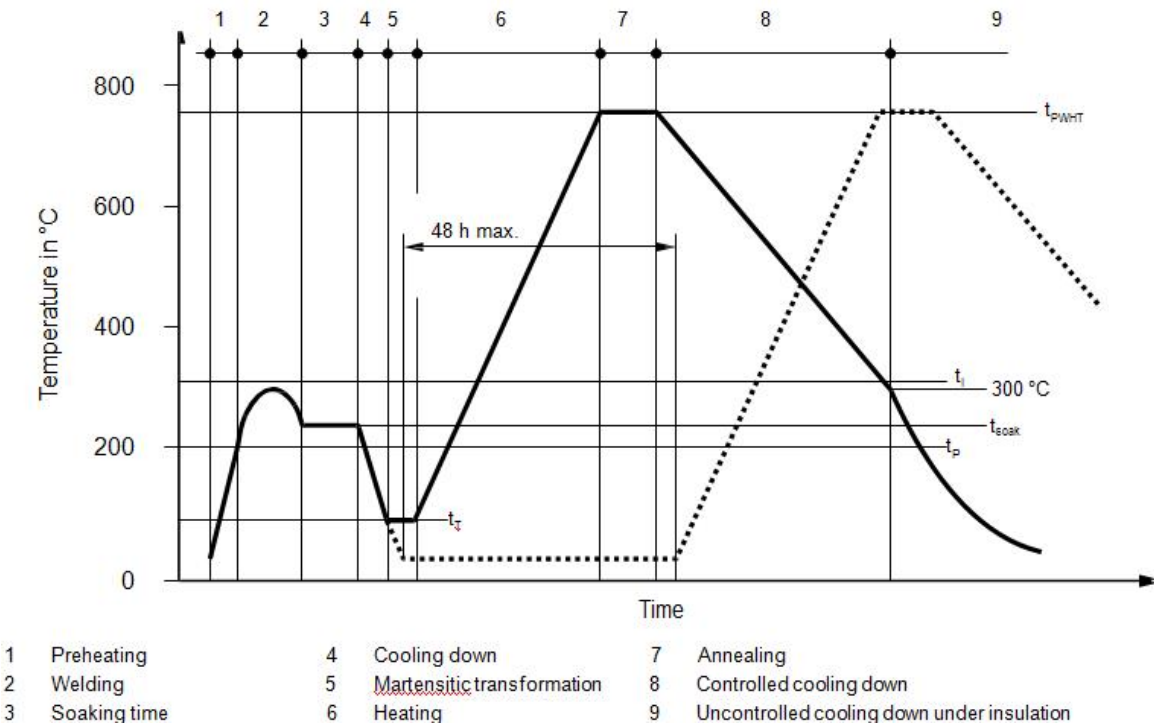


PWHT for a maximum of 48 hours under dry conditions. Care shall be taken to avoid stresses caused by impact, movement or inadequate supporting.

During the intermediate storage period welds may only be examined non-destructively. Defects found should be repaired prior to PWHT. A required additional PWHT will thus be avoided. This intermediate examination shall not be considered as a substitution for the specified examinations after PWHT.

### 8.3. Postweld Heat Treatment

At the end of the Martensitic transformation time, or after reaching the storage temperature thermocouple wires shall be tack welded on top of the weld (M3) by means of a spot-welding device or (Capacitance discharge welding machine).



**Figure 2** Temperature-Time-Diagram

The measured temperatures shall be recorded with a calibrated color chart recorder.

Heating up to the PWHT temperature  $t_{PWHT}$  shall be performed at the specified heating rate according to Table 2. The PWHT temperature which depends on the wall thickness shall be maintained for at least 2 hours. There- after, cooling down to 300 °C at the specified rate according to Table 2 shall be performed. Further cooling down to the ambient temperature may be performed uncontrolled. The insulation material (e. g. ceramic fiber fabric) shall only be removed after the ambient temperature has been reached.

Table 2. **Temperature-Time-Parameter**

Symbol	Description	Value
$t_p$	Preheating temperature	180 °C to 200 °C
$t_i$	Interpass temperature	300 °C to 320 °C
$t_{soak}$	Soaking temperature	250 °C
$t_T$	Martensitic transformation temperature	20 °C to 80 °C
$t_{PWHT}$	PWHT temperature	750 °C ± 10 °C
	Heating rate for PWHT	100 °C / h max.
	Cooling down rate for PWHT	100 °C / h max.

## 9 EXAMINATION OF WELDS

Non-destructive examination shall be performed on welds at ambient temperature and after PWHT. Extent of NDE Examination shall be performed in accordance with table 1 of Project Specification 7T04-CS-00-TS-003, RT or UT for Butt welds; and PT or MT for Socket welds, Fillet welds and Branch connection welds.

The hardness values shall not exceed 241 HBW.

## 10 DOCUMENTATION

Heat treatment records shall depict the full heating cycle for each measuring point (preheating, welding, soaking, cooling down, transformation phase, heating, annealing, cooling down). The heat treatment charts depicting the cooling down after welding (soaking) may be stopped at temperatures below 80 °C. The heat treatment charts depicting the cooling down after annealing may be stopped at temperatures below 300 °C.