# INTERNATIONAL STANDARD 4799

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



# Laboratory glassware — Condensers

*Verrerie de laboratoire — Réfrigérants*

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**Descriptors** : laboratory equipment, laboratory glassware, coolers, condensers (liquefiers), specifications, dimensions, marking.



Price based on 6 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 4799 was developed by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*, and was circulated to the member bodies in March 1976.

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

| | | |
|---|---|---|
| Belgium | Hungary | Poland |
| Canada | India | Romania |
| Chile | Israel | South Africa, Rep. of |
| Egypt, Arab Rep. of | Italy | Spain |
| France | Korea, Rep. of | Turkey |
| Germany, F. R. | Philippines | U.S.S.R. |

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

Australia
Czechoslovakia
Netherlands



Printed in Switzerland

# Laboratory glassware — Condensers

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies details for an internationally acceptable series of glass condensers suitable for general use in laboratories.

## 2 REFERENCES

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

ISO 641, *Laboratory glassware — Interchangeable spherical ground joints.*

## 3 DEFINITION

For the purposes of this International Standard, the following definition applies :

**condenser :** A piece of laboratory apparatus designed for the exchange of heat between two fluids.

It is used for condensing vapours or for cooling or heating a liquid.

## 4 CLASSIFICATION AND TYPES

Five types of condenser, of three classes, according to design and the relative position of the cooling medium, are specified, with the nominal jacket lengths shown :

— **water jacketed condensers :**

a) Liebig—West condenser (see 8.1), 100 — 160 — 250 — 400 — 630 and 1 000 mm;

b) Allihn condenser (see 8.2), 160 — 250 — 400 and 630 mm;

c) coiled distillate condenser (see 8.3), 160 — 250 — 400 and 630 mm;

— **coolant-tube condensers :**

d) Graham condenser (see 8.4), 160 — 250 and 400 mm;

— **double-action condensers :**

e) jacketed coil condenser (see 8.5), 160 — 250 and 400 mm.

## 5 MATERIAL

Condensers shall be constructed of clear glass of suitable chemical and thermal properties.

Internal stress and visible defects in the glass shall be reduced to a level sufficient to minimize the possibility of fracture due to thermal or mechanical shock.

## 6 CONSTRUCTION

**6.1** The extremities may be plain (see 6.4) or fitted with conical or spherical interchangeable ground glass joints (see 6.3).

**6.2** Water connections, for example olives, should preferably face towards the same side of the condenser, except in the case of type e) condensers, where this configuration may cause an increased risk of fracture.

### 6.3 Ground glass joints

**6.3.1** Conical ground glass joints shall comply with the requirements of ISO 383, the sizes being chosen from the *k*6 series.

**6.3.2** Spherical ground glass joints shall comply with the requirements of ISO 641.

**6.4** The wide end of plain-end condensers shall be fire-polished, and the stem shall be either ground or fire-polished.

**6.5** The drip tip at the lower end of the condenser shall be cut off at an angle of not less than 30° to the plane of right angles to the longitudinal axis of the condenser.

## 7 INSCRIPTIONS

The following inscriptions shall be permanently marked on all condensers :

— the nominal (jacket) length;

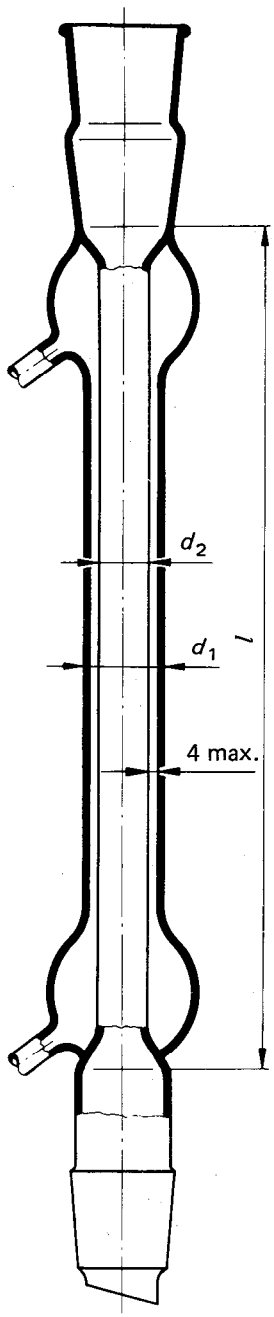
— the maker's or vendor's name or mark;

— the size of any ground joints.

## 8 DESIGN AND DIMENSIONS

Typical condenser designs and essential dimensions are indicated in 8.1 to 8.5.

### 8.1 Liebig-West condenser



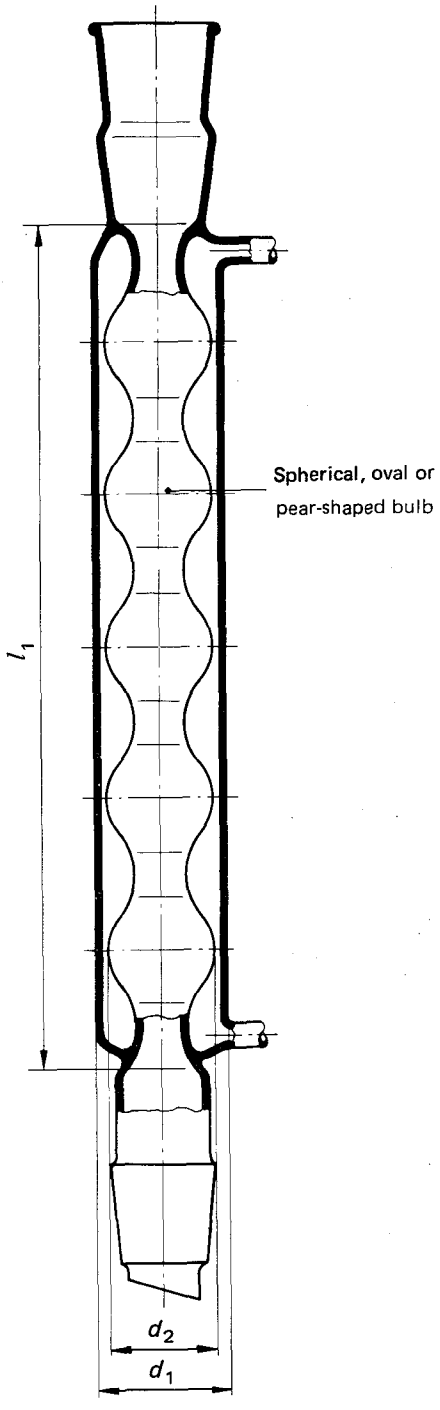

Dimensions in millimetres

| $l$ | $d_1$ min. | $d_2$ min. |
|---|---|---|
| **100** | 15 | 9 |
| **160** | 20 | 12 |
| **250**<br>**400**<br>**630**<br>**1 000** | 24 | 16 |

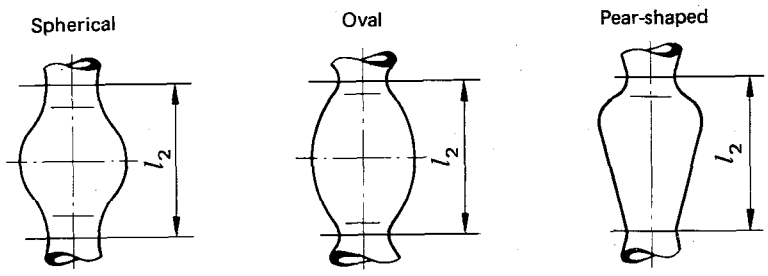
NOTE – In the case of condensers not provided with conical ground joints, the wide end and the stem shall have the following dimensions :

- wide end : length 75
  diameter 22
- stem : length 115
  diameter 13

## 8.2 Allihn condenser




**Shapes of enlargement**




Dimensions in millimetres

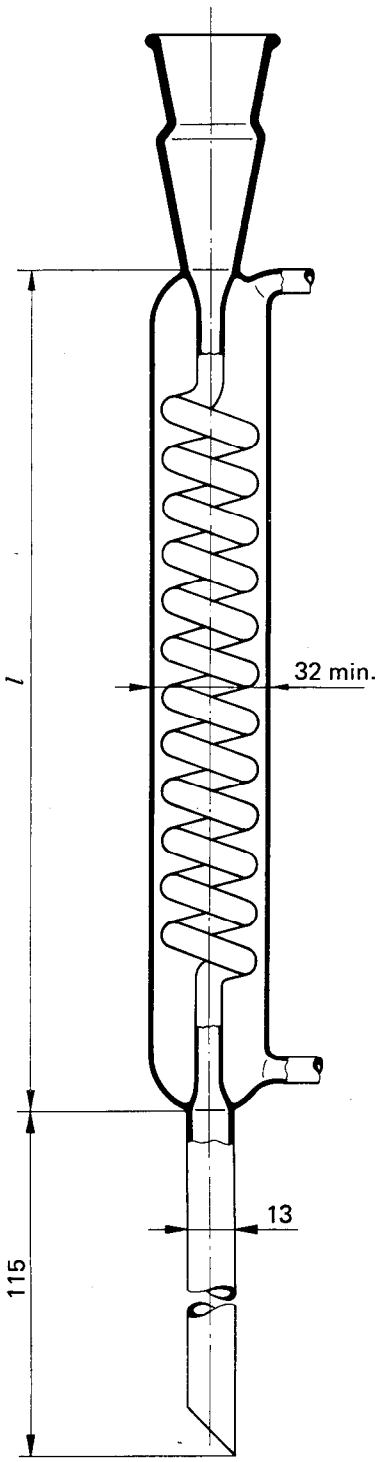
| $l_1$ | $l_2$ min. | $d_1$ min. | $d_2$ min. |
|---|---|---|---|
| **160** | 25 | 29 | 21 |
| **250**<br>**400**<br>**630** | 40 | 32 | 25 |

NOTE – In the case of condensers not provided with conical ground joints, the wide end and the stem shall have the following dimensions :

– wide end : length 75
diameter 22

– stem : length 115
diameter 13

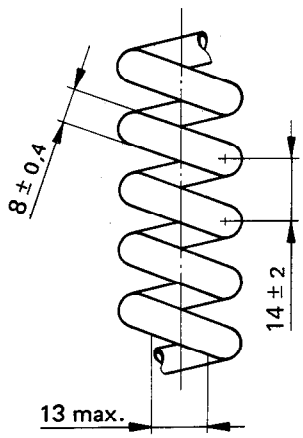
### 8.3 Coiled distillate condenser with socket only




Dimensions in millimetres

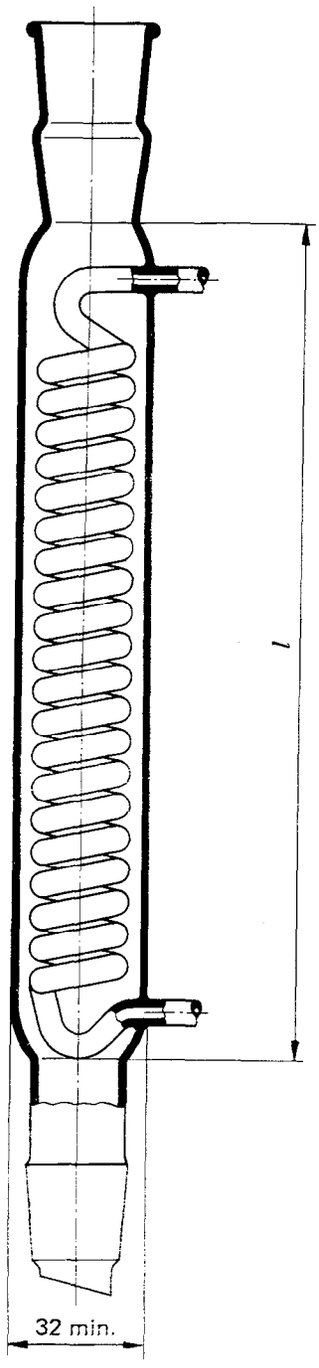
| *l* | 160 | 250 | 400 | 630 |
|---|---|---|---|---|
| Minimum number of turns in coil | 10 | 16 | 25 | 40 |

NOTE — If the condenser is provided with a cone, this shall be selected from the *k*6 series of ISO 383.




**Coil dimensions**

## 8.4 Graham condenser

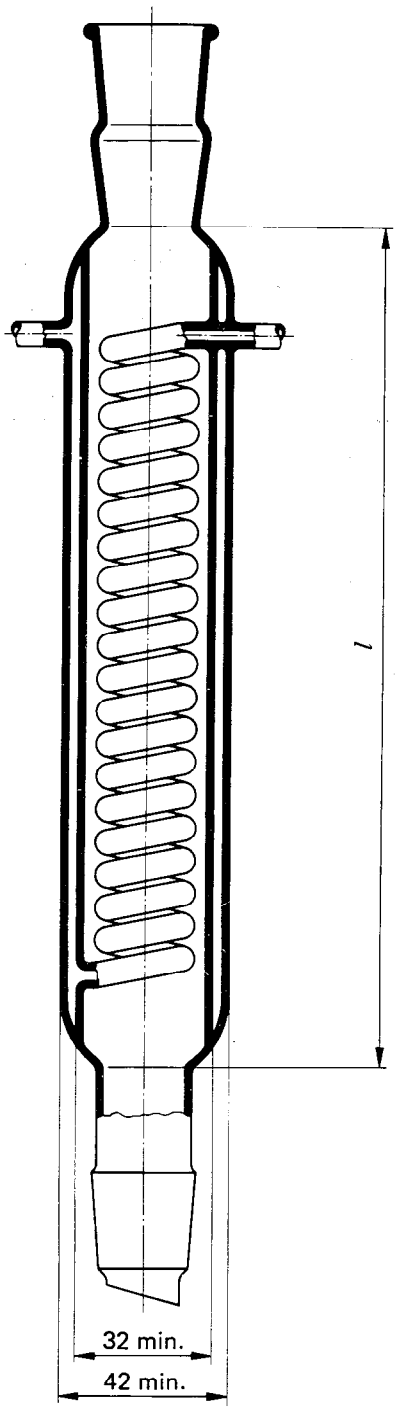



Dimensions in millimetres

| *l* | 160 | 250 | 400 |
|---|---|---|---|
| Minimum number of turns in coil | 10 | 16 | 25 |

*For coil dimensions, see 8.3.*

## 8.5 Jacketed coil condenser with cone and socket




Dimensions in millimetres

| *l* | 160 | 250 | 400 |
|---|---|---|---|
| Minimum number of turns in coil | 8 | 14 | 23 |

For coil dimensions, see 8.3.

Alternative design
of the lower part
of the coolant tube