

HEAT TREATMENT

# extrutec shows potential of new electrically resistance-heated heating solution EHKO

*extrutec from Germany, specialist in heat transfer technology for metal extrusions, invited national and international customers to an in-house exhibition at its Menden site near Dortmund Germany. The Highlight of the event was the daily heating tests of the new electric resistance-heated, high-velocity convection furnace (EHKO) for heating aluminium logs, which has already been successfully put into operation in Finland this year.*

The main customer attraction in Menden was the test heater equipment of the newly developed heating system, the EHKO. This heating concept uses electric resistant heated elements as a heat source and distributes the air in a convection process to the logs. Special about that new heating system, is the outrages thermal efficiency of 87 %.

A test heater zone was built and commissioned at the Menden site last year to validate the new heating concept. The test heater zone consists of a 2.5 meter long section for 12-inch logs and its heating power of 280 kW is generated by an array of resistance heating elements. The heating tests confirmed the previously simulated data. The control behavior of the furnace was particularly exciting for the visitors, as this is a new concept in the context of the aluminum extrusion industry. The test kiln will remain available for future customer demonstrations.

In real continuous production situations, the EHKO heating concept is always operated in combination with an induction oven. This combination combines the most efficient electrical base heating with the advantages of taper heating in an induction oven. The already proven “In-line” system, so far, a combination of a gas heater with an directly attached induction oven, will also be used in the new concept. The gas heater is replaced by the

EHKO. In this way the many advantages of the “In-line” constellation, such as space reduction and the not need overhead manipulator system result in a considerable reduction of the customers investment cost. The EHKO In-line version is a pending extrutec patent.

### Integration of an Energy Saving Unit (ESU) as part of the EHKO heating concept

Another proven system from the extrutec gas heaters can be transferred to the new complete electric heating system, the Energy Saving Unit. In the previous concept, the exhaust gases from the gas furnace heat water with the aid of a heat exchanger, which is then applied to the studs or rods to be heated.

As a result of the high efficiency of the EHKO, waste heat is not generated. As an additional source of the needed heat, every other heat inten-

sive process of extrusion plants in the customer’s environment can be considered. Foundry equipment, anodizing or even the heat of air compressors can be used to transfer the heat to the ESU and then will be used for the preheating of the logs in the extrusion process. The Energy Saving Unit is a worldwide patented system of extrutec, which is in the meantime sold over 40 times. With the integration of the ESU, a maximum thermal efficiency of up to 90 % can be achieved taking into account the external heat supply.

### Mechanical brushing device

Extrutec offers a new and improved brush system to clean logs and billets, in addition to high-pressure cleaning systems that use hot water. Although high-pressure cleaning is effective, the 11 kW pump used to operate the equipment requires regular maintenance and can be prone to breakdowns depending

Figure 1: EHKO testing zone shown at the customer event  
(Source: extrutec)





Figure 2: EHKO heater in operational setting as “In-Line” (left) and offline (right) version with integrated Eco Shower Unit (ESU) (Source: extrutec)

on the contaminants. The new brushing device uses four brush units that completely surround the log at 90° angles, making log cleaning more effective and efficient without the need for a high connected load pump.

### nEXT4.0 digitalization system

The nEXT4.0 digitalization system offers a software solution to record and evaluate the performance data of extrutec equipment and third-party systems in real-time. nEXT stands for Next Level Extrusion and means the new level of possible improvements while using data. The combination of hardware and software allows extrutec to access the equipment remotely. The remote support modem enables them to capture, visualize, and evaluate all SPS data. The equipment’s built-in sensors provide information on the condition of specific components, such as the saw blade on the hot saw, allowing for predictive maintenance in later stages. nEXT4.0 helps to identify optimization potential. The application can be operated both online and offline for IT security reasons. In offline mode, data access is only available via the company network.

### Induction furnaces with improved power electronics

Extrutec induction furnaces come with a new type of frequency converter as standard. The power electronics have been improved and existing systems can also be converted to the new standard. All extrutec inline ovens will be equipped with MIBu converters in the

future. Compared to conventional IGBT converters, MIBu converters do not require power factor compensation. This results in energy and space savings. For each induction unit, four capacitor fields are saved, freeing up three square meters of floor space. Additionally, the re-cooling system demand and induction furnace monitoring requirements are significantly reduced.

The initial furnaces that were equipped with the new converter technology were supplied approximately two years ago. Since then, extrutec has replaced several older switchgear units with this new converter topology, resulting in significant improvements in efficiency and process management. This modern technology is maintenance-free and provides a significant advantage over mechanical switchgear systems and even those equipped with thyristor elements. These systems produce high inrush surges during the switching process. The new topology developed by extrutec can result in energy savings of between 5-10 %.

By installing a new switchgear system, including new controls and a converter, it is possible to retrofit even 40-year-old equipment. This allows customers to operate their existing induction furnaces with greater efficiency, using the same set of coils and mechanical components. The investment costs for this retrofit are much more favourable compared to a complete equipment replacement.

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Figure 3: Log cleaning system (Source: extrutec)



Figure 4: Showing of the new power electronics during the customer event (Source: extrutec)