

Specification for

Unvented hot water storage units and packages

ICS 91.140.60

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 Policy Committee (SEB/-) to Technical Committee SEB/9, upon which the following bodies were represented:

- Association of Manufacturers of Domestic Electrical Appliances
- Association of Manufacturers of Domestic Unvented Supply Systems Equipment (MODUSSE)
- British Combustion Equipment Manufacturers' Association
- British Copper Cylinder Association
- British Gas plc
- British Plumbing Fittings Manufacturers' Association
- Chartered Institute of Building
- Copper Development Association
- Department of the Environment (Property Services Agency)
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Department of Transport (Common Services))
- Electricity Supply Industry in England and Wales
- Galvanizers' Association
- Heating and Ventilating Contractors' Association
- Institute of Plumbing
- National Association of Plumbing, Heating and Mechanical Services Contractors
- Plastic Tanks and Cisterns Manufacturers Association
- Solid Fuel Advisory Service
- Water Authorities' Association
- Water Companies' Association
- Waterheater Manufacturers' Association
- Zinc Development Association

This British Standard, having been prepared under the direction of the Building Services Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 30 March 1990

© BSI 1998

The following BSI references relate to the work on this standard:
Committee reference SEB/9
Draft for comment 86/14950

ISBN 0 580 17560 X

Amendments issued since publication

Amd. No.	Date of issue	Comments
9343	March 1997	Indicated by a sideline in the margin

Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
Section 1. General	
1 Scope	1
2 Definitions	1
3 Classification	1
Section 2. Materials, design and marking	
4 Effect of non-metallic materials on water quality	2
5 Water connections	10
6 Hot water draw-off	10
7 Drain tap	10
8 Direct heating by electricity	10
9 Direct heating by gas	10
10 Indirect heating	10
11 Safety devices	10
12 Controls	11
13 Thermal insulation	12
14 Marking	12
15 Instruction manual	13
Section 3. Performance	
16 Performance requirements to be verified by production tests	14
17 Performance requirements to be verified by type tests	14
Section 4. Construction	
18 Construction of copper storage cylinders	16
19 Construction of vitreous enamel lined steel storage cylinders	17
20 Construction of polyethylene lined steel storage cylinders	18
21 Construction of cementitious lined steel storage cylinders	19
22 Construction of copper lined steel storage cylinders	19
23 Construction of stainless steel storage cylinders	20
Appendix A Method of determination of draw-off of unit/package	22
Appendix B Method of determination of heating capacity of primary heaters	22
Appendix C Method of measurement of hot water output of direct gas-fired storage water heaters	23
Appendix D Method of determination of suitability of materials for long-term hot water storage	23
Appendix E Method of determination of performance of controls and safety devices	24
Appendix F Method of determination of continuity of polyethylene lining	25
Appendix G Vacuum test on polyethylene lining	25
Appendix H Method of measurement of thickness of cementitious lining	26
Appendix I Method of determining continuity of copper lining	26
Figure 1 — Typical units and packages	2
Figure 2 — Copper primary heaters	11

	Page
Figure 3 — Apparatus for determining draw-off rate and heat capacity	27
Table 1 — Minimum length of thread	10
Table 2 — Minimum tail length	10
Table 3 — Pressure valve settings and working pressures	12
Table 4 — Nominal thickness of body sheet and minimum thickness after forming of ends	17
Table 5 — Materials for screwed connections to copper lined cylinders	20
Table 6 — Minimum metal thickness (after forming) 316 and UNS-S44400 stainless steels	21
Table 7 — Minimum metal thickness (after forming) Duplex UNS-S31803 and UNS-S32304 stainless steels	21
Table C.5 — Adjusted draw-off rate	23
Publications referred to	28

Foreword

This British Standard has been prepared under the direction of the Building Services Standards Policy Committee.

Eight standards, covering water storage vessels mainly for domestic use, now form a series to which others may be added when necessary. The seven other standards in this series are: BS 417, BS 699, BS 853, BS 1565, BS 1566-1, BS 1566-2, BS 3198 and BS 4213.

Amendment No. 1 to this standard relates to two further classes on structural requirements.

- a) Construction of stainless steel storage cylinders
- b) Construction of copper lined steel storage cylinders

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 28, 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.

Section 1. General

1 Scope

This British Standard specifies requirements for the materials, design, construction and performance of unvented hot water storage units and packages which are either heated directly by gas or electricity or indirectly heated. The units and packages are suitable for connection to a water supply at a pressure of up to 12 bar¹⁾ with a maximum heat input to stored water of 45 kW, when fitted with the ancillary components specified in this standard and installed in accordance with manufacturer's installation manual (see clause 15) and BS 6700.

This standard specifies requirements for cylinders with a capacity of greater than 15 L up to and including 500 L with a minimum operating pressure of 1 bar and a maximum working pressure of either 3 bar or 6 bar and fitted with safety devices to prevent water temperature from exceeding 100 °C.

NOTE 1 Illustrations of typical units and packages are shown in Figure 1.

NOTE 2 This standard does not cover systems with storage vessel capacities of 15 L or less.

NOTE 3 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the definitions given in BS 6100-2.7 and BS 6100-3.3 apply, together with the following.

2.1

construction reference

the cylinder capacity, in litres, prefixed by an alpha character(s) denoting the type of cylinder construction, and suffixed by the operating pressure, in bar

2.2

maximum design pressure

the pressure at which the expansion valve is set to open

2.3

maximum working pressure

the maximum pressure (rated pressure) to which the storage cylinder will be subjected in normal operation, which is at least 0.5 bar less than the maximum design pressure

2.4

operating pressure

the design maximum output water pressure from the pressure reducing valve

2.5

storage cylinder

a cylindrical vessel in which the stored water is heated

2.6

unvented package

an unvented storage cylinder equipped and factory-fitted by the manufacturer with all the safety devices required by this standard and supplied by the manufacturer with a kit containing any other devices, e.g. to prevent backflow/crossflow, control working pressure, relieve excess pressure and accommodate expansion, and which is to be fitted by the installer

2.7

unvented unit

an unvented storage cylinder equipped and factory-fitted by the manufacturer with all the safety devices and the controls required by this standard

2.8

thermal cutout

a device that, during abnormal operating conditions, limits the temperature of the stored water by automatically interrupting the energy supply. It is constructed so that its temperature setting cannot be altered by the user and requires either replacement or operation by hand in order to restore the heat supply

3 Classification

Unvented units and packages are classified according to the following:

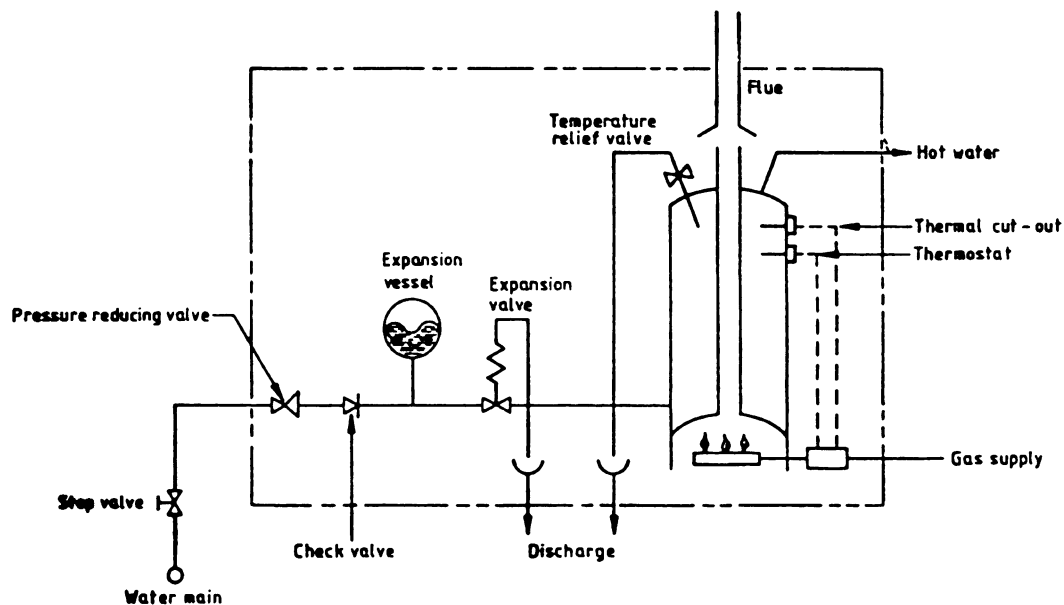
- a) type, either type 3 or type 6 in accordance with Table 3;
- b) construction reference (see section 4);
- c) capacity.

¹⁾ 1 bar = 10⁵ N/m² = 100 kPa. All pressures are gauge pressure unless otherwise stated.

Section 2. Materials, design and marking

4 Effect of non-metallic materials on water quality

When used under the conditions for which they are designed, non-metallic materials in contact with or likely to come into contact with potable water shall comply with the requirements of BS 6920.



(a) Unit directly heated by gas

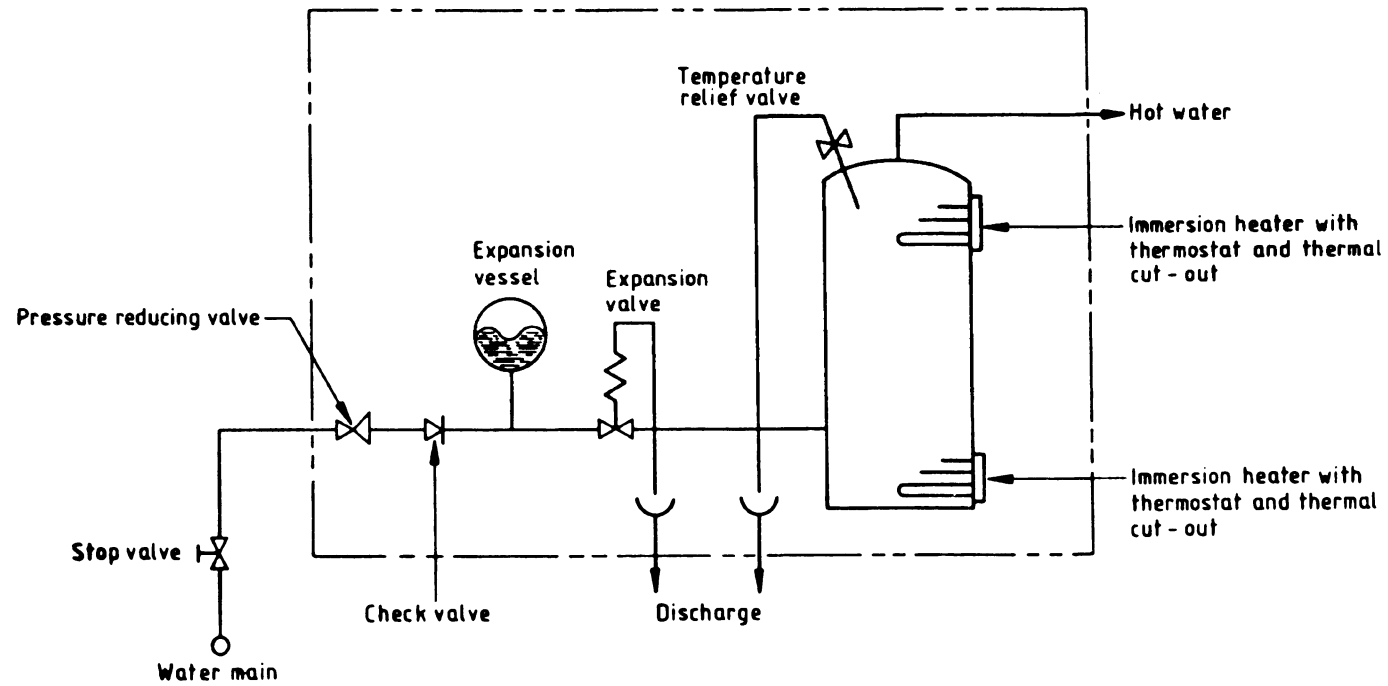
----- Extent of factory-fitted components, including wiring
 ———— Extent of components supplied with the package by the system manufacturer.

Figures are diagrammatic only.

NOTE 1. The cold water take-off may be positioned before or after the pressure reducing valve as indicated on the following typical examples.

NOTE 2. The order of the expansion vessel and the expansion valve indicated represents a typical layout only.

Figure 1 — Typical units and packages



(b) Unit directly heated by electricity

Figure 1 — (continued)

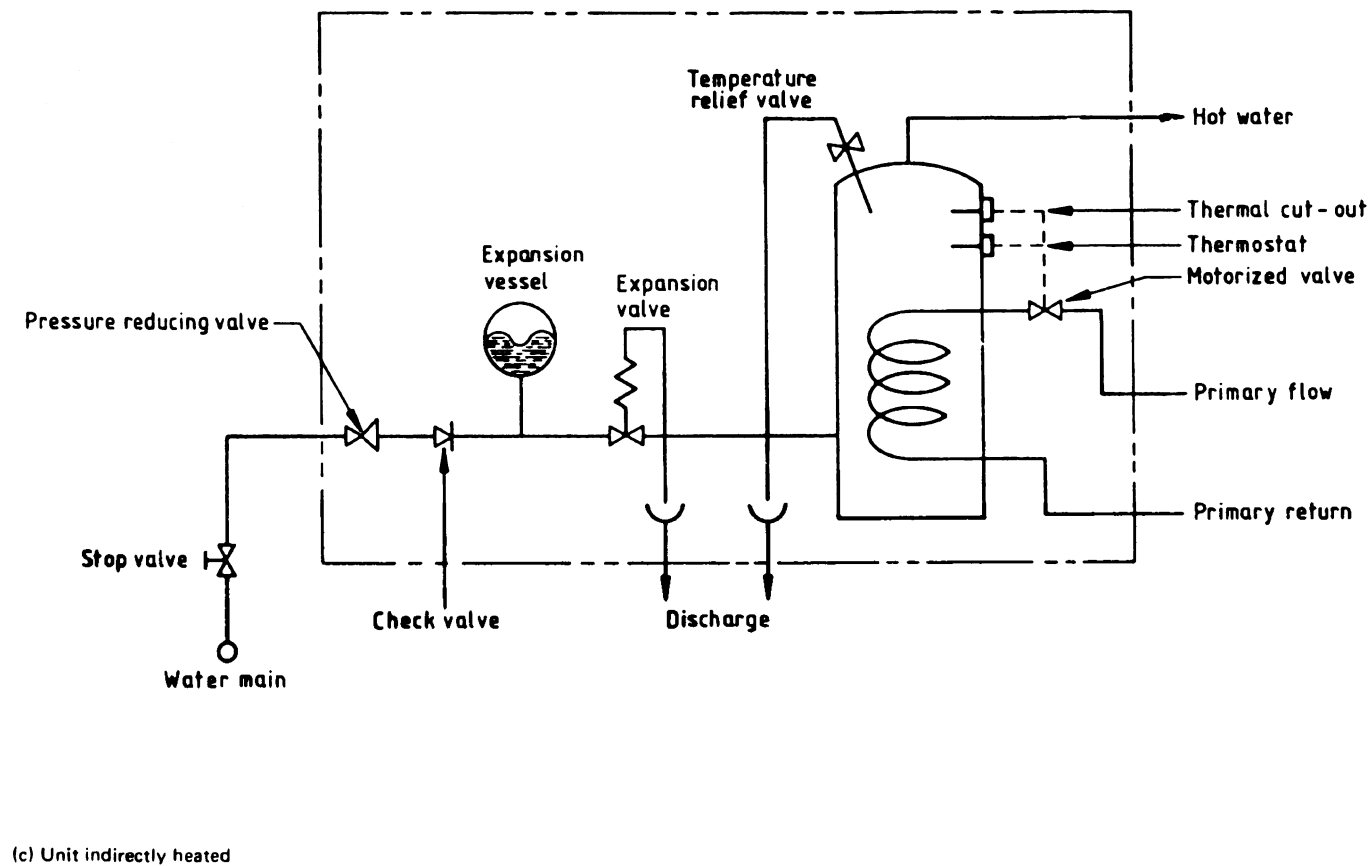
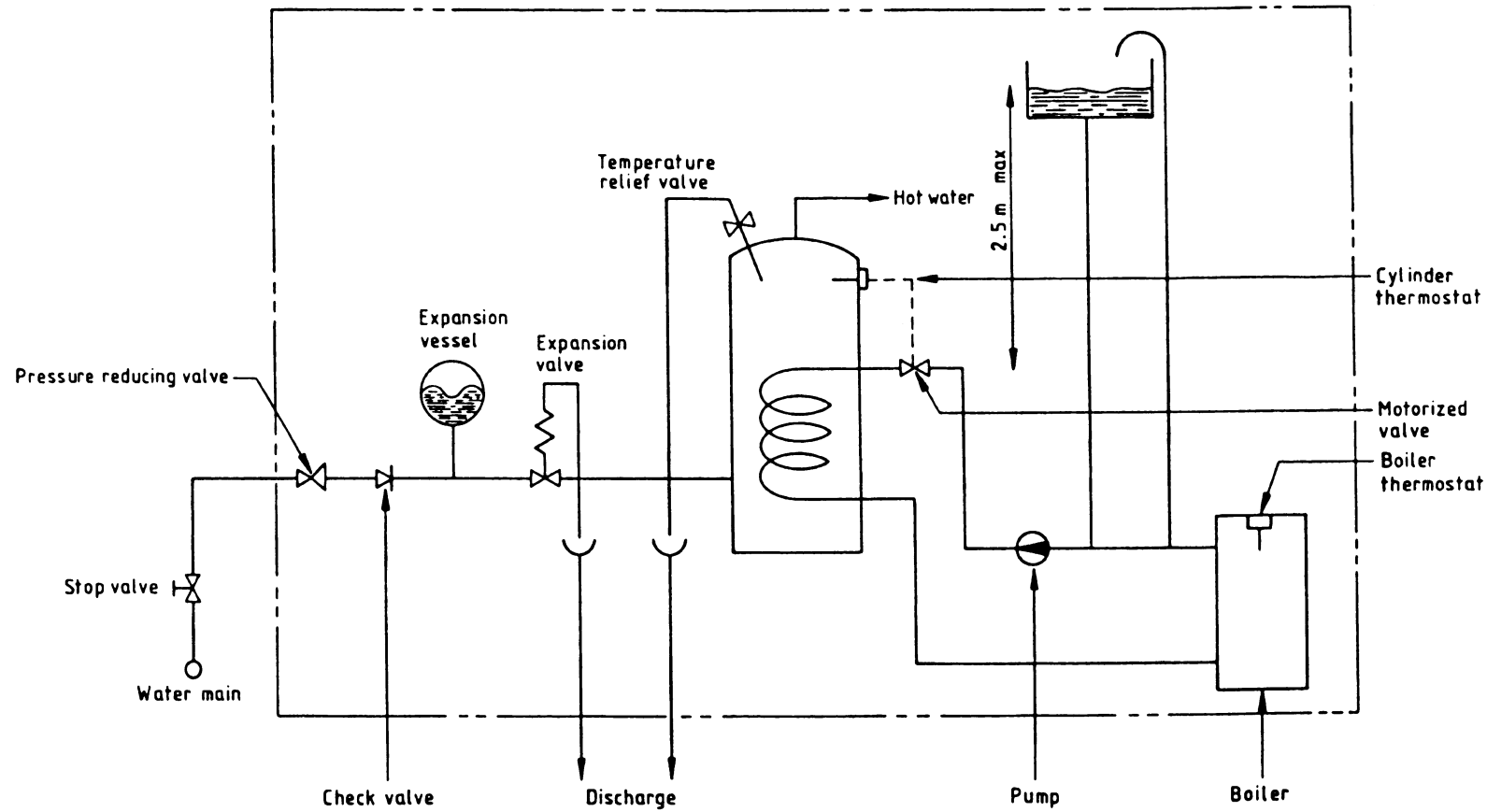


Figure 1 — (continued)



(d) Unit indirectly heated with low-head vented primary

Figure 1 — (continued)