

CONFIRMED
DECEMBER 2007

Copper indirect cylinders for domestic purposes —

Part 2: Specification for single feed indirect cylinders

UDC [683.974 + 696.463]-034.3

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Building Services Standards Committee (SEB/-) to Technical Committee SEB/9 upon which the following bodies were represented:

- Association of Manufacturers of Domestic Electrical Appliances
- British Copper Cylinder Association
- British Gas Corporation
- British Non-ferrous Metals Federation
- Chartered Institute of Building
- Copper Cylinder and Boiler Manufacturers
- Copper Development Association
- Copper Tube Fittings Manufacturers' Association
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Property Services Agency)
- Electricity Supply Industry in England and Wales
- Galvanizers' Association
- Heating and Ventilating Contractors' Association
- Institute of Plumbing
- London Boroughs Association
- Manufacturers' Association of Radiators and Convectors Ltd.
- Royal Institute of British Architects
- Royal Institute of Public Health and Hygiene
- Solid Fuel Advisory Service
- STC Water Regulations and Fittings Scheme
- Thames Water Authority Metropolitan Water Division
- Water Companies Association
- Zinc Development Association
- Coopted member

This British Standard, having been prepared under the direction of the Building Services Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 July 1984

© BSI 08-1999

First published July 1949
First revised and published as Part 1 April 1966
Part 2 first published March 1970
First revision May 1972
Second revision July 1984

The following BSI references relate to the work on this standard:
Committee reference SEB/9
Draft for comment 83/11773 DC

ISBN 0 580 13913 1

Amendments issued since publication

Amd. No.	Date of issue	Comments
5791	September 1988	
6601	September 1990	Indicated by a sideline in the margin

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Definitions	1
3 Sizes and grades	1
4 Primary heater	1
5 Designation of single feed copper indirect cylinders for ordering purposes	3
6 Tolerances	3
7 Materials	3
8 Manufacture	3
9 Design of cylinder top and bottom	4
10 Screwed connections for pipes	4
11 Optional features	4
12 Tests	5
13 Marking	6
Appendix A Information to be supplied by the purchaser with any enquiry or order	7
Appendix B Performance tests to determine the standing heat losses from factory insulated cylinders	7
Appendix C Test for isolation of primary and secondary water	8
Figure 1 — Cylinder top and bottom details	9
Figure 2 — Single feed indirect cylinder showing position of connections for pipes and immersion heater	10
Figure 3 — Single feed indirect cylinder showing positions of connections for pipes, draining tap and alternative position for immersion heater	10
Figure 4 — Example of protector rod construction and fixing	11
Figure 5 — Apparatus for heat loss test	12
Figure 6 — Isolation testing apparatus	13
Table 1 — Dimensions and details of single feed copper indirect cylinders	2
Table 2 — Ball diameter	4
Table 3 — Maximum height of cylinder top	4
Table 4 — Minimum surface area of protector rods	5
Publications referred to	Inside back cover

Foreword

This revision of this British Standard, which has been prepared under the direction of the Building Services Standards Committee, supersedes BS 1566-2:1972, which is withdrawn. It has been prepared in conjunction with BS 699 “*Specification for copper direct cylinders for domestic purposes*” and is complementary to BS 1566-1 “*Specification for double feed indirect cylinders*”.

Whereas double feed indirect cylinders require separate feed cisterns for both primary and secondary circuits, the single feed indirect cylinders specified in this Part of this standard require only one feed cistern, the feed water to the primary circuit being obtained from within the cylinder through the primary heater. The increase in volume of the primary water owing to expansion is accommodated within the primary heater and the primary water is prevented from coming into contact with the secondary water.

A new size 9E has been added to provide an additional size of cylinder suitable for off-peak electric water heating systems. The dimensions and positioning of connections are unaltered. The original cylinder grades 2 and 3 are included. A new grade 4 covers cylinders specifically designed for installations which are subject to a lower maximum working head than the maximum permitted in the previous grade 3, thus enabling a reduction to be made in the thickness of copper sheet used.

Primary heaters of the coil or annular type are used in single feed indirect cylinders. Whereas double feed indirect cylinders in accordance with BS 1566-1 with coil primary heaters are preferred for higher primary water operating pressures and higher primary water circulation rates, this is not the case with single feed indirect cylinders, which should not be used in sealed systems and which have limited application on direct pump circulation.

This Part of this standard does not include every detail of the primary heater design, and the manufacturer will continue to decide on the construction of his own particular unit to ensure that it complies with all relevant requirements and particularly with **12.3**.

Metal thicknesses are now specified both before and after forming.

Attention is drawn to the preferred sizes of cylinders in Table 1.

This standard now specifies material and heat loss performance requirements for thermal insulation where this is applied to cylinders by the manufacturer at the factory. In the interest of energy saving, it is recommended that all cylinders are either insulated at the factory or are provided with an insulating jacket complying with BS 5615.

A specification for aluminium protector rods is now included. It is recommended that these be fitted to copper cylinders during manufacture to help to ensure long service in those supply waters that have been known to cause or are expected to cause premature failure by pin hole corrosion. When required it is important that they be specified at the time of ordering. It is rarely possible and never satisfactory to install aluminium protector rods after the cylinder has been put into service. Leaflet MP.538 published by BNF Metals Technology Centre, Grove Laboratories, Denchworth Road, Wantage, Oxon, OX12 9BJ gives further information.

Copper cylinders require careful handling during transit and installation to avoid damage. Factory insulation is recommended to help prevent such damage (see **11.5**).

Parts 1 and 2 of this standard and BS 417, BS 699, BS 1565, BS 2777, BS 3198 and BS 4213 cover water storage vessels mainly for domestic use and now form a series to which others may be added when such a course is considered necessary.

Certification. It is strongly recommended that in view of the nature of this specification, manufacturers and purchasers should make use of the certification facilities described on the inside back cover of this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of this British Standard specifies requirements for copper cylinders, with or without the optional features listed in clause 11, for the storage of hot water, where the water is heated indirectly by the water circulating in an integral primary heater of annular or coil type and for which only one feed cistern is required, the feed water to the primary circuit being obtained from within the cylinder through the primary heater. Three grades and seven sizes are specified. The minimum storage capacities are from 86 L to 196 L. The cylinders are intended for fixing in the vertical position and are all of the type in which the bottom is domed inwards.

The information to be supplied with any enquiry or order is set out in Appendix A.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of this British Standard, the following definitions apply.

2.1 cylinder

a closed cylindrical vessel with domed ends

2.2 primary heater

an annular type heat exchanger constructed from sheet or a coil type heat exchanger constructed from tube and mounted inside a cylinder for the transfer of heat to the stored water from circulating hot water

2.3 primary water

the water in the primary circuit, including the water in the primary heater, boiler, radiators, pipework, etc.

2.4 primary capacity

the total volume of primary water, the expansion of which is to be accommodated by the primary heater

2.5 secondary water

the water in the cylinder and associated pipework that is heated by the primary heater

2.6 screwed connection

any threaded connection to which pipes or apparatus can be fitted

2.7 length of thread portion (of screwed connection)

the distance measured from the front face of the connection (including any chamfer or radius) to either the leading face of a plug or screw ring gauge which has been screwed as far as possible by hand into or onto the connection or in the case of a fully threaded female connection, to the back face

2.8 metal thickness before forming

the nominal thickness of copper sheet (which is subject to the tolerances specified in BS 2870) from which units are manufactured

2.9 storage capacity

the total volume of water that can be stored in the cylinder, excluding the water content of the primary heater

3 Sizes and grades

The size of cylinder, the grade and the thickness of material appropriate to each grade shall comply with Table 1.

NOTE For thicknesses of materials after forming see clause 8. The diameter of a cylinder shall be measured externally, and the height externally from base to top of dome, excluding any seam, screwed connection or other projection.

4 Primary heater

4.1 Classes. The primary heater shall be either:

- a) class 110 for systems having a primary capacity of not more than 110 L; or
- b) class 180 for systems having a primary capacity of not more than 180 L.

4.2 Dimensions. Primary heaters shall be of the annular or coil type. The minimum surface area and thickness of materials shall be as specified in Table 1.

The tube diameter for coil type heaters shall be as specified in Table 1.

4.3 Feed to primary circuit. The effective cross-sectional area of the waterway from the cylinder to the primary circuit shall be not less than 500 mm².

4.4 Vent from primary heater. The effective cross-sectional area of the entry to the internal vent pipe shall be not less than 245 mm². Connections between the heat-exchanger and the vent shall at no point be less than 140 mm².