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Ultrasonic phased array testing method for round steel

圆钢相控阵超声检测方法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

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Ultrasonic testing method for round steel phased array

1 Scope

This document specifies the general requirements, testing equipment, comparison samples, testing methods, testing procedures, and acceptance criteria for ultrasonic testing of round steel phased array circuits. Test report.

This document applies to phased array ultrasonic automatic or semi-automatic testing of round steel bars with diameters ranging from 8mm to 400mm. Manual testing and other specifications are also covered.

The ultrasonic testing of the phased array of round steel is performed in accordance with the reference procedure.

2 Normative references

GB/T 9445

GB/T 12604.1

GB/T 20737

GB/T 32563

GB/T 42399.1

GB/T 42399.2

3 Terms and Definitions

The terms and definitions defined in GB/T 12604.1, GB/T 20737 and GB/T 32563, as well as the following terms and definitions, apply to this document.

3.1 Automatic testing

Using electromechanical equipment, one or more ultrasonic phased array probes perform appropriate relative motion scanning on the product surface, and the results are obtained through detection.

The instrument automatically evaluates defect echoes based on the alarm thresholds set by the instrument.

3.2 semi-automatic testing

The electromechanical device or equipment operated by the testing personnel enables one or more ultrasonic phased array probes to perform appropriate relative motion on the product surface.

The system scans and evaluates defect echoes using alarm thresholds set by the testing instruments.

3.3 Manual testing

The inspector holds one or more ultrasonic phased array probes and performs appropriate relative motion scanning on the product surface, and then checks the inspection instrument.

The waveform displayed by the instrument is observed and/or the alarm threshold set by the detection instrument is used to evaluate the defect echo.

3.4 phased array image

Different display formats for phased array ultrasonic acquisition data.

Note. Common display modes include A-display, B-display, C-display, D-display, etc.

3.5 phasedarray signal

The phased array image (3.4) or waveform to be evaluated.

3.6

The beam width is equivalent to the distance the beam moves axially along the surface of the round steel.

3.7

The beam width is equivalent to the distance the beam moves circumferentially over the surface of the round steel.

3.8 active axis

The direction is parallel to the axis of the phased array probe containing multiple array elements.

3.9 non-reference system

The initial instrument model, probe specifications, workpiece specifications, and settings for beam aperture, angle, focus, and path range are all included. The system.

3.10 Reference system

The non-reference system records and calls the system settings parameters after calibration.

4 General Requirements

4.1 Unless otherwise agreed in the agreement between the supplier and the buyer, the inspection shall be carried out during the main production processes of round steel (rolling, heat treatment, hot and cold working and straightening, etc.). Proceed after completion.

4.2 The surface of the round steel to be inspected should be flat and smooth, free from loose oxide scale, oil stains and other contaminants that may affect the inspection.

4.3 Detection can be performed using contact technology, partial or full immersion technology. Contact technology can use water, oil, grease or paste as coupling agents; immersion technology...

The technology can use water or oil as a coupling agent. Corrosion inhibitors, wetting agents, and defoamers can be added to the water to prevent the round steel from rusting and to protect the round steel from phase control.

Bubbles are generated on the surface of the array probe.

4.4 The testing environment should avoid strong light, strong electromagnetic fields, strong vibration, corrosive gases, heavy dust, and other factors that may affect the stable operation of the ultrasonic testing instrument.

Factors that can be reliably observed by testing personnel.

4.5 Testing personnel shall meet the requirements specified in GB/T 9445 or equivalent standards. In cases involving third-party testing, the testing shall be conducted by both the supplier and the buyer.

The agreement was reached through negotiation.

4.6 The scanning tracks of the phased array probe should continuously and uniformly cover the surface of the round steel, and the scanning width between adjacent tracks should be at least 10% of the equivalent beam width.

The degree of overlap. See Appendix A for the measurement of the equivalent beam width.

5.1 Testing Instruments

The testing instruments should have the function of recording test signals and detecting defects. The testing instruments should be tested for performance in accordance with GB/T 42399.1.