SLOVENSKI STANDARD
SIST ISO 7863:1999

01-marec-1999

Globinska vijaļ na merila in podlogne klade

Height setting micrometers and riser blocks

Micromètres verticaux et rehausses

Ta slovenski standard je istoveten z: **ISO 7863:1984**

ICS:

17.040.30 Merila Measuring instruments

SIST ISO 7863:1999 **en**

International Standard 7863

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Height setting micrometers and riser blocks

Micromètres verticaux et rehausses

First edition — 1984-06-01

UDC 531.714.7 **Ref. No. ISO 7863-1984 (E)**

Descriptors : measuring instruments, mechanical measuring instruments, micrometers, specifications, marking.

Price based on 6 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7863 was developed by Technical Committee ISO/TC 3, *Limits and fits*, and was circulated to the member bodies in March 1983.

It has been approved by the member bodies of the following countries:

Australia	Italy	Switzerland
Belgium	Netherlands	Thailand
Canada	New Zealand	United Kingdom
Czechoslovakia	Poland	USA
Germany, F.R.	South Africa, Rep. of	USSR
Hungary	Spain	
India	Sweden	

The member bodies of the following countries expressed disapproval of the document on technical grounds:

France
Japan

Height setting micrometers and riser blocks

1 Scope and field of application

This International Standard specifies the characteristics of height setting micrometers with a measuring capacity up to 600 mm and a minimum scale value not greater than 2 µm together with riser blocks up to 600 mm in height.

Test methods for the accuracy of these instruments are given in annexes A and B for general information only.

2 References

ISO 1, *Standard reference temperature for industrial length measurements.*

ISO 3650, *Gauge blocks.*

ISO 5459, *Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances.*

ISO 8512/1, *Surface plates — Part 1: Cast iron surface plates.*[1)]

ISO 8512/2, *Surface plates — Part 2: Granite surface plates.*[1)]

3 Terms and definitions

3.1 Terms

For the terms relating to height setting micrometers see figure 1, and for riser blocks see figure 3.

3.2 Definitions

3.2.1 height setting micrometer: A measuring instrument comprising a substantial housing which carries a vertical movable column, positioned by a micrometer screw, with measuring elements provided with regularly spaced, alternative or coplanar measuring faces.

3.2.2 scale mark: One of the marks constituting a scale.

3.2.3 scale division: A part of the scale delimited by two adjacent scale marks.

3.2.4 minimum scale value: The smallest value of the measurand which the scale is graduated to indicate.

3.2.5 repeatability: The property which characterizes the ability of a measuring instrument to give identical indications, for repeated measurements of the same quantity, over a short interval of time, under stated conditions of use.

3.2.6 datum plane: A simulated datum feature (see ISO 5459), here represented, for example, by a surface plate of grade 0 (see ISO 8512/1 and ISO 8512/2).

4 Specifications for height setting micrometers

4.1 Housing and column

The housing and column shall be made of material with a linear thermal coefficient of $(11 \pm 1) \times 10^{-6}\ K^{-1}$ and suitably heat-treated to stabilize their lengths.

The stabilizing process for the elements of the measuring column shall ensure that the rate of change in the length of the elements due to residual instability of the material is not greater than

$$\pm (0{,}05 + 0{,}001\ L)\ \mu m/year$$

where L is the nominal length in millimetres.

The column shall move freely within the housing and shall be free from stickiness.

1) At present at the stage of draft.

4.2 Measuring elements

The measuring elements shall be made of hard and wear-resistant material such as

— steel hardened to at least 700 HV;

— steel provided with wear-resistant coating; etc.

The measuring elements shall provide facilities for measurement on upper and lower measuring faces.

4.3 Support pads

The support pads shall be made of hard and wear-resistant material such as

— high grade steel hardened to at least 700 HV;

— tungsten carbide; etc.

4.4 Micrometer head

4.4.1 Spindle

The screw shall have a pitch of 0,5 or 1 mm, and the screw thread shall be a good fit in the nut. There shall be full engagement of the spindle screw and the nut throughout the range of measurement.

The spindle shall be made

a) of high grade tool steel with a hardness number of not less than 670 HV; or

b) of stainless steel with a hardness number of not less than 530 HV.

When a spindle clamp is fitted, the design shall be such that it effectively locks the spindle without altering the indicated value by more than 0,5 µm.

4.4.2 Micrometer thimble (drum) and scale design

To reduce any parallax error in reading the instrument, the scales on the micrometer shall be such that

a) where the scales abut, the distance separating the thimble from the barrel shall be not greater than 0,2 mm;

b) where the scale of the micrometer thimble overlaps the barrel, the distance from the barrel to the reading end of the thimble (distance D in figure 2) shall not exceed 0,6 mm.

4.4.3 Scale marks

All scale marks (lines) shall be cleanly cut and uniform in thickness. The thickness of the lines shall be not greater than one-fifth of the scale division, with a minimum distance between scale lines of 0,8 mm and a maximum permissible variation in thickness of 0,03 mm.

4.5 Location on riser block

Each height setting micrometer shall incorporate a feature ensuring positive and secure location on its associated riser block.

4.6 Marking

Each height setting micrometer shall be legibly and permanently marked with the following indications:

a) the minimum scale value;

b) the manufacturer's name or trade mark;

c) a serial number.

4.7 Dimensional requirements and performance

4.7.1 Support pads

Each support pad shall be flat within a tolerance of 1 µm.

The coplanity shall be such that the bearing area of each support pad is not less than 50 % of its surface.

4.7.2 Measuring faces

4.7.2.1 Flatness

The measuring faces shall be flat within a tolerance of 0,3 µm.

4.7.2.2 Parallelism

The measuring faces shall be parallel to the datum plane within a tolerance of 1 µm.

Consecutive measuring faces shall be mutually parallel within a tolerance of 0,5 µm.

4.7.3 Measuring head

The maximum value of the difference between the displacement of the measuring column by the screw and the value read on the scale shall not exceed

— 1,5 µm for the total displacement;

— 0,5 µm for each revolution of the micrometer thimble.

4.7.4 Repeatability

Each height setting micrometer shall repeat its reading within 0,5 µm.

4.7.5 Column

With the instrument placed on a datum plane and the micrometer set precisely to its appropriate nominal value, the actual height of each upper and lower measuring face above

the datum plane, measured at the centre of the measuring face, shall agree with its nominal value to

— within 2 µm for any height up to and including 300 mm;

— within 3 µm for heights exceeding 300 mm.

When the height setting micrometer is provided with a zero setting adjustment, the height of each upper and lower measuring face relative to the upper, or if appropriate, lower measuring face of the bottom measuring element shall agree with its nominal value to

— within 2 µm for any height up to and including 300 mm;

— within 3 µm for any height exceeding 300 mm.

4.7.6 Performance test

When the micrometer has been accurately set at zero, the nominal height of each upper and lower measuring face, relative to the datum plane, at any position of the measuring head shall agree with the known size appropriate to that height to

— within 3 µm for any height up to and including 300 mm;

— within 4 µm for heights exceeding 300 mm.

5 Specification for riser blocks

These specifications cover riser blocks of 150; 250; 300 and 600 mm nominal height, for use with height setting micrometers.

Each riser block shall incorporate a feature ensuring positive and secure location of its associated height setting micrometer.

A typical riser block is illustrated in figure 3.

5.1 Lower support pads

Each lower support pad shall be flat within a tolerance of 1 µm.

The coplanity shall be such that the bearing area of each lower support pad is not less than 50 % of its surface.

5.2 Upper support pads

The upper support pads shall be of a material specified in 4.3, and shall be coplanar within a tolerance of 1 µm.

5.3 Height

When resting on a datum plane

a) the mean height of the riser block shall be in agreement with its nominal height within the values given in the table;

b) the variation in height shall not exceed the values given in the table.

Table — Tolerances on height of riser blocks

Nominal height	Permissible variation in height	Permissible deviation between mean and nominal height
mm	µm	µm
150	1,5	± 1,5
250	2	± 2
300	2,5	± 2,5
600	4	± 4

5.4 Marking

Each riser block shall be legibly and permently marked with the following indications:

a) the nominal height;

b) the manufacturer's name or trade mark;

c) a serial number.

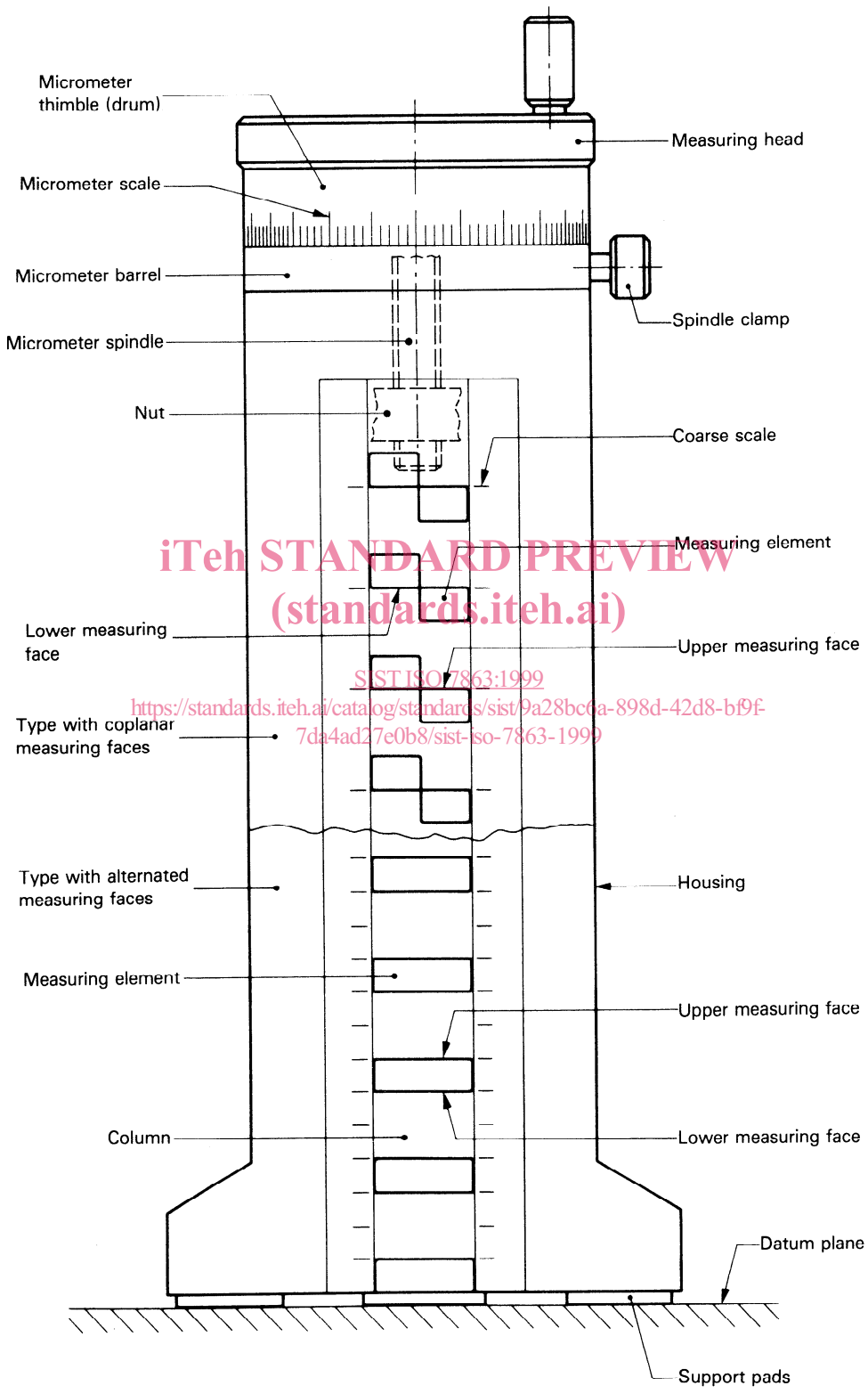

Figure 1 — Nomenclature of a height setting micrometer

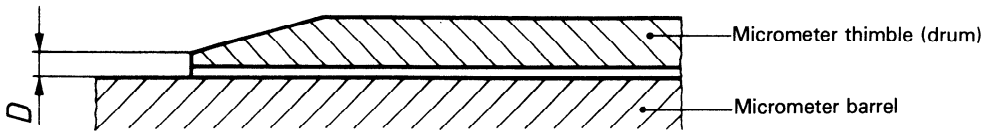

Figure 2 — Distance D

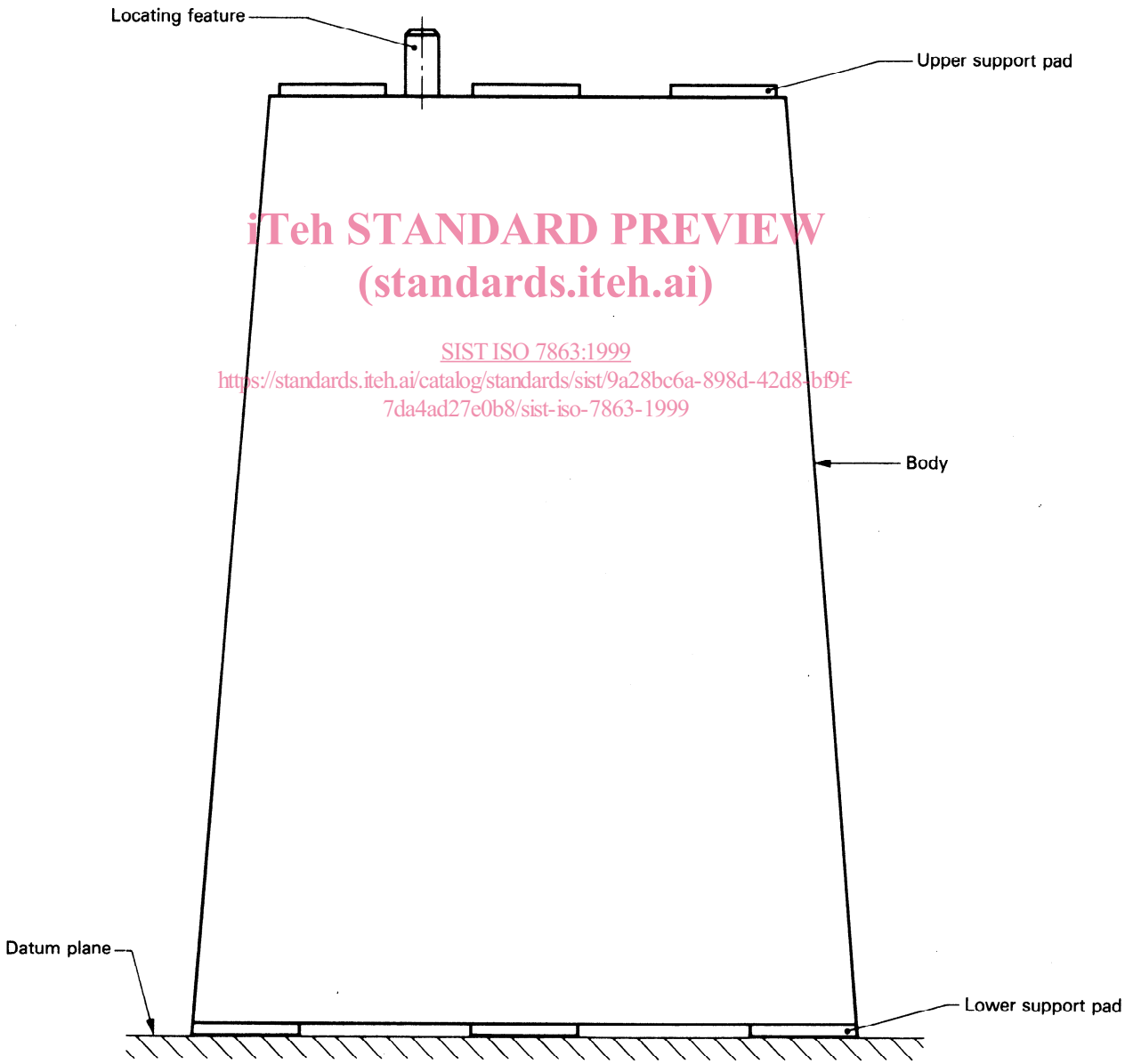

Figure 3 — Typical riser block