

Schaeffler Global Technology Solutions

Raw material extraction and processing

TAKRAF GmbH, Germany

Special Heating Equipment for extra large Workpieces

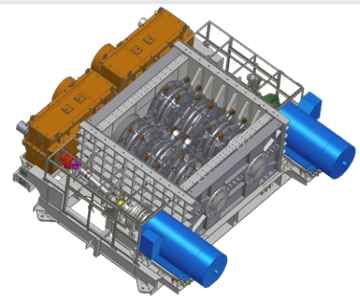
TAKRAF GmbH is part of the Tenova Group. As a globally-operating company, TAKRAF develops, designs and supplies equipment for mining applications and conveyor equipment of all types, in particular for overburden removal, raw materials extraction, preparation, storage and homogenization up to transportation and shipping. Companies in industries all over the world use TAKRAF bucket wheel excavators, stackers, crushers, belt conveyors, reclaimers and leach pads as well as treatment plants.

Challenge for Schaeffler

One of TAKRAF's newest product areas is the development of roll crushers and the associated gearboxes. These gearboxes comprise large and heavy components such as gears that weigh up to 5000 kilograms. TAKRAF has always used conventional FAG inductive heating devices that are suitable for workpieces weighing up to 1200 kilograms for heating their smaller workpieces. Since these devices are not able to heat the large gearbox components, TAKRAF needed a new heating device with considerably more power.

Schaeffler Solution

The local Schaeffler sales engineer forwarded the inquiry from TAKRAF to the specialists responsible at the Global Technology Network. Schaeffler engineers in the business unit Service and Application Engineering then designed a device that can generate sufficient electric power required for such large components – the FAG Heater5000. To ensure the heating process is carried out safely and evenly, the brand new Delta T control system technology was used. Two magnetic sensors simultaneously measure the workpiece inside and outside on two measuring points in order to monitor the temperature level and reduce it automatically if the maximum permitted difference in temperature is exceeded.



TAKRAF
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Technical Information about the Machine

Roll crusher

Throughput:

4 250 t/h (max. 6 500 t/h)

Feed material size:

Max. 2 000 mm

Product material size:

Max. 350 mm

Weight:

160 000 kg





Size comparison: FAG HEATER5000, the largest heating device ever built by Schaeffler next to the FAG HEATER10



The heaviest gear weighs almost five tons and has an outside diameter of 1 700 mm



The heating process is controlled using a touchscreen display on the FAG Heater5000

Customer Benefit

With the FAG HEATER5000 TAKRAF now has a powerful induction heating device for larger workpieces weighing up to a maximum of 5 000 kilograms. Smaller workpieces weighing up to 2 000 kilograms that were previously heated using FAG HEATER1200 can now be heated much more quickly using the new device. This produces a wide variety of applications. The cost and time savings involved as well as the use of resources in terms of personnel vary depending on the application (workpiece type and size, processes in use).

Time savings using a medium-weight gear (2 000 kg)	
Product	Time
FAG HEATER1200	6 hours
FAG HEATER5000	20 minutes
Saving:	5 hours 40 minutes

In addition to the Delta T control system with 2 sensors described above, the FAG HEATER5000 has two heating options controlled by setting the temperature (1 sensor) and the time. These are used for components with which there is no risk of changes in the structure during the heating process (e.g. rolling bearings with large radial clearance or thin-walled workpieces).

What's special

The FAG HEATER5000 is the largest inductive heating device ever built by Schaeffler. As a special solution, it complements the range of FAG inductive heating devices. As is the case with all heating devices from the HEATER series, FAG HEATER5000 also fulfills the highest standards in terms of quality and safety. This example shows how Schaeffler always meets the individual needs of its customers and develops optimum customer solutions using a high level of engineering and manufacturing expertise.

Technical Information about the Solution

FAG heating device:

HEATER5000

Max. workpiece weight:

5 000 kg

Heating temperature:

- Gears: 200 °C
- Rolling bearings: 100 °C

Heating options:

- Time control (100 % power)
- Temperature control with 1 sensor (100 % power)
- Delta T control with 2 sensors (automatic power reduction)

Max. power consumption:

100 kVA

Voltage/frequency:

400 V/50 Hz

Vertical ledges (W x H x D):

- 100 x 100 x 1 650 mm
- 150 x 150 x 1 650 mm
- 200 x 200 x 1 650 mm