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**Non-destructive testing — Ultrasonic  
testing — Specification for calibration  
block No. 2**

*Essais non destructifs — Contrôle par ultrasons — Spécifications  
relatives au bloc d'étalonnage n° 2*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 7963 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*.

This second edition cancels and replaces the first edition (ISO 7963:1985), which has been technically revised.

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## Introduction

Calibration block No. 2 differs in size and shape from that described in ISO 2400.

Calibration block No. 2 is very much smaller and lighter, and its geometry is much simpler.

Calibration block No. 2 does not offer as much scope as the larger block; in particular it is not meant to check an ultrasonic flaw detector completely.

However, calibration block No. 2 makes it possible, during practical testing, to check simply, from time to time, the setting of the time base and the sensitivity of the ultrasonic equipment. Moreover, it is suited to checking the beam angle and the probe index of miniature angle-beam probes.

NOTE Calibration block No. 1 is currently specified in EN 12223.

Requests for official interpretations of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 5 via your national standards body, a complete listing which can be found at [www.iso.org](http://www.iso.org).

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# Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 2

## 1 Scope

This International Standard specifies the dimensions, material, manufacture and methods of use for calibration block No. 2 for calibrating and checking ultrasonic testing equipment.

## 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 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

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

EN 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

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## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5577 apply.

## 4 Dimensions

The dimensions of the block are given in Figure 1.

The tolerances are  $\pm 0,1$  mm, except on the length of the engraved scale where it is  $\pm 0,5$  mm.

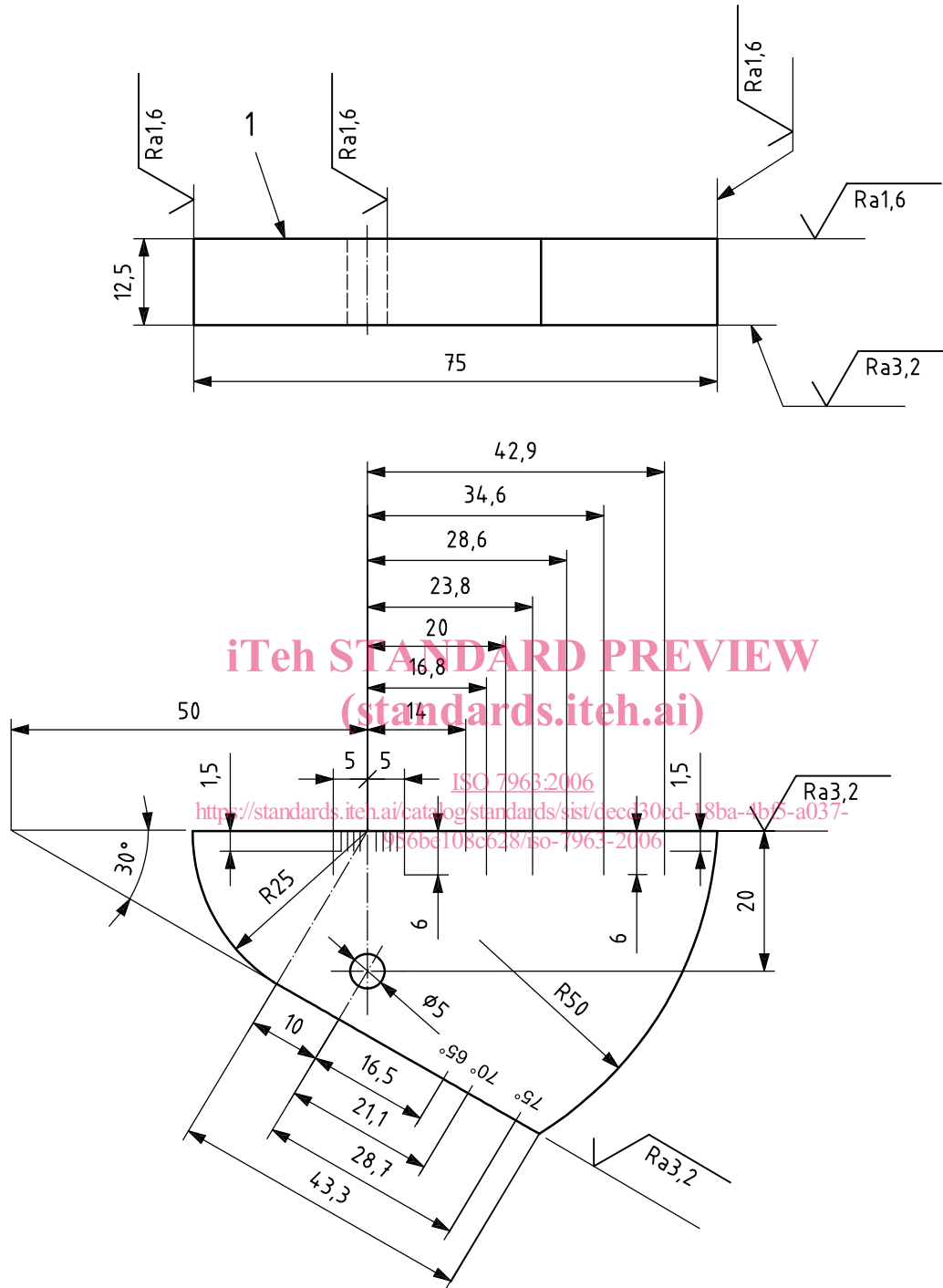
Average surface roughness values,  $R_a$ , are defined in accordance with ISO 4287.

The thickness of the block can be greater than 12,5 mm (see A.1).

## 5 Material

The calibration block shall be made of steel of grade S355JO in accordance with EN 10025-1 or equivalent.

Dimensions in millimetres,  
surface roughness in micrometres



**Key**

- 1 reflection surface

**Figure 1 — Calibration block No. 2 for ultrasonic testing — Dimensions of block and scales**



## 6 Preparation

The calibration block shall be homogeneous and free from defects revealed by ultrasonic testing (see A.2).

In order to obtain a fine grain structure and good homogeneity, before final machining the block shall be heat treated as follows:

- a) maintain at 920 °C for 30 min with water-quenching;
- b) reheating to 650 °C for at least 2 h with cooling in still air.

After heat treatment, and prior to machining, the block shall undergo further ultrasonic testing from two different directions at right angles to each other and in the direction of rolling.

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.

In order to prevent parasitic effects, the depth of the marks of the engraved scale shall be  $0,1 \text{ mm} \pm 0,05 \text{ mm}$ . The length of the marks shall be 6 mm and the tolerance on the positioning of the marks shall be  $\pm 0,2 \text{ mm}$ .

On completion of machining, a final ultrasonic testing shall be carried out.

The velocity of longitudinal waves shall be verified as being  $5\,920 \text{ m/s} \pm 30 \text{ m/s}$  and the velocity of transverse waves shall be verified as being  $3\,255 \text{ m/s} \pm 15 \text{ m/s}$ .

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## 7 Marking

Reference marks on block No. 2 shall be permanently marked as shown in Figure 1.

Additionally the block shall be permanently marked with

- the manufacturer's trade mark,
- the number of this International Standard, and
- a unique serial number.

## 8 Method of use

### 8.1 Setting of the time base

To set the time base, the leading edge (left side) of successive echoes shall be adjusted to coincide with the appropriate scale markings on the screen of the measuring equipment.

The pulse-travel time depends on the velocity of ultrasonic waves in the material examined.

#### 8.1.1 Calibration of the time base up to 250 mm with a straight beam probe

The position of the probe on the reflective side of the calibration block shall be as indicated in Figure 2a). Figure 2b) is a schematic representation of the screen (A-scan) of the instrument for calibration of a range of 50 mm.

NOTE Depending on the probe and the frequency used, difficulties can arise when calibrating distances greater than 10 times the thickness of the block.