
INTERNATIONAL STANDARD



650

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

Relative density 60/60 ° F hydrometers for general purposes

Aréomètres à densité relative 60/60 ° F d'usage général

First edition — 1977-07-15

UDC 542.3 : 531.756.3

Ref. No. ISO 650-1977 (E)

Descriptors : laboratory equipment, laboratory glassware, hydrometers, specifications, dimensions, shape, measuring scales.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 650 was developed by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*.

It was submitted directly to the ISO Council, in accordance with clause 6.12.1 of the Directives for the technical work of ISO. It cancels and replaces ISO Recommendation R 650-1968, which had been approved by the member bodies of the following countries :

Australia	Egypt, Arab Rep. of	Poland
Austria	Greece	Spain
Belgium	Hungary	Switzerland
Brazil	India	Turkey
Bulgaria	Israel	United Kingdom
Chile	Korea, Rep. of	U.S.A.
Colombia	Netherlands	U.S.S.R.
Czechoslovakia	New Zealand	Yugoslavia

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

France
Germany

Relative density 60/60 °F hydrometers for general purposes

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies requirements for five basic series of glass hydrometers of constant mass which indicate relative density 60/60 °F with reference to water and comply with ISO 387.

NOTE — The use of a scale other than one based on density (mass per unit volume) is not in general recommended, but in view of its importance in trade between various countries the scale based on relative density with reference to water is accepted.

The dimensions of the hydrometers have been chosen in such a way as to lead to convenience in use and economy in manufacture.

2 REFERENCES

ISO 387, *Hydrometers — Principles of construction and adjustment*.¹⁾

ISO 1768, *Glass hydrometers — Conventional value for the thermal cubic expansion coefficient (for use in the preparation of measurement tables for liquids)*.

3 DEFINITION

relative density 60/60 °F of a liquid with reference to water²⁾ : The ratio

$$\frac{\text{density of the liquid at } 60^{\circ}\text{F}}{\text{density of water at } 60^{\circ}\text{F}}$$

4 BASIS OF SCALE

The scale shall indicate relative density 60/60 °F with reference to water.

5 REFERENCE TEMPERATURE

The standard reference temperature for the hydrometers shall be 60 °F. When used in a liquid at this temperature, the hydrometer shall indicate the relative density of the liquid at 60 °F with reference to water at 60 °F.

NOTE — For the purposes of this International Standard, the standard reference temperature 60 °F can be taken as equal to 15,56 °C.

6 SURFACE TENSION

The adjustment shall be related to specific capillary conditions as follows :

6.1 When the hydrometer is slightly displaced from its equilibrium position in a liquid, the stem passes through the liquid surface without causing any apparent alteration in the shape of the meniscus.

6.2 The hydrometer shall be adjusted with regard to surface tension. Except where the highest precision is required, one of the standard categories of surface tension given in table 3, annex A, shall be used.

For hydrometers of the highest precision, intended for use in particular liquids (for example alcohol solutions), the surface tension values appropriate to clean surfaces of these liquids and to the actual indications of the hydrometer shall be used [see 15 b) 3)].

7 REFERENCE LEVELS FOR ADJUSTMENT AND READING

7.1 Hydrometers should preferably be adjusted for readings taken at the level of the horizontal liquid surface. If a hydrometer so adjusted is used in an opaque liquid, readings may be taken at the top of the meniscus where it appears to meet the stem, but appropriate correction to the level of the horizontal liquid surface shall then be made.

To avoid the necessity for making such corrections, hydrometers intended for use in opaque liquids may alternatively be adjusted for readings taken at the top of the meniscus where it appears to meet the stem. If a hydrometer is so adjusted, this shall be clearly indicated on the scale [see 15 c)].

NOTE — Appropriate corrections are given in annex C.

7.2 The middle of the thickness of a scale line shall be taken as its definitive position.

1) At present at the stage of draft. (Revision of ISO/R 387.)

2) The expression "relative density" complies with ISO 31, Part III, *Quantities and units of mechanics*. The term "specific gravity" is often used in English instead of "relative density", when the reference substance is water.