

Schaeffler Global Technology Solutions

Power plants

Customer-specific Induction Facility Gives Rapid and Reliable Heating of Workpieces

The customer is a leading energy company with numerous manufacturing locations and sales offices in Poland. Company activities involve the production and sale of electricity and gas.

Challenge for Schaeffler

Rolling bearings in coal pulverizing mills must be replaced regularly. The project concerned 96 beater mills of type N 230.45, each with two spherical roller bearings. Since the bearing seat has a transition fit, the mounting of a new bearing requires heating of the housing so that the components can be joined together. Due to the size of the housing and the weight of 3,6 tonnes, it was not possible to use a conventional heating device. The customer was using a gas burner for this purpose. However, this method carries a considerable danger of injury and the risk of non-uniform material expansion, possibly leading to bearing seat damage. Furthermore, heating of each component takes several hours.

Schaeffler Solution

For the specific case of the mill described above and for a further new type of mill at the customer's plant, Schaeffler developed a medium frequency induction device that is also suitable for mobile use. This comprises a generator and two different fixed inductors for the two different bearing seats. For heating, the inductor is inserted in the housing. With a maximum output of 20 kW and an operating frequency of 10 to 25 kHz, the locating bearing seat is heated to 60 °C in only about 20 minutes using a temperature control facility. This temperature ensures a sufficiently large clearance for mounting of the bearing in its seat. The concept for the induction device was created by experts in the Schaeffler Global Technology Network working in partnership with local Schaeffler sales engineers in Poland. Schaeffler also provided commissioning and customer training.



Technical Information on the Beater Mills

Task:

Crushing of brown coal in order to supply the combustion chamber with coal dust

Type:

N 230.45

Speed:

480 – 500 RPM

Bearing support per beater mill:

2 spherical roller bearings with tapered bores

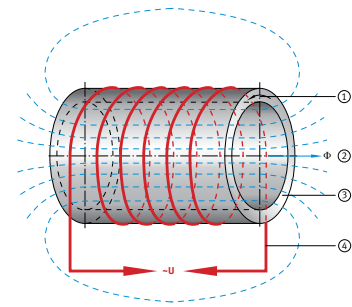




FAG medium frequency generator – compact design, giving the additional option of mobile use



Housing in vertical position with fixed inductor for heating of the bearing seat



Induction heating principle I 1: Short circuit current; 2: Magnetic field; 3: Bearing ring; 4: Excitation coil

Customer Benefit

The customer-specific design of the induction device took account of all the requirements present. This solution was based on the concept of fixed inductors, which can be rapidly and easily positioned in the bearing seat. This design is thus particularly suitable for batch operation – a benefit that should not be underestimated given the large number of bearing positions. In comparison with the gas burner, medium frequency technology reduces the time required for replacement of a single bearing by several hours – an enormous amount of optimization when extrapolated to all the bearing positions involved. Overall, a significant increase in efficiency was achieved: time outlay, personnel allocation and energy consumption were significantly reduced and plant availability was thus increased. In addition, security of personnel and machinery was increased since the temperature-controlled, automatic process carried out by the induction device checks the component and achieves heating without the use of a naked flame.

The advantages at a glance:

	Gas burner	Induction heating device
Operations Scheduling:	Time-consuming	Low
Use of resources:	Several people	1 person (only for preparation and follow-up)
Occupational safety:	Problematic	High
Heating time:	Several hours	20 minutes

What's special

With medium frequency technology, Schaeffler offers a reliable and economical method for the heating of large rolling bearings, labyrinth rings, housings and other steel parts. Medium frequency devices are designed for the specific application and are fitted, depending on the workpiece and the requirements of the customer, with flexible or fixed inductors.

Schaeffler also offers the heating of bearings, including mounting, as a service – which is particularly attractive to customers for whom it would not be economically viable to purchase their own heating device.

Technical Information about the Solution

Medium frequency device:

HEAT-GENERATOR20-BASIC

Air cooling, enclosed-ventilated:

Enforced

Active power:

20 kW

Working frequency:

10 – 25 kHz

Mains frequency:

50 – 60 Hz

Mains nominal voltage/current:

3 x 400 V / approx. 31 A

Line-side fuse protection:

32 A

Dimensions (L x D x H):

553 x 600 x 630 mm

Weight:

approx. 55 kg