



**TECHNICAL DELIVERY CONDITION OF HEAT
TREATMENT OF FORGING IN VERTICAL CONDITION**

CENTRAL FOUNDRY FORGE PLANT
BHEL, RANIPUR, HARDWAR

TDC NO.	TDC/FRG/8846
DATE	29-05-2013
REV	01
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1.0 DESCRIPTION:

This TDC governs the requirement of oil quenching and tempering of Forging in Vertical Condition Only. The heat treatment profile is as per page 2 of 2 of this spec.

2.0 PREQUALIFICATION :

- The vendor must have Vertical Oil Quenching Tank capable of Quenching of forging weighing ~25T in vertical condition. The vendor's quenching tank should be able to accommodate the rotor and sufficient oil should be available with the vendor for undertaking the oil quenching.
- Vendor must have Vertical Shaft Furnace of sufficient capacity to heat treat the rotor in Vertical Condition.

3.0 The temperature of oil in the tank should not increase beyond 80°C during quenching.

4.0 SCOPE OF WORK :

Vendor will execute the heat treatment cycle and carry out the hardness testing on the job.

5.0 HEAT TREATMENT CYCLE :



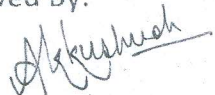
The indicative thermal cycle to be followed is as detailed below. Firm cycle giving all parameters shall be stated at the time of heat treatment.

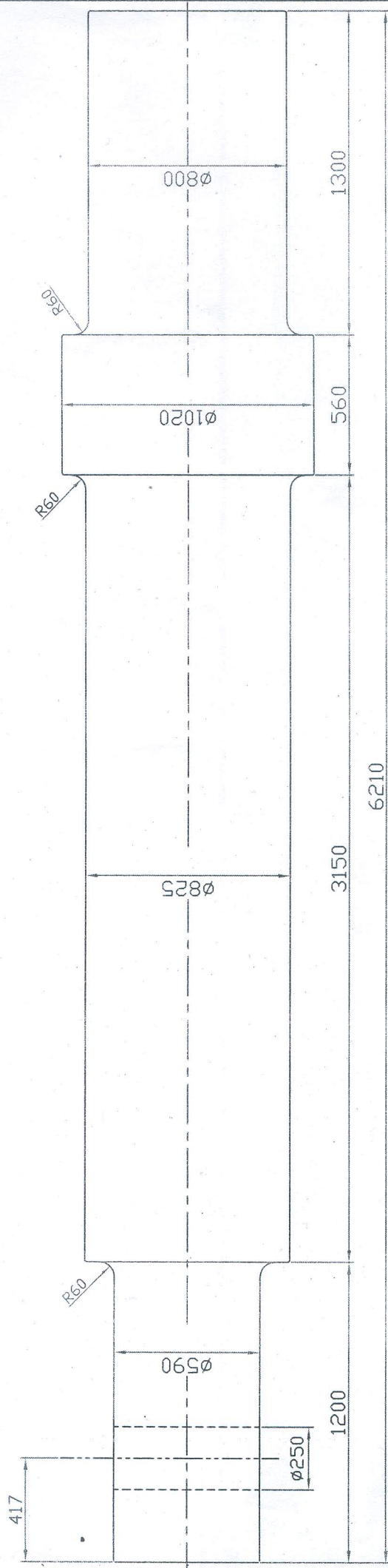
- Load in vertical furnace.
- Heat to 1090 °C and hold for 10 hrs, furnace cool to 150° C.
- Hold at 150° C for 10 hrs
- Heat to 1070 °C and hold for 10 hrs , Oil quench in vertical condition for 5-6 hrs. Check the rerise temperature and report.
- Hold at 100 °C for 10 hrs.
- Heat to 570 ± 5 °C and hold for 10 hrs, furnace cool @ 10 °C/hr to 350 °C.
- Cool in air to ambient temperature, hold for 10 hrs.
- Heat to 705 ± 5 °C and hold for 17 hrs, furnace cool @ 10 °C/hr to 150 °C.
- Air cool to ambient temperature.

6.0 **HARDNESS TESTING :** After heat treatment Hardness survey on the Forging to be carried out at 120° apart along the length at every 1000 mm.

7.0 The heat treatment and Hardness testing shall be witnessed by BHEL representatives who shall have access to the facilities at any time during the heat treatment and testing. Vendor will provide the details of the actual cycle provide.

8.0 **REWORK :** in case of disruption of the heat treatment cycle for any unforeseen reason, the same shall be repeated in part or in full depending upon the judgment of BHEL.

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