

**EFFECT OF TEMPERATURE DROPPING DURING SOLUTION TREATMENT DURING  
REJUVENATION HEAT TREATMENT ON FINAL MICROSTRUCTURES IN CAST NICKEL  
BASE SUPERALLOY, GRADE INCONEL-738**

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**Abstract**

Generally, the rejuvenation heat treatment of degraded turbine blades, which were made of cast nickel based superalloy, Grade Inconel 738, usually consist of solution treatment condition with temperature range of 1125°C- 1205°C for 3 hours and then following with double aging processes, which include primary aging at 1055°C for 1 hour and secondary aging at 845°C for 24 hours. However, in practical working conditions of reheat treatment processed, the possible change of temperature during solution treatment can be obtained by error or malfunction of heating furnace, which usually provides the temperature dropping down. To simulate this effect, the dropping temperature during solution treatment was chosen to decrease till the level of 845°C, which usually happens in practices then immediately heating up again to solution temperature level. The various selected temperature dropping programs were performed during solution treatment. The maximum number of temperature droppings during the single solution treatment is up to 3 times. From the received results, it was found that the effect of temperature dropping during solution treatment has extremely influenced on the final rejuvenated microstructures.

**Keywords:** Nickel base superalloy, rejuvenation heat treatment, Inconel-738, temperature dropping, solution treatment

**Author did not supply full text of the paper/poster.**