

BRITISH STANDARD SPECIFICATION

**ELECTRICAL
REFRIGERATORS AND
FOOD FREEZERS
FOR HOUSEHOLD USE**

B.S. 922 & 1691 : 1959

Incorporating amendments issued
January 1960 (PD 3610) and October 1961 (PD 4356)

BRITISH STANDARDS INSTITUTION

INCORPORATED BY ROYAL CHARTER

THIS BRITISH STANDARD, having been approved by the Refrigeration Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 18th March, 1959.

B.S. 922. First published, October, 1940.

First revision, December, 1950.

B.S. 1691. First published, December, 1950.

B.S. 922 and 1691. First published, March, 1959.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 4000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook,

This standard makes reference to the following British Standards:

- B.S. 7. Rubber insulated cables and flexible cords.
- B.S. 37. Electricity meters.
- B.S. 350. Conversion factors and tables.
- B.S. 613. Components and filter units for radio interference suppression.
- B.S. 800. Limits of radio interference.
- B.S. 1224. Electro-plated coatings of nickel and chromium.
- B.S. 1584. Glossary of terms used in refrigeration.
- B.S. 1608. Condensing units for refrigeration.
- B.S. 2004. PVC-insulated cables and flexible cords.
- B.S. 2754. Memorandum on the design of electrical apparatus having double insulation.

**Amendment Slip No. 3, published 31 October, 1969
to B.S. 922 & 1691 : 1959**

**Electrical refrigerators and food freezers
for household use**

Revised text

Clause 5. Calculation of volumes of cabinet

Subclause g. *Units of measurement.* Delete this subclause and substitute the following:

‘ Measurement. All volumes shall be stated in cubic feet. All measured volumes shall be at least 97 % of those stated by the manufacturer (Clause 44 b) ’.

Clause 8. Calculation of volumes of cabinet

Subclause c. *Unit of measurement.* Delete this subclause and substitute the following:

‘ Measurement. All volumes shall be stated in cubic feet. All measured volumes shall be at least 97 % of those stated by the manufacturer (Clause 44 b). ’

Clause 18. Terminals Delete the last paragraph of this clause and substitute the following:

‘ The line supply terminal shall be marked with the letter ‘ L ’ and the neutral terminal shall be marked ‘ N ’. Such markings shall be permanent and indelible.’

Clause 44. Information to be supplied by manufacturer

Subclause b. Delete this subclause and substitute the following:

‘ The food storage volume and the net shelf area calculated as specified in Clauses 5, 6 and 8.’

New Clause 45. Add the following new Clause 45:

‘ GROSS VOLUMES

45. Whenever gross volumes are stated net volumes must also be stated.’

B.S. 3042. Standard test finger.

B.S. 3189. Phosphating treatment of iron and steel.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:
Committee reference RFE/3. Draft for comment CY(RFE) 3523.

CO-OPERATING ORGANIZATIONS

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

- *British Refrigeration Association
- *Institute of Refrigeration
- Llood's Register of Shipping
- Ministry of Defence J.E.S.C.
- *Ministry of Supply

The Government department and scientific and industrial organizations marked with an asterisk in the above list and the following Government department and scientific and industrial organizations were directly represented on the committee entrusted with the preparation of this standard:

British Electrical Development Association
British Hotels and Restaurants Association
Council of Scientific Management in the Home
Electricity Supply Industry in England and Wales
Electrical Contractors Association
Electrical Association for Women
Ministry of Power
Royal Institute of British Architects
Certain independent bodies

BRITISH STANDARD SPECIFICATION FOR ELECTRICAL REFRIGERATORS AND FOOD FREEZERS FOR HOUSEHOLD USE

FOREWORD

This British Standard was first issued as two separate documents, B.S. 922, 'Electrical refrigerators and food freezers for household use in all climates', and B.S. 1691, 'Electrical refrigerators and food freezers for household use in temperate climates only'.

B.S. 922 was first published in 1940 and was based on American, Australian and Canadian practice at the time. It was revised in 1950, when certain definitions were included and also the scope was enlarged to include household food freezers.

B.S. 1691 was first published in 1950 as a complementary standard to B.S. 922 and covered refrigerators and food freezers for household use in temperate climates only.

In the course of the present revisions of these two standards, it became increasingly evident that, except for the question of ambient test temperatures, both were identical. It was, therefore, decided, to incorporate B.S. 1691 within the revision of B.S. 922.

These present revisions have been made in order to allow for improvements in design. Advantage has been taken also to restrict the number of refrigerants to those known to be in general and satisfactory use and to alter the methods of computation of volumes and areas.

For the use of the Certification Mark of the British Electrical Approvals Board for Domestic Electrical Appliances, see Clause 43.

*As
added
Oct.,
1961*

NOTE. Where metric equivalents have been given, the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in B.S. 350, 'Conversion factors and tables'.

SPECIFICATION

SECTION ONE : GENERAL

SCOPE

1. This British Standard prescribes the general constructional requirements and the methods of determining the performance and computing the volume and shelf area of electrical refrigerators designed for household food storage and of electrical refrigerators designed as household food freezers and having a net volume up to and including 12 cu. ft (0.34 m³). In addition, it specifies type tests for performance and for compressor motor rating.

The upper limits of ambient dry bulb shade temperatures covered by this standard are as follows:

B.S. 1691 (Temperate climate)—90°F (32°C).

B.S. 922 (All climates)—110°F (43°C).

DEFINITIONS

2. For the purpose of this British Standard the following definitions shall apply:

a. Temperate climate. A climate in which the dry bulb temperature of the air surrounding the cabinet may vary between 50°F and 90°F (13°C and 32°C) and in which the wet bulb temperature of the air may rise to 75°F (24°C).

b. Refrigerator. A complete unit comprising (i) the refrigerating system (ii) the insulated storage compartment or compartments (generally referred to as the 'cabinet') and (iii) all auxiliaries such as fans, lights, etc.

c. Normal temperature food storage compartment. The part of the refrigerator specifically arranged for the storage of unfrozen food.

d. Freezing compartment. The part of the refrigerator specifically arranged and fitted for the freezing of water and ice cream mix and for the short term storage of frozen food.

e. Food freezer. A refrigerator specifically designed for freezing food and for the long term storage of frozen foods.

NOTE. In view of the fact that the term 'freezer' is commonly used to denote the freezing compartment in a household refrigerator, manufacturers who incorporate the food freezer in a household refrigerator are recommended to use another description.

f. Food freezer compartment. A compartment in a household refrigerator designed as a food freezer.

g. Refrigerating system. The condensing unit, evaporator, valves, piping and other components through which the refrigerant circulates.

h. Condensing unit. A built-up unit of the high-pressure components of a refrigerating system, including a power-driven compressor, a condenser and a liquid receiver, if any, or the corresponding components in an absorption system.

j. Evaporator. The part of the refrigerating system which performs the function of absorbing heat.

k. Open condensing unit. A condensing unit in which the compressor is a separate entity driven by a motor through a belt or equivalent drive.

l. Hermetically-sealed compressor unit (sealed unit). A refrigerating compressor and motor assembly enclosed in a shell, rendered gas-tight by welding or other suitable means.

m. Hermetically-sealed refrigerating system (sealed system). A complete refrigerating system comprising a hermetically-sealed condensing unit and an evaporator unit permanently connected together by the manufacturer of the system.

n. Refrigerant. The medium for conveying heat in a refrigerating system, being evaporated by absorbing heat at a lower temperature, and liquefied by surrendering heat at a higher temperature.

o. High pressure side. The part of the refrigerating system subject to the higher or condenser pressure.

p. Low pressure side. The part of the refrigerating system subject to the lower or evaporator pressure.

q. Ice freezing compartment. The part or shelf of the refrigerator specifically arranged and fitted for the making of ice only; it may form part of the freezing compartment but is not suitable for the storage of frozen food. *As added Jan. 1960*

NOTE. A general glossary of terms used in refrigeration is published as B.S. 1584, 'Glossary of terms used in refrigeration'.

SECTION TWO : DIMENSIONS AND CAPACITY OF REFRIGERATORS

INSIDE DIMENSIONS OF CABINET

3. For the purpose of calculating volumes and shelf areas, the following shall apply:

a. Front access type. The inside depth shall be the mean horizontal distance between the front and rear inside surfaces of the cabinet's enclosed space, ignoring all projection of shelves formed on the inner surface of a formed inner door panel. The inside width shall be the horizontal distance between the inner surfaces of the side walls of the enclosed space. The inside height shall be the vertical distance between the inner surfaces of the floor and ceiling of the enclosed space.

b. Top access type. The inside depth shall be the horizontal distance between the front and rear inner surfaces of the front and back walls of the cabinet's enclosed space. The inside width shall be the horizontal distance between the inner surfaces of the side walls of the enclosed space. The inside height shall be the mean vertical distance between the inner surface of the floor and of the lid.

DIMENSIONS OF EVAPORATOR SPACE

4. *a. Depth.* The depth of the evaporator space shall be the mean horizontal distance between the front and rear surfaces of the cabinet's enclosed space over the vertical area occupied by the evaporator, unless there is a space arranged in front of the evaporator for food storage.

Where a storage space is located in front of the evaporator, the depth of the evaporator space shall be taken as the mean horizontal distance from the inner surface of the rear of the cabinet's enclosed space to the foremost part of the evaporator or evaporator door if fitted.

b. Width. The width of the evaporator space shall be the overall horizontal width of the evaporator itself (neglecting suction headers near the top of the evaporator) or, if side baffles are used, the overall width including the baffles. If there is less than 3 in. (76 mm) horizontal distance between the unit or baffle and an inside wall of the lining, such space shall be computed as part of the evaporator space.

c. Height. The height of the evaporator space shall be the overall height of the evaporator itself, including baffles if any. If there is less than a clear space of 4 in. (102 mm) between the evaporator and the floor or ceiling of the cabinet's enclosed space, then the height shall be the vertical distance from that inner surface of the enclosed space to the furthestmost point of the evaporator.

The evaporator height shall include the drip tray in all cases except those where a definite manual operation is needed to initiate defrosting.

CALCULATION OF VOLUMES OF CABINET

5. a. Gross volume. The gross volume of the cabinet shall be the product of the inside depth, the inside width and the inside height, as defined in Clause 3.

b. Volume of the evaporator space. The volume of the evaporator space shall be the product of the depth, the width and the height, as defined in Clause 4.

c. Volume of shelves and partitions.

(i) *Thickness.* The thickness of a partition shall be the mean distance between the outer surfaces.

Where the surface of the partition is corrugated or fitted with external pipe grids, the surface for this purpose shall be the plane joining the outer apices of the corrugations or pipes unless the distance between adjacent corrugations or pipes is greater than 4 in. (102 mm).

(ii) *Full partitions.* The volume of a full partition shall be the product of its thickness and its depth, width or height, whichever two of these are applicable. The depth, width and height shall be those dimensions of the cabinet applying in the plane of the partition.

(iii) *Fractional partitions.* The volume of a permanently fixed fractional partition shall be the product of its thickness and its depth, width or height, whichever two of these are applicable. The depth, width or height shall be the distances, normal to the lining, from adjacent surfaces to the farther edges of the partitions, or to the evaporator in cases where the fractional partition adjoins it.

A horizontal partition, the edges of which are more than 3 in. (76 mm) from the lining of the cabinet, shall be regarded as a fractional partition. A vertical partition, the edges of which are more than 4 in. (102 mm) from the lining of the cabinet, shall be regarded as a fractional partition.

d. Freezing storage volume. The freezing storage volume shall be the sum of the volumes of the freezing compartments and the food freezer compartments

(if any). The volumes of these compartments shall be the products of their inside dimensions, as defined in Clause 3, each compartment being considered as a separate refrigerator.

e. General storage volume. The general storage volume shall be the gross volume (Clause 5 *a.*) minus the volume of the evaporator space (Clause 5 *b.*) and minus the volume of the shelves and partitions (Clause 5 *c.*) whose thickness is greater than $\frac{1}{2}$ in. (13 mm).

f. Net volume. The net volume shall be the sum of the general storage volume (Clause 5 *e.*) and the freezing storage volume (Clause 5 *d.*).

g. Units of measurement. All volumes shall be stated in cubic feet to the nearest 0.1 cu. ft (2.8 dm³) except the freezing storage volume (Clause 5 *d.*) which shall be stated to the nearest 0.01 cu. ft (0.3 dm³).

CALCULATION OF SHELF AREA

6. *a. Full shelves and partitions.* The area of the full shelf or horizontal partition and of the bottom of the lining shall be the product of the width and the depth; any part of the shelves or of the bottom of the lining having less than 4 in. (102 mm) vertical clearance above shall be excluded from the net shelf area.

The width shall be the distance measured parallel to the surface of the shelf between the inner surfaces of the side walls of the cabinet's enclosed space.

The depth shall be the distance measured parallel to the surface of the shelf between the inner surface of the front and rear walls of the cabinet's enclosed space.

b. Fractional shelves. For the purpose of calculating the area of fractional shelves, the width and depth shall be measured parallel to the surface of the shelves from the adjacent surfaces of the cabinet's enclosed space to the farther edge of the shelf.

c. Cut-away shelves. When a shelf is cut away the area of the portion cut out shall be deducted.

d. Drip trays. Whenever the space occupied by the drip tray is included in the general storage volume the part of the shelf supporting the drip tray or the bottom of the drip tray may be considered as a food-shelf area (see Clause 4 *c.*).

e. Freezing compartment and food freezer compartment shelves. The areas of the shelves and compartment bottoms in the freezing compartment and food freezer compartment shall be included in the net shelf area, provided there is a clear vertical space of not less than $1\frac{1}{2}$ in. (38 mm) above such shelves and compartment bottoms.

f. Suspended containers. The area of the bottom of a suspended container and the area of the shelf beneath shall not both be counted unless the vertical clearance between this shelf and the bottom of the container is at least 4 in. (102 mm). If the mean height vertically of a suspended container, as measured between its bottom and the cover, or shelf immediately above, is less than 2 in. (51 mm), the bottom area of the container shall not be added.