

Fabrication of simple bearing heater

Structure and working principle of a simple [bearing heater](#)

We use the thickness of 3mm A3 steel plate to make a 450 * 450 x (high) 350mm square box, a 2kW U heating tube, a liquid expansion temperature controller and a pair of metal thermometers, all installed in the lower part of the bearing bracket, and the bearing bracket is removable for placing hot bearing. The bearing bracket should not be less than 50mm from the bottom of the heater to prevent impurities from entering the bearing at the bottom of the box. There is a box lid on the box to prevent sundries from falling into the environment and oil vapor pollution. Install a row of oil valves at the bottom. The structure is shown in Figure 1.

We use 46# machine oil as heat transfer medium, place the bearing horizontally on the bearing bracket, turn on the thermostat, connect the power supply, preset the temperature of the oil heating, and gradually heat the oil. The temperature of the oil can be displayed on the dial of the bimetal thermometer. When the oil temperature reaches the set value, the thermosensitive cylinder on the thermostat is placed in the oil and the external force is prevented, and the signal is turned back to the thermostat to cut off the power supply of the bearing heater automatically, and the heating is stopped. The bearing is removed and assembled with clean wire.

2. Determination of heating temperature

After cleaning the journal and bearing, the fit gap between the inner hole and the Journal of the bearing is measured to be 0.055mm, according to the following formula

$$T1 = (2 \sim 3) I / k_a \cdot D + t_0$$

Formula:

T1 - oil heating temperature;

I - the clearance between bearing bore and journal is mm;

The expansion coefficient of Ka - bearing steel is $k_a = 1.1 \cdot 10^{-5} / \text{C}$;

D - nominal diameter of bearing hole mm;

T0 ambient temperature.

The bearing heating temperature is calculated. We choose the expansion of the inner hole of the bearing to be 2.5 times the fit gap between the bearing bore and the axle neck. The gap between the inner hole and the Journal of the bearing is $i = 0.055\text{mm}$, the ambient temperature is $t_0 = 30$ degrees, and the nominal diameter of the bearing hole is $d = 220\text{mm}$. The oil temperature of the bearing heater should be heated to 86.8 C.

3. [Bearing heating](#) and installation

The bearing should be thoroughly cleaned before heating the heater. The oil temperature should be controlled at 80~100 C, and the maximum temperature should not exceed 120 C to avoid bearing tempering and hot oil combustion.

When the bearing is removed from the heater, it should be cleaned immediately with clean cloth (not with cotton yarns) and with clean welder gloves. The bearings are quickly loaded into the shaft and placed at once. Slowly turn the bearing to check whether the bearing is inclined or hairpin. When rotating, the bearing should not have abnormal noise. The bearing is gradually cooled, and the cooling water is forbidden to reduce the plasticity of bearing material and reduce stress.

After the bearings are completely cooled, clean air is used to purge the bearings, and a suitable amount of molybdenum disulfide lubricating grease is applied to the bearing cage and raceway, and the next installation process can be carried out.