



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Quality requirements for post welding heat treatment

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1 Scope

This Document specifies the quality requirements for post weld heat treatment and provides guidelines for manufacturers to implement post weld heat treatment.

This Document applies to various post weld heat treatment methods for metallic materials and can also be used as a basis for evaluating the manufacturer's heat treatment capability.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 3375 Welding Terminology

GB/T 7232 Terminology of Metal Heat Treatment

GB 15735 Requirements for the Safety and Health in Production Process of Metal Heat Treatment

GB/T 16839.1 Thermocouples - Part 1: EMF Specifications and Tolerances (GB/T 16839.1-2018, IEC 60584-1:2013, IDT)

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 3375, GB/T 7232 and the following apply.

3.1 Manufacturer

Organizations and personnel that are engaged in heat treatment of welded products or components.

3.2 Loading temperature

The furnace temperature at which the product or component is loaded into the furnace.

3.3 Holding temperature

The process temperature at which the product or component is held constant in order to obtain special properties.

NOTE 1: The holding temperature depends on the type of heat treatment, the type of material and the thickness of the material.

NOTE 2: The holding temperature is usually expressed by a certain temperature range.

3.4 Holding time

The holding time of the product or component at the holding temperature.

NOTE 1: The calculation of the holding time starts when all the temperature measurement points reach the lower limit of the holding temperature, and ends when a temperature measurement point is lower than the temperature.

NOTE 2: The holding time depends on the type of heat treatment, the material and its thickness.

3.5 Section temperature range

The temperature variation range between two adjacent temperature measurement points within the specified straight-line distance.

3.6 Post weld heat treatment

After welding, heat treatment measures to improve the structure and properties of welded joints or to eliminate residual stress.

4.1 General

The manufacturer shall review the contract requirements, all other requirements and relevant technical data to ensure that all information necessary to carry out the heat treatment operation is obtained before the work begins. Manufacturers shall confirm that their capabilities meet the requirements to ensure that all quality-related activity plans are feasible and comply with the provisions of GB 15735.

The review is carried out by the manufacturer; and it shall be confirmed that the content of the work is within the scope of its ability; that it has sufficient resources to ensure timely delivery, and that the documents are clear and unobjectionable. Manufacturers shall ensure that major n) Quality requirements and heat treatment test (if necessary);

- o) Heat treatment sequence/order;
- p) Whether there is sufficient energy;
- q) Other special agreements, such as product or component support.

5 Subcontractor

All subcontractors shall work in accordance with the manufacturer's agreement and shall fully meet the relevant requirements of this Document. The manufacturer shall ensure that subcontractors meet the specified quality requirements.

The information that the manufacturer provides to subcontractors shall include all relevant data involved in the technical review (see 4.3).

Manufacturers employing heat treatment subcontracting shall provide subcontractors with specifications and requirements for all relevant work. Subcontractors shall provide reports and documents of their related work as required by the manufacturer.

6 Personnel

The manufacturer shall assign a sufficient number of competent personnel to plan, implement and supervise the heat treatment work according to the specified requirements.

The competence of heat treatment operators shall be assessed and confirmed by the manufacturer.

Heat treatment operators shall receive necessary training and be able to read, understand and execute heat treatment process documents, such as adjustment procedures, installation of thermocouples, maintenance of temperature measuring instruments, etc.

7.1 General

The manufacturer shall assign a sufficient number of competent personnel to carry out the

planning, implementation, testing, inspection and evaluation of heat treatment work in accordance with the specified requirements.

7.2 Non-destructive testing

Non-destructive testing shall be carried out in accordance with product standards or relevant technical requirements.

7.3 Destructive test

Destructive test after heat treatment may be required in the following cases:

- a) Application standards or contractual requirements;
- b) The manufacturer decides to verify the performance of the product or component.

A separate test piece shall be used for the destructive test. The test piece is made of the same material as the product; and its production conditions and heat treatment process are also the same as the product.

8.1 Production, test and related equipment

The following equipment shall be configured if necessary:

- a) Heat treatment furnaces or heating equipment;
- b) Heat treatment program control device;
- c) Temperature measuring instruments and recording instruments;
- d) Cooling equipment;
- e) Lifting and transporting equipment;
- f) Personal protective equipment and other safety equipment.

8.2 Equipment list

In order to assess the capacity and ability of the workshop, the manufacturer and/or subcontractor shall maintain a list of necessary equipment for heat treatment. Such list shall include various information on the main equipment, such as:

- a) Equipment name, heat source type and capability;
- b) Furnace size, maximum loading and temperature range;
- c) Program-controlled devices and their capabilities;
- d) Temperature measuring equipment and its capacity, measuring method, reading range,