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NATIONAL STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

中华人民共和国国家标准

GB/T 5777-2008

Replace GB/T 5777-1996

Seamless Steel Pipe and Tubing Methods for Ultrasonic Testing

(ISO 9303:1989 (E), MOD)

无缝钢管超声波探伤检验方法

Issued on: August 5, 2008 Implemented on: April 1, 2009

Jointly issued by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (GAQSIQ) and Standardization Administration of the People's Republic of China (SAC)

Foreward

This standard is modified in relation to ISO 9303:1989 (E) "Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes - Full peripheral ultrasonic testing for the detection of longitudinal imperfections".

This standard is redrafted according to ISO 9303:1989 (E). Comparison list between the Chapter and Article numbers of this standard and those of ISO 9303:1989 (E) is shown in Annex A.

This standard is modified during the adoption of international standard. Those technical differences have already been marked with perpendicular single line on the margin of relevant clauses.The list for the technical differences and their reasons is shown in Annex B for your reference.

For convenient application, the following editorial revisions are made for ISO 9303:1989 (E):

——"This international standard" is revised into "this standard";

——The foreword and introduction of ISO 9303:1989 (E) are deleted.

This standard replaces GB/T 5777—1996 "Seamless steel pipe and tubing-Methods for ultrsonic testing". There have been some significant changes in this standard over GB/T 5777 - 1996 as follows:

——"Electromagnetic ultrasonic testing may be carried out according to this standard" is added in the scope (see Chapter 1);

——Testing and testing methods for oblique defects are added (see Chapter 4 and Annex B);

——The restriction for the position of manual slot on the tube end is modified (Chapter 5 of GB/T 5777 - 1996; Chapter 5 of this standard);

——Dimension and code number of artificial defect is modified (Chapter 5 of GB/T 5777 - 1996; Chapter 5 and Annex E of this standard);

——Probe working frequency is modified from 2.5MHz~10MHz to 1MHz~15MHz (Chapter 6 of GB/T 5777 - 1996; Chapter 6 of this standard).

Annex A, Annex B and Annex E of this standard are informative.Annex C and Annex D are normative.

This standard is proposed by China Iron & Steel Association.

This standard is under the jurisdiction of the National Technical Committee on Iron and Steel of Standardization Administration of China.

Chief Drafting Organizations: Hunan Hengyang Steel Tube (Group) Co., Ltd., Metallurgical Information and Standardization Institute, Baoshan Iron & Steel Co.,Ltd. Special Steel Branch.

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The previous editions of the standards replaced by this standard are:

——GB/T 5777—1986, GB/T 5777—1996;

——GB/T 4163—1984.

Seamless Steel Pipe and Tubing Methods for Ultrasonic Testing

1 Scope

This standard specifies the ultrasonic testing principle, ultrasonic testing methods, reference block, ultrasonic testing equipments, ultrasonic testing conditions, ultrasonic testing procedures, result evaluation and ultrasonic testing report for seamless steel tubes.

This standard is applicable to the ultrasonic testing for longitudinal and transverse defects of seamless steel tubes for various purposes. The testing methods stated in this standard are mainly applicable to test the defects that destroy the metal continuity of steel tubes, but can not effectively test laminar defects.

This standard is applicable to the inspection of tubes with an outside diameter greater than or equal to 6 mm, and with a wall thickness-outside diameter ratio less than or equal to 0.2. For tubes with a wall thickness-outside diameter ratio greater than 0.2, one of the methods specified in annex C shall be used by agreement between manufacturer and purchaser.

Electromagnetic ultrasonic testing may be carried out according to this standard.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard.For dated references, all subsequent modifications (excluding correction contents) or revisions are not applicable to this standard. However, all parties coming to an agreement according to this standard are encouraged to study whether the latest editions of these documents are applicable.For undated references, the latest edition of the normative document referred to applies.

GB/T 9445 Non-destructive testing - Qualification and certification of personnel

YB/T 4082 Measurement method of comprehensive properties for automatic ultrasonic flaw detection system for steel tubes

JB/T 10061 Commonly used specification for A-mode ultrasonic flaw detector using pulse echo technique

3 Ultrasonic Testing Principle

Interconversion between electric energy and sound energy realized by ultrasonic probe and physical properties of ultrasonic traveling in an elastic medium are basis of steel tube ultrasonic testing principle. Ultrasonic beams emitted along a particular direction will generate wave reflection when encounter defects during travel in the tube, defect echo is picked up by ultrasonic probe, and then treated by defect detector to obtain defect echo signals and hereby give out quantitative defect indication.

4 Ultrasonic Testing Methods

4.1 Steel tubes shall be tested with shear wave reflection method under the relative move state of probe and steel tube. During automatic or manual testing, sound beams shall scan all surfaces of steel tubes. Both ends of steel tubes can not be tested effectively during the

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