



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 384:2015

# Laboratory glass and plastics ware - Principles of design and construction of volumetric instruments (ISO 384:2015)

**I.S. EN ISO 384:2015**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

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## National Foreword

I.S. EN ISO 384:2015 is the adopted Irish version of the European Document EN ISO 384:2015, Laboratory glass and plastics ware - Principles of design and construction of volumetric instruments (ISO 384:2015)

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EUROPEAN STANDARD

**EN ISO 384**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2015

ICS 17.060

English Version

**Laboratory glass and plastics ware - Principles of design  
and construction of volumetric instruments (ISO  
384:2015)**

Matériel de laboratoire en verre ou en plastique -  
Principes de conception et de construction  
d'instruments volumétriques (ISO 384:2015)

Laborgeräte aus Glas oder Kunststoff - Grundlagen für  
Gestaltung und Bau von Volumenmessgeräten (ISO  
384:2015)

This European Standard was approved by CEN on 16 November 2015.

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**EN ISO 384:2015 (E)**

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## **European foreword**

This document (EN ISO 384:2015) has been prepared by Technical Committee ISO/TC 48 "Laboratory equipment" in collaboration with Technical Committee CEN/TC 332 "Laboratory equipment" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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### **Endorsement notice**

The text of ISO 384:2015 has been approved by CEN as EN ISO 384:2015 without any modification.

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# INTERNATIONAL STANDARD

# ISO 384

Second edition  
2015-12-15

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## Laboratory glass and plastics ware — Principles of design and construction of volumetric instruments

*Matériel de laboratoire en verre ou en plastique — Principes de  
conception et de construction d'instruments volumétriques*



Reference number  
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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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## ISO 384:2015(E)

### Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 48, *Laboratory equipment*.

This second edition cancels and replaces the first edition (ISO 384:1978), which has been technically revised to incorporate the following modifications.

- a) Volumetric instruments made from plastics have been added to the scope.
- b) Volumetric instruments of class AS have been added.
- c) The thickness of graduation lines has been modified.
- d) The basic principles for construction have been modified such that they comply with the product standards ISO 1042, ISO 648, ISO 835, ISO 385, ISO 4788 and ISO 4787.
- e) The relation between maximum permissible error and the inner diameter has been specified by an equation.
- f) [Annex A](#), explaining that relation, has been reworded.

# Laboratory glass and plastics ware — Principles of design and construction of volumetric instruments

## 1 Scope

This International Standard sets out principles for the design of volumetric instruments manufactured from glass or from plastics in order to facilitate the most reliable and convenient use to the intended degree of accuracy.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 383, *Laboratory glassware — Interchangeable conical ground joints*

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC Guide 99 apply.

## 4 Unit of volume and reference temperature

### 4.1 Unit of volume

The unit of volume shall be the millilitre (ml), which is equivalent to one cubic centimetre (cm<sup>3</sup>).

### 4.2 Reference temperature

The standard reference temperature, i.e. the temperature at which the volumetric instrument is intended to contain or deliver its volume (capacity), shall be 20 °C.

When the volumetric instrument is required for use in a country which has adopted a standard reference temperature of 27 °C, this figure shall be substituted for 20 °C.

**NOTE** The capacity of volumetric instruments varies with change of temperature. A volumetric instrument which was adjusted at 20 °C, but used at 27 °C or vice versa, would show an extra error of only 0,007 % if it is made of borosilicate glass having a coefficient of cubic thermal expansion of  $9,9 \times 10^{-6} \text{ °C}^{-1}$  and of 0,02 % if it is made of soda-lime glass having a coefficient of cubic thermal expansion of  $27 \times 10^{-6} \text{ °C}^{-1}$ . These errors are smaller than the limits of error for most volumetric instruments. It follows, therefore, that the reference temperature is of minor importance in practical use when dealing with glassware. However, when performing calibrations, it is important to refer to the reference temperature, especially when considering volumetric plastic ware.

## 5 Volumetric accuracy

### 5.1 There are two classes of accuracy:

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