

JB

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

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**Technical requirements for nitrocarburizing-oxidizing combined
treatment (QPQ)**

氮碳氧复合处理（QPQ）技术要求
(English Translation)

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1 Scope

This standard specifies the terms and definitions, equipment requirements, process material requirements, process requirements, quality control and inspection, safety, hygiene and environmental protection requirements of the nitride carbonize and oxidize multi-treatment (QPQ) technology.

This standard applies to the nitride carbonize and oxidize multi-treatment (QPQ) of black metal, cast iron and stainless steel.

2 Normative references

The following documents are essential to the application of 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) are applicable to this standard.

GB/T 230.1 Metallic materials - Rockwell hardness test - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)

GB/T 443 L-AN full loss system oil

GB/T 4340.1 Metallic materials - Vickers hardness test - Part 1: Test method

GB 5959.1 Safety in electroheat installations - Part 1: General requirements

GB 5959.4 Safety in electroheat installations - Part 4: Particular requirements for safety resistance heating installations

GB/T 6067.1 Safety regulations for lifting appliances - Part 1: General

GB/T 7232 Terminology of metal heat treatment

GB/T 8121 The terminology of technological materials for heat treatment

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

GB/T 10067.1 Basic specifications for electroheat installations Part 1: General

GB/T 10067.4 Basic technical conditions for electroheat equipment - Part 4: Indirect resistance furnace

GB/T 11354-2005 Steel-iron parts - Determination of nitrided case depth and metallographic examination of nitriding structure

GB 14554 Emission standards for odor pollutants

GB 15735 Requirements for the safety and health in production process of metal heat treatment

GB/T 22560 Gas nitrocarburizing of iron and steel parts

GB/T 27945.1 The management of hazardous solid wastes from heat treatment salt - Part 1: General management

GB/T 27945.2 The management of hazardous solid wastes from heat treatment salts - Part 2: Test method of extractives

GB/T 27945.3 The management of hazardous solid wastes from heat treatment salts - Part 3: Method of innocent treatment

GB/T 27946 Limited value of hazardous substance in the air of heat treatment working place

GB/T 30822 Environmental protection technical requirements for heat treatment industry

GB/T 32529 Technical requirement of cleaning liquid waste recycling and emissions for heat treatment

GB/T 32541 Quality control system for heat treatment

JB/T 6050 Generalization of hardness test for heat treated iron and steel parts

JB/T 6090 Polishers

3 Terms and definitions

The definitions of GB/T 7232, GB/T 8121, GB/T 11354-2005 and the following terms and definitions apply to this document.

3.1 Nitride carbonize and oxidize multi-treatment (Quench-Polish-Quench

QPQ)

4.4 Oxidation furnace

4.4.5

Oxidation furnace shall have salt leakage alarm device and corresponding safety protection device.

4.4.6

Oxidation furnaces shall have air extraction devices and shall comply with the requirements of 4.9.

4.4.7

Oxidation furnace can choose electric lifting furnace lid or pneumatic lifting furnace lid, and set up the salt addition port on the furnace lid.

4.5 Control system

4.5.1

The external heat crucible resistance furnace shall meet the requirements of GB/T 32541 for equipment and instruments.

4.5.2

Each heating zone shall have two thermocouples, one is connected to temperature control instruments and installed between the crucible and the resistance wire, the other is connected to the temperature recording instrument and installed in the crucible, the instrument shall have the alarm function; the thermocouples shall be checked regularly to ensure normal use.

4.5.3

The control system shall be able to display, control and record the temperature, as well as record and store the whole process. It has the functions of automatic temperature timekeeping, automatic timing alarm and salt leakage alarm, it has the functions of overcurrent, overload and phase failure protection.

4.6 Cleaning device

4.6.1

Cleaning device is divided into pre-cleaning and post-cleaning device, it may use cleaning tank or cleaning machine.

4.6.2

The cleaning tank shall be made of glass steel or stainless steel, with stirring function, and its effective size is determined in accordance with the size of the nitriding furnace crucible.

4.6.3

The temperature control device of the hot water cleaning tank is subject to temperature measurement by a thermocouple or a thermal resistor, and temperature control by temperature control instrument, with the operating temperature $\geq 80\text{ }^{\circ}\text{C}$.