

Specification for

Safety of household electrical appliances —

Part 2: Particular requirements —

Section 2.22 Electrique heaters

Co-operating organizations

The Electrical Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Associated Offices' Technical Committee	Electrical Research Association*
Association of Consulting Engineers	Electricity Council, the Central Electricity
Association of Manufacturers of Domestic	Generating Board and the Area Boards in
Electrical Appliances*	England and Wales*
Association of Mining Electrical and	Electronic Engineering Association
Mechanical Engineers	Engineering Equipment Users' Association
Association of Supervisory and Executive	Institution of Electrical Engineers*
Engineers*	Lighting Industry Federation Limited
British Electrical and Allied Manufacturers'	Ministry of Aviation Supply
Association	Ministry of Defence
British Railways Board	Ministry of Defence, Army Department
British Radio Equipment Manufacturers'	Ministry of Defence, Navy Department*
Association	Municipal Passenger Transport Association
Crown Agents for Oversea Governments and	(Incorporated)
Administrations	National inspection Council for Electrical
Department of Employment and Productivity	Installation Contracting
Department of the Environment*	National Physical Laboratory (Department of
Department of Trade and Industry	Trade and Industry)
Electric Cable Makers' Confederation	Oil Companies Materials Association
Electrical Contractors' Association	Post Office
Incorporated)*	Public Road Transport Association
Electrical Contractors' Association of Scotland	South of Scotland Electricity Board

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

British Electrotechnical Approvals Board for	Institution of Electrical and Electronics
Household Equipment	Technician Engineers
Consumers Association	Institution of Heating and Ventilating
Department of the Environments — Fire	Engineers
Research Station	Royal Institute of British Architects
Electrical Association for Women	Small Electric Motor Manufacturers
Fire Protection Association	Association
Home Office	Women's Advisory Committee of BSI

This British Standard, having been approved by the Electrical Industry Standards Committee, was published under the authority of the Executive Board on 8 September 1972

© BSI 10-1999

The following BSI references relate to the work on this standard:
Committee references ELE/82, ELE/82/32
Draft for comment 70/17800

ISBN 0 580 07366 1

Amendments issued since publication

Amd. No.	Date of issue	Comments
1664	February 1975	
2137	October 1976	
5215	March 1987	
6226	February 1990	Indicated by a sideline in the margin

Contents

	Page
Co-operating organizations	Inside front cover
Foreword	ii
1 Scope	1
2 Definitions	1
3 General requirement	1
4 General conditions for the tests	1
5 Rating	3
6 Classification	3
7 Marking	3
8 Protection against electric shock	4
9 Starting of motor-operated appliances	4
10 Input	4
11 Heating	4
12 Operation under overload conditions	5
13 Electrical insulation at operating temperature	5
14 Radio-interference suppression	6
15 Moisture resistance	6
16 Insulation resistance and electric strength	6
17 Overload protection	6
18 Endurance	6
19 Abnormal operation	6
20 Stability and mechanical hazards	8
21 Mechanical strength	8
22 Construction	8
23 Internal wiring	9
24 Components	9
25 Supply connection and external flexible cables and cords	9
26 Terminals for external conductors	10
27 Provision for earthing	10
28 Screws and connections	10
29 Creepage distances, clearances and distances through insulation	10
30 Resistance to heat, fire and tracking	10
31 Resistance to rusting	10
Appendix A Requirements for contactors for electricaire heaters	11
Appendix B Measurement of active storage capacity	11
Appendix C Preferred nominal dimensions of return air grilles	13
Figure 1 — Test apparatus	13
Figure 2 — Section of duct showing thermocouple and anemometer positions	14
Table 1 — Permissible temperature rises	5
Table 2 — Permissible temperature rises	8
Table 3 — Air flow and duct pressure	12
Table 4 — Active store measurement termination points	13

Foreword

This standard makes reference to the following British Standards:

BS 1142, *Fibre building boards*.

BS 3536, *Asbestos insulating boards and asbestos wallboards*.

BS 3958, *Thermal insulating materials*.

BS 6007, *Elastomer-insulated cables for electric power and lighting*.

BS 6500, *Insulated flexible cords*.

This British Standard has been prepared under the authority of the Electrical Industry Standards Committee and is one of a series of sections of the specification covering safety requirements for household electrical appliances¹⁾.

It is a section of Part 2, Particular requirements, of BS 3456 and specifies requirements which depart from, or are additional to, those given in the latest edition of Part 1, General requirements, and the clauses are numbered to correspond with those given in Part 1.

Appendix A specifies additional requirements for main switching devices for controlling the heating element circuits for use in electricaire heaters.

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 and ii, 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⁾ See the back cover of this Standard.

1 Scope

This Section 2.22 of BS 3456 covers electricaire heaters for household and similar use having a rated input up to and including 18 kW and for use on single-phase or three-phase supplies.

The heaters are required to comply in all respects with the requirements specified in the latest edition of Part 1 except in so far as they are modified by this Section 2.22.

Storage fan heaters which discharge heat directly into the room in which they are installed and which can also be provided with air output ducts not greater than 0.6 m long to heat adjacent rooms are not covered by this specification: in such cases BS 3456, Section 2.26²⁾, applies.

NOTE The titles of the British Standards referred to in this Standard are listed on page ii.

2 Definitions

For the purposes of this section of this British Standard, the definitions given in Part 1 apply, with the following additions:

I.

electricaire heater

an electrical appliance designed to provide heating by means of a ducted air circulating system, the air being heated in a thermal storage unit through which it is forced or induced by a fan

NOTE Electricaire heaters are available with and without an integral plenum.

II.

charge controller

a device such as a thermostat, energy regulator, or the like, integral with the heater and which enables the energy input to be regulated

III.

standby conditions

the conditions obtained when the heater is cycling regularly under the influence of the charge controller at its maximum setting and with the fan OFF unless the design is such that the fan is intended to be in continuous operation

IV.

rated active storage capacity

the useful heat available at the end of a charge when the heater is operating on a prescribed cycle of charge and discharge

3 General requirement

This clause of Part 1 applies.

4 General conditions for the tests

This clause of Part 1 applies, with the following modification and additions:

to 4.2 as an addition:

In cases where it is normal practice for the heater to be delivered unassembled the heater shall be assembled according to the manufacturer's instructions.

to 4.3 as a modification:

If an unsatisfactory result is obtained for the test of 13, and it is suspected that this is due to the presence of the thermocouples, this test shall be repeated at any convenient stage after the thermocouples have been removed.

²⁾ In course of preparation.

The following additional subclauses apply:

I. Heaters not provided with an integral plenum shall be positioned on the plenum section of the test apparatus shown in Figure 1 of this Section 2.22. For heaters provided with an integral plenum one air outlet shall be directly connected to the ducting shown in Figure 1 of this Section 2.22, excluding the plenum section. Any other air outlet normally used to discharge heated air shall be closed to prevent the heated air entering the test enclosure.

II. A heater intended only for use in an enclosure shall be tested in an enclosure constructed in the following manner:

The enclosure shall completely surround the heater and plenum section of the test apparatus of Figure 1 of this Section 2.22. The enclosure shall have a removable front panel in which are situated two return air grilles having dimensions as given in Appendix C of this Section 2.22, unless other sizes are specified by the manufacturer in his installation instructions. The floor of the test enclosure on which the plenum section of the test apparatus is placed shall consist of a sheet of fire and heat resistant cement or calcium silicate asbestos-free building board supported on 75 mm × 50 mm section timber of sufficient length to support the heater and enclosure and with the 75 mm dimension in the vertical plane. The walls and ceiling of the enclosure shall be constructed as follows. The inner layer is fire and heat resistant cement or calcium silicate asbestos-free building board. This layer shall be thermally insulated externally by resin bonded mineral wool complying with the requirements of BS 3958-5, of 36 mm nominal thickness and 55 kg/m³ nominal density. The mineral wool is retained in position by hardboard complying with the requirements of BS 1142 and of 3 mm nominal thickness. The overall thickness of this composite assembly shall be maintained between 48 mm and 52 mm. The interior surface of the enclosure shall be finished matt black.

Unless the manufacturer's instructions state that smaller distances are permissible, in which case these are followed, the air gap between the enclosure walls and the main surfaces of the heater shall be 50 ± 5 mm and the air gap between the ceiling and the main surface of the top of the heater shall be 150 ± 10 mm.

The return air grilles in the front panel shall be positioned so that the top edge of one is 50 ± 5 mm below the underside of the ceiling of the enclosure and the bottom edge of the other grille is at the same height, within ± 5 mm, as the top of the plenum section of the test apparatus.

III. A heater intended only for use as a free standing unit shall be tested in a test corner constructed in the following manner:

The test corner shall consist of two walls at right angles, a floor and a ceiling all constructed as detailed in 4.II. The free ends of the walls, floor and ceiling shall extend at least 0.3 m beyond the faces of the heater. The heater shall be spaced from the surfaces of the corner by 50 ± 5 mm at the sides and 150 ± 5 mm at the top unless the manufacturer's instructions allow smaller distances, in which case the manufacturer's instructions shall be followed.

IV. Heaters which may be used either free standing or inside a cupboard shall be tested under the conditions specified in 4.II and 4.III unless it is obviously unnecessary to carry out one of these tests.

V. The duct section of the test apparatus (see Figure 1 of this Section 2.22) external to the test enclosure shall be thermally insulated to have a thermal resistance of not less than 1.0 m² °C/W up to the position of the adjustable restrictor. The material used for the test duct shall be such that the accuracy of temperature measurements of the air in the duct is not affected by the thermal capacity of the duct.

NOTE A duct fabricated from sheet steel 1.0 mm thick and insulated with rigid polyurethane foam 25 mm thick is known to be suitable.

The non-adjustable restrictor (see Figure 1 of this Section 2.22) shall provide a 95 % restriction of the duct. This restrictor is only inserted in the duct when specified.

The adjustable restrictor shall be of the multi-slat, opposed vane type having not less than eight slats.

Air temperature measurements shall be made by means of a thermocouple grid in which the thermocouples are located at the points shown in Figure 2 of this Section 2.22, positioned as shown in Figure 1 of this Section 2.22.