

Specification for

Rating and performance of air source heat pumps with electrically driven compressors

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Refrigeration Heating and Air-Conditioning Standards Committee (RHE/-) to Technical Committee RHE/17, upon which the following bodies were represented:

- British Air Conditioning Approvals Board
- British Gas plc
- British Refrigeration Association
- Building Services Research and Information Association
- Chartered Institution of Building Services Engineers
- Department of the Environment (Building Research Establishment)
- Electricity Supply Industry in England and Wales
- Heating and Ventilating Contractors' Association
- Heat Pump Manufacturers' Association
- Hevac Association
- Institute of Refrigeration
- Institution of Mechanical Engineers
- Ministry of Defence
- Society of British Gas Industries

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Foreword

This British Standard has been prepared under the direction of the Refrigeration Heating and Air-Conditioning Standards Committee.

The methods of test specified in BS 2852-1 and BS 5491 and referred to in this standard are for unit air conditioners when used for cooling only.

This present standard has therefore been prepared in order to cover the requirements for rating and testing of heat pumps for both heating and cooling applications.

The specified test conditions for rating heat pump capacity have been chosen to provide a basis for comparison of heat pumps within the expected range of operation and are considered as the standard rating conditions.

The standard takes account of the current work on this subject by Technical Committee 113 of the European Committee for Standardization (CEN/TC 113 Heat pumps) and the related work by Technical Committee ISO/TC 86 of the International Organization for Standardization on testing and rating of room air conditioners including heat pumps, which has also been used in its preparation.

It is intended that this standard will be replaced by equivalent CEN standards covering air-to-air and air-to-water heat pumps and it will therefore be withdrawn as soon as the relevant CEN standards are published.

Noise in relation to heat pumps is the subject of work by CEN/TC 113 and has thus not been covered in this standard.

For safe operation of heat pumps and associated equipment reference should be made to BS 4434.

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 10, 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

1.1 This British Standard specifies requirements for rating capacity and electrical input and for operational performance of air source single packaged and split system heat pumps with electrically driven compressors classified as in Table 1.

NOTE 1 Table 1 also summarizes the test methods for rating that are applicable to the classification.

1.2 This standard applies to heat pumps used for heating only or for heating and cooling, designed for both ducted and non-ducted applications.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this standard the definitions given in BS 5643 apply, together with the following.

2.1

heat pump

an encased assembly or assemblies designed as a unit to transfer heat by means of a vapour compression refrigeration cycle and to provide air or water for the purposes of heating or cooling. It includes a prime source of refrigeration and means of circulating and if necessary cleaning the air or water. It may also include means of providing supplementary heating, humidifying, ventilating or exhausting the air where the distribution is by that means

2.2

air-to-air unit

a unit designed to transfer heat from an air source to an air distribution

2.3

air-to-water unit

a unit designed to transfer heat from an air source to a water distribution system

2.4

heating only unit

a unit designed to transfer heat for heating only, i.e. from outside the space to be heated

3 Instruments

3.1 Temperature-measuring instruments

The instruments shall be as described in 13.1 of BS 5491:1977.

3.2 Pressure-measuring instruments

The instruments shall be as described in 13.2 of BS 5491:1977.

3.3 Electrical instruments

The instruments shall be as described in 13.3 of BS 5491:1977.

3.4 Water-flow measuring instruments

The instruments shall be as described in 13.4 of BS 5491:1977.

3.5 Volatile refrigerant flow instruments

Volatile refrigerant flow rates shall be measured with integrating type flow meters having an accuracy of $\pm 1.0\%$ of the quantity measured.

3.6 Other instruments

3.6.1 Time interval measurements shall be made with instruments having an accuracy of $+ 0.2\%$ of the quantity measured.

3.6.2 Mass measurement shall be made with apparatus having an accuracy of $\pm 1\%$ of the quantity measured.

3.6.3 Instruments for measuring rotating speed shall be of the remote reading type having an accuracy of $\pm 1\%$ of the quantity measured.

4 Rating

4.1 General

4.1.1 Heat pumps shall be rated for heating or cooling capacity and electrical input using the test methods given in 4.3.

4.1.2 The ratings shall be marked on a nameplate in accordance with clause 6. Capacity ratings shall be followed by the corresponding voltage and frequency ratings.

4.2 Test conditions for rating

4.2.1 The test conditions for rating the heating or cooling capacity shall be as given in Table 2.

4.2.2 The rating of equipment in which the indoor and outdoor heat exchangers are in separate units shall be determined with the maximum length of interconnecting tubing and size recommended by the manufacturer. Equipment in which the interconnecting tubing is furnished as an integral part of the machine and is not recommended for cutting to length shall be tested with at least 3 m exposed to the outside conditions. The rest of the tubing shall be exposed to inside conditions. The line sizes, insulation and details of installation shall be in accordance with the manufacturer's published recommendations.