
INTERNATIONAL STANDARD



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Milk and liquid milk products — Density hydrometers for use in products with a surface tension of approximately 45 mN/m

Lait et produits laitiers liquides — Aréomètres à masse volumique pour utilisation dans les produits ayant une tension superficielle d'environ 45 mN/m

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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 2449 was drawn up by Technical Committee ISO/TC 34, *Agricultural food products*, and circulated to the Member Bodies in July 1971.

It has been approved by the Member Bodies of the following countries :

Australia	France	Poland
Austria	Germany	Portugal
Belgium	Hungary	Romania
Brazil	India	South Africa, Rep. of
Bulgaria	Iran	Spain
Chile	Israel	Sweden
Czechoslovakia	Korea, Dem.P.Rep. of	Thailand
Egypt, Arab Rep. of	Netherlands	United Kingdom
Finland	New Zealand	U.S.S.R.

No Member Body expressed disapproval of the document.

Milk and liquid milk products – Density hydrometers for use in products with a surface tension of approximately 45 mN/m

0 INTRODUCTION

The system of units known as the *Système International d'Unités* (SI), and adopted by ISO (see ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*), has been used in this International Standard as follows :

1) Instead of the surface tension unit "dyne per centimetre" (dyn/cm) used in ISO/R 387, *Principles of construction and adjustment of hydrometers*, the unit adopted in the present International Standard is the "millinewton per metre" (mN/m), the recommended submultiple of the SI unit of surface tension "newton per metre" (N/m); the newton (N), the SI unit of force, is defined as that force which, when applied to a body having a mass of 1 kg, gives it an acceleration of 1 m/s². (1 mN/m = 1 dyn/cm).

2) The SI unit of density, i.e. mass divided by volume, is the "kilogram per cubic metre" (kg/m³), a permitted submultiple of this unit being the "gram per cubic centimetre" (g/cm³). As a convenient synonym for the latter unit, the SI unit system permits the use of the "gram per millilitre" (g/ml), and this method of expressing density, accepted in ISO/R 387, has been adopted in the present International Standard. (1 g/ml $\equiv$ 1 g/cm³). It should be noted that "density (g/ml)" means "grams (mass) per millilitre" and not "grams (observed weight) per millilitre".

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard gives specifications for glass hydrometers of constant mass, for use in milk and liquid milk products with a surface tension of approximately 45 mN/m, which indicate density (g/ml) at 20 °C (27 °C in tropical countries).

1.2 Two types of hydrometers are specified, a precision type and a wide-range type, which comply in all important respects with ISO/R 387.

1.3 Notes on the verification of the hydrometers are given in annex A, a suitable hydrometer cylinder is described in annex B and a suitable thermometer is described in annex C.

2 SCALE RANGES, SUBDIVISION OF SCALES AND TOLERANCES

2.1 Scale ranges

The scale ranges shall be as follows :

- a) 1,025 to 1,035 g/ml for the precision hydrometer, and
- b) 1,015 to 1,045 g/ml for the wide-range hydrometer.

NOTE — Additional precision hydrometers of scale range of 1,015 to 1,025, 1,035 to 1,045 or 1,040 to 1,050 g/ml may be required for certain purposes.

2.2 Subdivision of scales

The scale shall be subdivided at each 0,000 2 g/ml for a precision hydrometer, and at each 0,000 5 g/ml for the wide-range hydrometer.

2.3 Tolerances

The density indication shall not be in error at any point on the scale by more than $\pm 0,000 2$ g/ml for a precision hydrometer, or by more than $\pm 0,000 5$ g/ml for a wide-range hydrometer.

3 ADJUSTMENT

3.1 Reading level

The hydrometer shall be adjusted to be read at the top of the liquid meniscus, i.e. where the meniscus appears to meet the stem. (See clause 8 b).)

3.2 Immersion

The hydrometer shall be adjusted to give correct readings when the emergent stem is wetted by the liquid to a level not more than 3 mm above the top of the meniscus.

3.3 Temperature and surface tension

The hydrometer shall be adjusted to indicate density in grams per millilitre at 20 °C when floating in a liquid at 20 °C with a surface tension of 45 mN/m.

NOTES

1 The value 45 mN/m is taken as the average surface tension at 20 °C of a freshly formed surface of cows' milk, i.e. obtained by pouring milk into a vessel until some has overflowed.