

JIS

JAPANESE INDUSTRIAL STANDARD

Precision levels

Ⓔ JIS B 7510—1993

Translated and Published

by

Japanese Standards Association

**In the event of any doubt arising,
the original Standard in Japanese is to be final authority.**

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1. **Scope** This Japanese Industrial Standard specifies the precision levels <sup>(1)</sup> of which length of measuring face of one side is from 150 mm to 300 mm (hereafter referred to as "levels").

Note <sup>(1)</sup> An indicating instrument to measure the minute inclination from horizontal or vertical, using a precision bubble tube, by directly reading the displacement of its bubble on the graduation of the bubble tube.

Remarks: The standards cited in this Standard are given in the following:

JIS B 0601 Surface roughness — Definitions and designation

JIS B 7513 Precision surface plates

JIS B 7538 Autocollimators

JIS Z 8103 Glossary of terms used in instrumentation

2. **Definitions** For the purposes of this Standard, main definitions given in JIS Z 8103 apply, and the rest of the terms shall be as given in the following:

- (1) **flat level** The level of which bubble tube is being built in a square bar shaped structural body, and its bottom is used as the measuring face.
- (2) **square level** The level of which bubble tube is being built in a side of an equal quadrilateral frame shaped structural body, and the four faces of periphery are used as the measuring faces respectively.
- (3) **sensitivity** The sensitivity of a level is the inclination required to allow the bubble of the main bubble tube to displace by one graduation, and it is expressed by a height ( $\mu\text{m}$  in unit) or angle (second in unit) in respect to 1 m of bottom side.

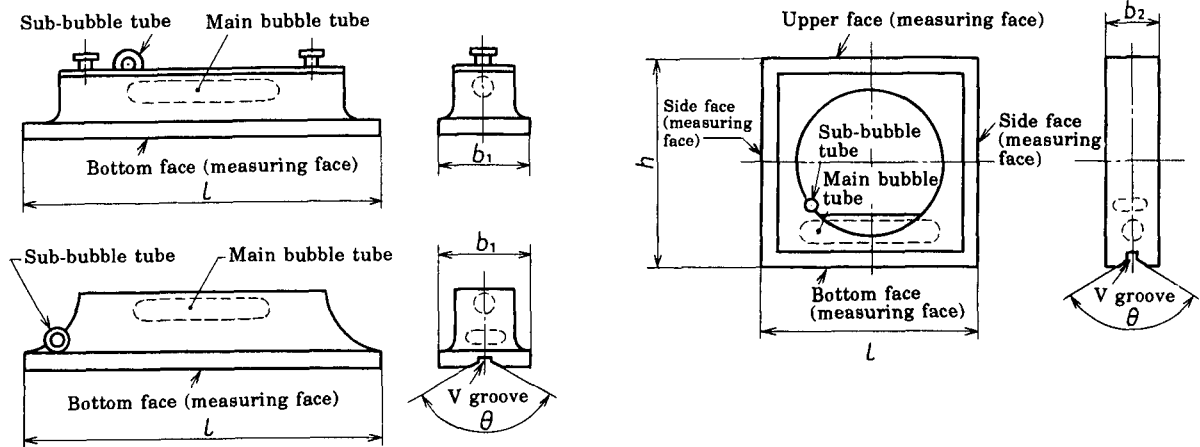
Informative reference: The relation between the angle and the height in respect to the bottom side shall be as follows:

Angle 1 second =  $4.85 \mu\text{m}$  per 1 m

$\approx 5 \mu\text{m}$  per 1 m

3. **Names and symbols of respective parts** The names and symbols of main parts of the levels shall be in accordance with Fig. 1.

Fig. 1. Names and symbols of respective parts  
Flat level Square level



Remarks: These figures shall be for indicating the names and symbols of respective parts only, and shall not be for indicating the standard of structure and shapes.

#### 4. Classification and grades

4.1 Classification The levels shall be classified into three classes according to sensitivities as given in Table 1.

Table 1. Sensitivities of levels

| Class   | Sensitivity (mm/m)      |
|---------|-------------------------|
| Class 1 | 0.02 ( $\approx 4''$ )  |
| Class 2 | 0.05 ( $\approx 10''$ ) |
| Class 3 | 0.1 ( $\approx 20''$ )  |

Remarks: Numerals given in parentheses are informative reference values.

4.2 Grades The grades of the levels shall be two grades of grade A and grade B according to performances thereof.

#### 5. Performances

5.1 Indication accuracies As to the indication accuracies of the main bubble tube, the indicating accuracies of the full scale ranges (hereafter referred to as "full range accuracies") and the differences of the indication error in the adjacent graduations (hereafter referred to as "adjacent accuracies") are specified, and respective permissible value is as shown in Table 2.