

Translated English of Chinese Standard: GB/T11345-2023
www.ChineseStandard.net → Buy True-PDF → Auto-delivery.
Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 25.160.40

CCS J 33

GB/T 11345-2023 / ISO 17640:2018

Replacing GB/T 11345-2013

**Non-destructive testing of welds - Ultrasonic testing -
Techniques, testing levels and assessment**

焊缝无损检测 超声检测 技术、检测等级和评定

(ISO 17640:2018, IDT)

Issued on: November 27, 2023

Implemented on: June 01, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the People's Republic of China.**

Table of Contents

Foreword	3
1 Scope	6
2 Normative references	6
3 Terms and definitions	8
4 Symbols.....	8
5 General.....	9
6 Information required prior to testing	9
7 Requirements for personnel and equipment	11
8 Testing volume	13
9 Preparation of scanning surfaces.....	14
10 Parent metal testing.....	15
11 Range and sensitivity setting	15
12 Testing levels.....	17
13 Testing techniques.....	18
14 Test report	19
Annex A (normative) Testing levels for various types of welded joints	21
Bibliography	33

Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document replaces GB/T 11345-2013 "Non-destructive testing of welds -- Ultrasonic testing -- Techniques, testing levels, and assessment". Compared with GB/T 11345-2013, in addition to the structural adjustments and editorial modifications, the main technical changes in this document are as follows:

- a) Change the scope (see Chapter 1 of this Edition; Chapter 1 of Edition 2013);
- b) Change the terms and definitions (see Chapter 3 of this Edition; Chapter 3 of Edition 2013);
- c) Add symbols (see Chapter 4 of this Edition);
- d) Delete the illustration of probe contact width (see Figure 1 of Edition 2013);
- e) Add the coordinate system for defining the location of discontinuities (see Figure 1 of this Edition);
- f) Change the general (see Chapter 5 of this Edition; Chapter 4 of Edition 2013);
- g) Change the requirements for testing equipment (see 7.2 of this Edition; 6.2 of Edition 2013);
- h) Changed the requirements for probe parameters (see 7.3 of this Edition; 6.3 of Edition 2013);
- i) Change the indexing number description of the schematic diagram of the detection area when scanning for longitudinal discontinuities (see Figure 2 of this Edition; Figure 2 of Edition 2013);
- j) Change the requirements for scanning surface preparation (see Chapter 9 of this Edition; Chapter 8 of Edition 2013);
- k) Change the requirements for sensitivity and time baseline correction (see Table 2 of this Edition; Table 2 of Edition 2013);
- l) Change the requirements for transmission correction (see 11.4 of this Edition; 10.4 of Edition 2013);
- m) Change the recommended testing levels (see Table 5 of this Edition; Table 5 of Edition 2013);
- n) Change the illustration and indexing number description of the probe position of

- the butt joint (see Figure A.1 of this Edition; Figure A.1 of Edition 2013);
- o) Add an illustration of the probe positions for a set-through nozzle joint (see Figure A.3 of this Edition; Figure A.3 of Edition 2013);
 - p) Delete the appendix on tandem scanning (see Annex B of Edition 2013);
 - q) Delete the appendix on calculation of the actual refraction angle of curved workpieces (see Annex D of Edition 2013);
 - r) Delete the appendix on time baseline and sensitivity settings (see Annex E of Edition 2013);
 - s) Delete the appendix for transmission corrections (see Annex F of Edition 2013).

This document identically adopts ISO 17640:2018 "Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment".

This document made the following minimum editorial modification:

- Add notes (see Chapter 5, 6.1 and 11.3 of this Edition).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights.

This document was proposed by China Machinery Industry Federation.

This document shall be under the jurisdiction of National Technical Committee on Welding of Standardization Administration of China (SAC/TC 55).

The drafting organizations of this document: Shanghai Materials Research Institute, China Special Equipment Inspection Institute, Fushun Special Equipment Supervision and Inspection Institute, Zhejiang Special Equipment Science Research Institute, Jiangsu Fangtian Electric Power Technology Co., Ltd., Fujian Jianyan Engineering Inspection Co., Ltd., Shandong Ruixiang Mold Co., Ltd., Shanghai Survey and Design Institute Co., Ltd., Wuhan Zhongke Innovation Technology Co., Ltd., Guangdong Jianyuan Inspection Technology Co., Ltd., Iintik Technology (Shanghai) Co., Ltd., Chongqing Shuntai Tower Manufacturing Co., Ltd., Chengdu Special Equipment Inspection Research Institute, Railway Research Institute (Shenzhen) Inspection Engineering Co., Ltd., Harbin Welding Research Institute Co., Ltd., Dongying Huachen Petroleum Equipment Co., Ltd., and Shenzhen Jingheng Engineering Inspection Co., Ltd.

Main drafters of this document: Jiang Jiansheng, Zheng Hui, Zhang Yifeng, Huang Wenda, Pan Zhixin, Liu Xiangmin, Wei Zhongrui, Zhu Jian, Che Youming, Lin Guanghui, Lou Ruilong, Zhang Rui, Zhang Wenjie, Ma Junpeng, Wang Bin, Huang Yin,

Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels and assessment

1 Scope

This document specifies techniques for the manual ultrasonic testing of fusion-welded joints in metallic materials of thickness not less than 8 mm which exhibit low ultrasonic attenuation (especially that due to scatter) at object temperatures from 0°C to 60°C. It is primarily intended for use on full penetration welded joints where both the welded and the parent material are ferritic.

Where material-dependent ultrasonic values are specified in this document, they are based on steels having an ultrasonic sound velocity of (5920 ± 50) m/s for longitudinal waves and (3255 ± 30) m/s for transverse waves.

This document specifies four testing levels, each corresponding to a different probability of detection of imperfections. Guidance on the selection of testing levels A, B, and C is given in Annex A.

This document specifies that the requirements of testing level D, which is intended for special applications, be in accordance with general requirements. Testing level D can only be used when defined by specification. This includes tests of metals other than ferritic steel, tests on partial penetration welds, tests with automated equipment, and tests at object temperatures outside the range 0°C to 60°C.

This document can be used for the assessment of discontinuities, for acceptance purposes, by either of the following techniques:

- a) evaluation based primarily on length and echo amplitude of the discontinuity;
- b) evaluation based on characterization and sizing of the discontinuity by probe movement techniques.

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.

ISO 5577, *Non-destructive testing - Ultrasonic testing - Vocabulary*

NOTE: GB/T 12604.1-2020, Non-destructive testing -- Terminology -- Ultrasonic testing (ISO

The evaluation levels for techniques 1 to 4 are given in ISO 11666:2018, Table A.1.

NOTE: Evaluation grade is also called evaluation level.

11.4 Transfer correction

When separate blocks are used for establishing reference levels, a measurement shall be made of the transfer differences between test object and reference block, at a representative number of locations. Suitable techniques are described in ISO 16811.

If the differences are less than or equal to 2 dB, correction is not required.

If the differences are greater than 2 dB but smaller than or equal to 12 dB, they shall be compensated for.

If transfer losses exceed 12 dB, the reason shall be considered and further preparation of the scanning surfaces shall be carried out, if applicable.

When there are no apparent reasons for high correction values, the attenuation, at various locations on the test object, shall be measured and, where it is found to vary significantly, corrective actions shall be considered.

11.5 Signal-to-noise ratio

During testing of the weld, the noise level, excluding spurious surface indications, shall remain at least 12 dB below the evaluation level. This requirement may be relaxed subject to specification.

12 Testing levels

Quality requirements for welded joints are mainly associated with the material, welding process and service conditions. To accommodate all of these requirements, this document specifies four testing levels (A, B, C, and D).

From testing level A to testing level C, an increasing probability of detection is achieved by an increasing testing coverage, e.g., number of scans, surface dressing. Testing level D may be agreed for special application using a written procedure which shall take into account the general requirements of this document.

In general, the testing levels are related to quality levels (e.g., ISO 5817). The appropriate testing level may be specified by standards for testing of welds (e.g., ISO 17635), product standards or other documents.

When ISO 17635 is specified, the recommended testing levels are as given in Table 5.

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----