively.



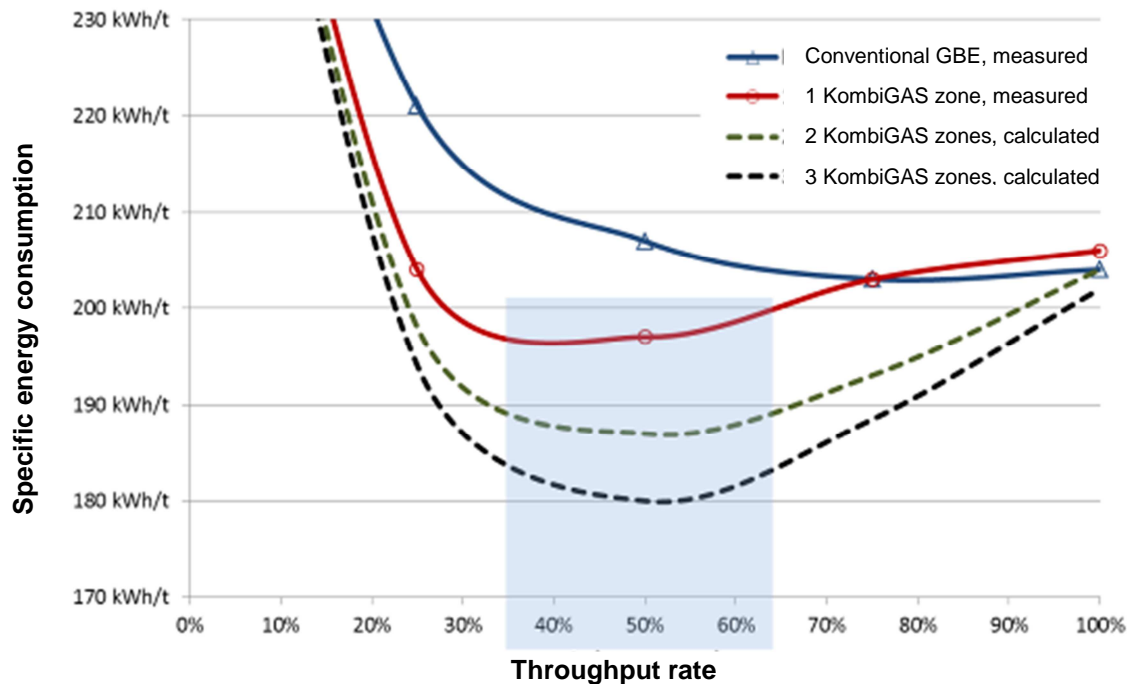


Fig. 3: Specific energy consumption versus throughput when heating to a temperature of 480°C

A special operating mode to be highlighted is used for fast extrusion programs where Al99.5 billets are heated in 'continuous operation' at a ram speed of 30 mm/sec.: In this case the log is not returned into the preheater after cutting but is advanced immediately into the shearing position once again. In this manner, the system can handle up to 75 cuts per hour.

SAPA BOLZANO

Since SAPA's magnetic billet heater based on superconductor technology failed to meet demands on the production of extruded automotive parts, the company placed an order with OTTO JUNKER in late 2011 for the supply of two parallel induction heaters for 16" billets. Apart from providing reliable heating technology the customer required equipment to be compatible with the existing log and billet handling systems, requiring only minimum changes and as little floor space as possible. After a lead time of just 6 months, the equipment was accepted in June 2012. During the performance tests, its throughput, energy consumption and temperature accuracy levels were duly validated on 7000-series alloys. Special design features of this job are the energy-saving ceramic melt protection tube and the so-called "blind heating" mode.



CONSTELLIUM SINGEN

At CONSTELLIUM in Singen a complete new 44 MN press line is being installed which is intended to take over the production ranges of several older-type systems. This situation by definition called for maximum flexibility, including flexibility of the heater installation. Accordingly, CONSTELLIUM had opted for induction-type heaters. It was important to the customer that the entire billet heating line should be procured from a "single source" vendor. This capability won OTTO JUNKER the contract to supply the two parallel induction heaters. Billets are fed to these heaters from a saw which receives the logs from a vertical magazine. The necessary handling and conveying equipment, a data management system, and the entire installation and commissioning work round out the contractual scope. One particular feature of this heating system is the "narrow cut" saw. Since the metal is cut by two saw blades operating simultaneously, their blade thickness can be reduced to about 3.5 mm as distinct from conventional saws. As compared to a conventional single-blade saw this means savings of at least 30 tonnes of swarf a year, based on production of 20,000 annual tonnes with an average billet length of 1,000 mm. In terms of money this translates into approx. 50,000 Euro savings per year due to the differential cost per tonne of logs versus the value of a tonne of swarf. The narrow-cut saw can cut both cold and hot logs and is thus also suitable for replacement of a conventional hot log shear.

SCAP

The much-noticed joint venture launched between SAPA and the Aluminium Corporation of China (CHALCO) at Chongqing/China in early 2012 is an ambitious project. In mid-2013, one of the world's largest aluminium extrusion lines (120 MN) is envisaged to start production of extrusions for use in the transport industry. OTTO JUNKER won the customer's confidence not least through the above-mentioned reference projects at Offenburg and Bolzano and received the contract for the supply of the entire heating line for 18" and 21" logs and billets. The heating line comprises a vertical magazine for approx. 1200 tonnes of logs, a cold saw and 6 parallel induction heaters. Apart from the complete machinery and equipment itself, OTTO JUNKER supplies the entire product data management software, **Fig. 2**. All data required for identification of the loaded logs are scanned by barcode reader and then stored in a PC-based product tracking system along with the storage location (rack No., position No.). A standard software („Factory Talk“) is used for this purpose. Upon withdrawal of a log from the magazine, full data tracking is provided, i.e., the system generates data packages which are supplemented with actual data during the processing cycle, and finally transferred to the extrusion press for each individual billet. It goes without saying that the system also supports a return of remaining logs into storage, e.g., in the case of a job change or abortion.



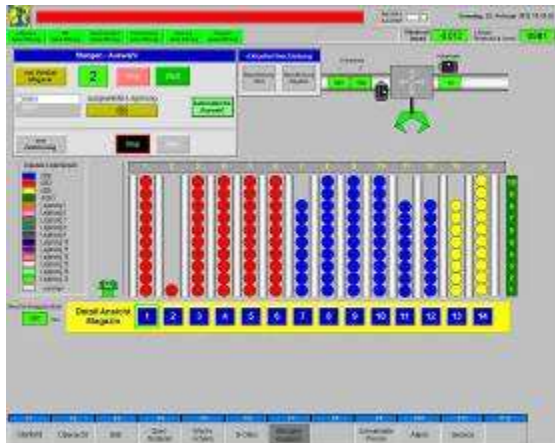


Fig. 2: Data management screenshot und view of the associated vertical magazine

The project is handled in cooperation between OTTO JUNKER GmbH and JUNKER Metallurgical Equipment, Shanghai (JMS). OTTO JUNKER GmbH supplies the entire engineering and key components (e.g., IGBT frequency converters, induction coils, etc.). JMS provides the machinery, fully pre-wired to terminal box level, and will install the system under supervision of their German colleagues. During the subsequent commissioning process, JMS staff will be trained to ensure fast response in the case of future service needs.

HYTC, Korea

Not least on the strength of the above-mentioned references, our Korean customer HYTC became convinced of the benefits of pairing his two new UBE presses with OTTO JUNKER induction heaters. The two systems, each comprising an induction heater, a cross conveyor and a magazine, will be supplied in mid-2013.

MKM, Hettstedt

MKM is one of the most important German manufacturers of extruded copper profiles. Over the turn of the year 2012/2013, a fuel-fired preheater was put into operation at one of the company's sites for heating approx. 17 tonnes/h of copper billets to 900°C. The system offers the above-mentioned features, e.g., full data tracking and multiple heat recovery equipment. The contract is mentioned here although it involves a copper industry project since it illustrates how OTTO JUNKER's standing in the extrusion industry broadens our product portfolio, thus giving rise to expanded expertise.



Just off the ticker: SAPA KÖFEM, Hungary

As variously reported in the trade press, SAPA intends to erect a new extrusion line (P3) at its Szekesfehervar site in Hungary. OTTO JUNKER has won the contract for supplying all equipment upstream of the press. One noteworthy feature of this installation is that the sophisticated magazine system will be capable of feeding both the new P3 press and its P4 counterpart scheduled to remain in operation in parallel with it. This functionality will include the entire data management. The new system is slated to go into service in the 1st quarter of 2014.

Summary and outlook

A key success factor and unique selling proposition lies in OTTO JUNKER GmbH's ability to supply extrusion works with both induction-type and fuel-fired heaters. This ensures that the customer will always receive objective advice, without any bias towards one or the other technology. Additional customer benefits are provided by synergy effects from other OTTO JUNKER product sectors because the experience gained in commissioning is always fed back directly into the product development and design loops, given that all commissioning is carried out by our own automation engineers.

