

# Heat Treating Forgings

United Induction Heating Machine Limited

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Forgings are subjected to final heat treatment or intermediate heat treatment to improve the machinability.

The processes that occur during heat treatment of forgings can be divided into two groups — processes occurring at temperatures above and below  $A_c3$ .

The temperatures of these processes are given below: Forgings are heat treated in continuous furnaces with complete mechanization of the heat treatment cycle and automatic control.

Apparatus for Heat Treating Forged Turbine Blades.

The apparatus consists of two pusher electric furnaces of the Eichelin type (Fig. 1) [1].

The furnace dimensions are 1600 × 400 × 6000 mm.

The frame of the furnace is welded. It is gastight, which makes it possible to use a protective atmosphere. The metal is heated either to 600 or 950°C.

The furnace is heated by means of radiant tubes mounted on the side walls and in the hearth.

The furnace is divided into six independently controlled zones. The power to each zone is graduated

- - 50 kW in the first stage, 35 kW in the second stage, 22.5 kW in the third stage, and 17.5 kW in the fourth stage.

The following production cycles are possible (Fig. 1):

- a) The forgings, passing through the furnace, are either transported to another section (positions 7, 8, 1, 2, 3, 4) or are transferred to a washer, after which they arrive at the loading station (positions 7, 8, 1, 2, 3, 5, 7);
- b) in furnace 1 the forgings are heated to quenching temperature and in furnace 9 to tempering temperature (positions 7, 8, 1, 2, 3, 5, 9);
- c) in fully loaded furnaces the treatment occurs in the same manner as in batch furnaces.

The forgings are placed on trays of a heat resistant alloy (37% Ni, 17% Cr). The loading-unloading time varies from 10 to 60 min.

The apparatus is intended for heat treating a wide variety of steels; the maximum throughput is 600 kg/h, which requires two workers.

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