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# International Standard



# 649/2

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## Laboratory glassware — Density hydrometers for general purposes — Part 2 : Test methods and use

*Verrerie de laboratoire — Aréomètres à masse volumique d'usage général — Partie 2 : Méthodes d'essai et d'utilisation*

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**Descriptors :** glassware, laboratory glassware, measuring instruments, hydrometers, density (mass/volume), tests, utilization, interfacial tension, dimensions, specifications.

Price based on 9 pages

## 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 649/2 was developed by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*, and was circulated to the member bodies in September 1979.

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

Australia	India	Portugal
Brazil	Italy	Romania
Canada	Korea, Rep. of	South Africa, Rep. of
Czechoslovakia	Libyan Arab Jamahiriya	Spain
France	Mexico	United Kingdom
Germany, F.R.	Netherlands	USSR
Hungary	Poland	

No member body expressed disapproval of the document.

International Standards ISO 649/1 and ISO 649/2 cancel and replace ISO Recommendation R 649-1968, of which they constitute a technical revision.

# Laboratory glassware — Density hydrometers for general purposes —

## Part 2 : Test methods and use

### 1 Scope and field of application

This part of ISO 649 specifies the test methods and use of density hydrometers for general purposes.

Part 1 of this International Standard gives the specification for density hydrometers for general purposes.

### 2 References

ISO 91/1, *Petroleum measurement tables — Part 1: Tables based on reference temperatures of 15 °C and 60 °F*.<sup>1</sup>

ISO 649/1, *Laboratory glassware — Density hydrometers for general purposes — Part 1: Specification*.

ISO 650, *Relative density 60/60 degrees F hydrometers for general purposes*.

ISO 653, *Long solid-stem thermometers for precision use*.

ISO 654, *Short solid-stem thermometers for precision use*.

ISO 655, *Long enclosed-scale thermometers for precision use*.

ISO 656, *Short enclosed-scale thermometers for precision use*.

ISO 3507, *Pyknometers*.

ISO 4788, *Laboratory glassware — Graduated measuring cylinders*.

### 3 Methods of determination of density by means of ISO hydrometers

#### 3.1 General

To obtain the highest precision when using a particular hydrometer, the following general procedures should be

adhered to :

**3.1.1** Read the hydrometer in the liquid at a known temperature.

**3.1.2** Apply corrections (when significant) to the observed reading for :

a) the meniscus height (if the test liquid is opaque see 3.6.1);

b) the scale error of the hydrometer at the observed reading (see 3.6.2);

c) the difference between the temperature of the liquid and the standard temperature of the hydrometer (see 3.6.3);

d) the difference between the surface tension of the liquid and that for which the hydrometer is graduated (see 3.6.4).

#### 3.2 Apparatus

##### 3.2.1 Hydrometer

Select a hydrometer appropriate to the surface tension of the liquid to be examined. Table 3 of ISO 649/1 gives a guide to the range of liquids suitable for the appropriate hydrometer category. Surface tensions of other liquids may be obtained from appropriate tables of physical properties of substances, for example "International Critical Tables".

##### 3.2.2 Hydrometer vessel

Select a hydrometer vessel as described in clause 6.

##### 3.2.3 Thermometer

For high precision work, select a total immersion thermometer graduated in 0,1 °C, with a certificate of scale correction. A thermometer complying with ISO 653, ISO 654, ISO 655 or ISO 656 is suitable.

1) At present at the stage of draft. (Revision of ISO/R 91 and its Addendum 1.)