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

GB/T 30583-2014

**Specification for post weld heat treatment of pressure
equipment**

承压设备焊后热处理规程

(English Translation)

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1 Scope

This document specifies general basic technical requirements for post weld heat treatment of steel pressure equipment.

This document applies to post weld heat treatment of boilers and pressure vessels (excluding gas cylinders).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3375, Welding terminology

GB/T 9452, Testing method for working zone of heat treatment furnace

NB/T 47014, Welding procedure qualification for pressure equipment

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 3375, GB/T 9452 as well as the followings apply.

3.1

weldment

Welded pressure equipment or parts thereof.

3.2

post weld heat treatment

The process that, to eliminate the welding residual stress and improve the structure and

performance of the welded joint, the weldment is uniformly heated to a sufficiently high temperature below the phase transition point of the metal, kept for a certain period of time, and then uniformly cooled.

3.3

soak band

During partial post weld heat treatment, the area that the volume range over which the weldment reaches the specified temperature is on its surface. The soak band includes the weld zone, fusion zone, heat-affected zone and its adjacent base metal.

3.5

gradient control band

The area that during partial post weld heat treatment, to prevent heat dissipation in the temperature range and heating range of the weldment, a thermal insulation material is laid on its surface.

3.7

holding time

The time during which the indicated volume range of the weldment or its local soak band is maintained at the holding temperature. The holding time is calculated from the time when the temperature of all temperature measuring points reaches the minimum holding temperature.

4.1 General provisions

4.1.1

In addition to complying with this Standard, the post weld heat treatment of pressure equipment shall also comply with the requirements of product standards, design documents and contracts.

4.1.4

The constructor of pressure equipment shall have technical personnel, who have certain professional knowledge and sufficient practical experience, after they master the following basic conditions, prepare "Process specifications for post weld heat treatment" for each (piece) weldment.

4.1.5

The welding process evaluation items used for weldments shall include all important factors and supplementary factors that may occur during the implementation of the "Process specifications for post weld heat treatment".

4.2 Post weld heat treatment thickness deltaPWHT

4.2.1

The deltaPWHT of equal thickness full penetration butt joint is the weld thickness (excess height is not counted). At this time, deltaPWHT is the same as the base metal thickness.

4.2.4 The values of deltaPWHT when welding pressure components with different thicknesses are as follows (see Annex A).

4.2.5 Thickness of post weld heat treatment calculation holding time.

4.4 Specification parameters of post weld heat treatment

4.4.1

The specification parameters of post weld heat treatment are shown in Table 1.

4.4.1.1

For Fe-1 and Fe-3 steel weldments, when the post weld heat treatment is performed below the minimum holding temperature in Table 1, the holding time can be extended as specified in Table 2. The holding temperature of Fe-9B steel weldments shall not exceed 635°C. When the post weld heat treatment is performed below the minimum holding temperature in Table 1 (up to 55°C reduction is allowed), the holding time can be extended according to the provisions of Table 2.

4.4.1.5 Limits of post weld heat treatment temperature for Fe-5B-2 steel weldments

under the following conditions.

4.4.2 The holding time of post weld heat treatment can be completed in one heat treatment process. It can also be the accumulation of multiple heat treatment processes at the same holding temperature.

4.4.3 Unless otherwise specified, the temperature of each temperature measurement

point is allowed to be within $\pm 20^{\circ}\text{C}$ of the specified temperature of the heat treatment process but cannot exceed the specified limit.

5 Equipment, instruments, temperature measuring supplies

and thermal insulation materials

5.1

The post weld heat treatment furnace shall meet the following requirements.

5.2

The effective heating area of the post weld heat treatment furnace shall be determined according to the provisions of Annex C. The schematic diagram of the effective heating area shall be placed in a prominent position of the heat treatment furnace

5.3 Insulation materials, temperature control instruments and temperature measuring

instruments shall meet corresponding standards. The product shall have quality certificate and instruction manual.

5.4 Manufacturers of thermocouples and compensation wires shall have corresponding qualifications. The used thermocouple and compensation wire shall have quality certificate.

5.5 All kinds of measuring instruments shall pass the measurement inspection according to the standard. Before use, calibrate as specified.

5.6 The post weld heat treatment heating, temperature control, temperature

measurement device and the whole system outside the furnace shall be inspected and debugged each time before being put into use. Make them in a normal state and meet the heat treatment requirements.

5.7 The thermal insulation material shall not contain elements and impurities that are harmful to the weldment. It is advisable to use aluminum silicate fiber and its products, high silica cloth, alkali-free glass fiber cloth.

6 Technical preparation

6.1

In the case of overall post weld heat treatment or partial post weld heat treatment in the furnace, the main contents of the specification for the post weld heat treatment process include.

6.2

For the specification for post weld heat treatment process of the overall post weld heat treatment outside the furnace (including the overall post weld heat treatment outside the furnace), an expert review shall be organized if necessary. The main contents of the specification for post weld heat treatment process include.