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(JSNDI/JSA)

**Standard test blocks for ultrasonic
testing—Part 2: A7963 Standard
Test Block**

ICS 19.100;25.160.40

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by The Japanese Society for Non-Destructive Inspection (JSNDI)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently **JIS Z 2345**:2000 has been withdrawn and partially replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

JIS Z 2345 series consists of the following 4 parts under the general title “*Standard test blocks for ultrasonic testing*”:

Part 1: A1 Standard Test Block

Part 2: A7963 Standard Test Block

Part 3: Standard test blocks for normal ultrasonic testing

Part 4: Standard test blocks for angle beam ultrasonic testing

Standard test blocks for ultrasonic testing—Part 2: A7963 Standard Test Block

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 7963**:2006, Edition 2, with some modifications of the technical contents.

It constitutes Part 2 of the four-part standard series of **JIS Z 2345**, which was initially established as a single standard in 1973 to provide comprehensive standard test block requirements, revised in 2000, and has been newly established at this time as four separate standards with the aim of ensuring conformity to **ISO 2400**:2012 and **ISO 7963**:2006. The **JIS Z 2345** standard series consists of the following parts: Part 1: A1 Standard Test Block, Part 2: A7963 Standard Test Block, Part 3: Standard test blocks for normal ultrasonic testing, and Part 4: Standard test blocks for angle beam ultrasonic testing.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies requirements for A7963 Standard Test Blocks for calibrating ultrasonic test equipment used in manual testing.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 7963:2006 *Non-destructive testing—Ultrasonic testing—Specification for calibration block No.2* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS G 3106 Rolled steels for welded structure

JIS G 4051 Carbon steels for machine structural use

JIS K 2238 Machine oils

JIS Z 2300 Terms and definitions of nondestructive testing

JIS Z 2345-3 Standard test blocks for ultrasonic testing—Part 3: Standard test blocks for normal ultrasonic testing

ASTM A105 Standard Specification for Carbon Steel Forgings for Piping Applications

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS Z 2300** apply.

4 Designation and main purposes of use

The designation and main purposes of use of the standard test block specified in this Standard are as follows.

- a) Designation: A7963 Standard Test Block (STB-A7963).
- b) Purposes of use: Measurement of probe index, beam angle or other characteristics of angle-beam probe, test range and sensitivity setting of angle beam testing, and test range setting of straight beam testing.

5 Manufacture

5.1 Material

The material used for **STB-A7963** shall satisfy the requirements laid out in **a)** and **b)** below.

- a) The block shall be manufactured from one of the following:
 - 1) **SM400C** or **SM490C** specified in **JIS G 3106**;
 - 2) carbon steel for machine structural use specified in **JIS G 4051**;
 - 3) carbon steel forging for piping or pressure vessels applications specified in **ASTM A105**.
- b) The material used shall not have acoustical anisotropy that may change propagation characteristics of ultrasonic wave, i.e. the difference between the velocity of transverse wave propagating in the thickness direction of the material measured with the direction of polarization (vibration) parallel to the main rolling direction and that measured with the direction of polarization (vibration) normal to the main rolling direction shall not be greater than 1 %.

5.2 Shape and dimensions

Shape and dimensions of and marks to be given on **STB-A7963** shall be as shown in Figure 1. Tolerances, unless otherwise stated, shall be ± 0.1 mm.

5.3 Heat treatment, machining, ultrasonic testing and surface finish

The heat treatment, machining, ultrasonic testing and surface finish shall be as follows.

- a) The test blocks shall receive normalizing, and tempering and quenching before machining, unless other heat treatment is required.
- b) Prior to final machining, the test block shall be proven to be free from internal discontinuities by the following ultrasonic examination.

- 1) Using local immersion technique, the test block shall be checked on the basis of all four long faces with a straight-beam probe of 10 MHz frequency and having a transducer size of 10 mm in diameter. No echo from the test block shall be greater than 1/16 of the height of echo from flat bottom hole of STB-G V2 (-24 dB) specified in **JIS Z 2345-3**.
 - 2) In the case of performing this ultrasonic examination before the heat treatment, a proper flaw detection threshold value shall have been determined beforehand with the use of which equal detection results to those of the examination in 1) can be yielded.
- c) The machining and surface finish shall be as follows.
- 1) At least 2 mm shall be removed from all surfaces after heat treatment. All dimensions and surface finishes shall be in accordance with Figure 1.
 - 2) In order to prevent parasitic effects, the depth of the marks of the engraved scale shall be $0.1 \text{ mm} \pm 0.05 \text{ mm}$.
 - 3) The tolerance on length of the marks shall be as follows and the tolerance on the positioning of the marks shall be $\pm 0.2 \text{ mm}$:
 - $\pm 0.5 \text{ mm}$ for marks 6 mm long;
 - $\pm 0.25 \text{ mm}$ for marks 2.5 mm long;
 - $\pm 0.2 \text{ mm}$ for marks 1.5 mm long.
 - 4) All external surfaces shall be machined to an arithmetic mean roughness (R_a) value shown in Figure 1.
 - 5) The surface roughness parameter (arithmetic mean roughness) shall be measured on a test block representative of each lot by means of a surface roughness measuring instrument.

5.4 Marks to be given on test block

The test block shall be given the following marks.

STB-A7963 shall be given reference marks and angular identification as shown in Figure 1.