

Safety of household and similar electrical appliances

Part 2. Particular requirements

Section 2.40 Electric heat pumps, air conditioners and dehumidifiers

The European Standard EN 60335-2-40 : 1993 has the status of a British Standard

ICS 27.080; 91.140.30

Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the national committees of the following countries:

Austria	Italy
Belgium	Luxembourg
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Finland	Norway
France	Portugal
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom

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Summary of pages

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National foreword

This British Standard has been prepared under the direction of the Light Electrical Engineering Standards Policy Committee and is the English language version of EN 60335-2-40, *Safety of household and similar electrical appliances : Part 2 : Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers* including amendment A51 : 1996, published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by CENELEC from IEC publication 335-2-40 : 1992, second edition, published by the International Electrotechnical Commission (IEC).

The CENELEC Common Modifications have been implemented at the appropriate places in the text and are indicated by a side line in the margin. Parts of the original text that have been modified by CENELEC have been quoted in national annex NA.

This British Standard is to be read in conjunction with BS 3456 : Part 201 : 1990, *General requirements*, including the amendments shown in the following table, which supplement and modify BS 3456 : Part 201.

Amendment to BS 3456 : Part 201 : 1990	Amendment to EN 60335-1 : 1988	Amendment to IEC 335-1 : 1976
Amendment No. 1 : 1990	Amendment No. 2 : 1988	Amendment No. 4 : 1984
Amendment No. 2 : 1990	Amendment No. 5 : 1989	Amendment No. 5 : 1986
Amendment No. 3 : 1990	Amendment No. 6 : 1989	Amendment No. 6 : 1988
Amendment No. 4 : 1992	Amendment No. A51 : 1991	—
Amendment No. 5 : 1992	Amendment No. A52 : 1992	—
Amendment No. 6 : 1992	Amendment No. A53 : 1992	—
Amendment No. 7 : 1993	Amendment No. A54 : 1992	—
Amendment No. 8 : 1993	Amendment No. A55 : 1993	—

The foreword of EN 60335-2-40 makes reference to the 'date of withdrawal',
dow, of the relevant national standard. In this case the relevant national
standard is BS 3456 : Part 2 : Section 2.34 which will cease to be applicable on
1994-03-01. Certification and marks will not be awarded after this date with
respect to BS 3456 : Part 2 : Section 2.34. However, such certification and
marks already awarded may continue to apply to production until 1999-03-01.

Product approval. Attention is drawn to the fact that products conforming to
this British Standard may be approved by the British Electrotechnical Approvals
Board (BEAB) for the purposes of participation in the CENELEC Certification
Agreement and in the CB scheme of the IECEE (details of the BEAB Approval
Scheme are given on the inside back cover).

UDC 64.06-83 : 621.577 : 614.8

ICS 27.080; 91.140.30

Descriptors: Household electrical appliances, heat pumps, air conditioners, safety requirements, protection against electric shock, fire protection, protection against mechanical hazard

English version

Safety of household and similar electrical appliances Part 2 : Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

(includes amendment A1 : 1996)

(IEC 335-2-40 : 1992, modified)

Sécurité des appareils électrodomestiques et
analogues
Partie 2 : Règles particulières pour les pompes à
chaleur électriques, les climatiseurs et les
déshumidificateurs
(inclut l'amendement A1 : 1996)
(CEI 335-2-40 : 1990, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2 : Besondere Anforderungen für elektrisch
betriebene Wärmepumpen, Klimageräte und
Raumluft-Entfeuchter
(enthält Änderung A1 : 1996)
(IEC 335-2-40 : 1992, modifiziert)

This European Standard was approved by CENELEC on 9 March 1993. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

Following a decision taken by the CENELEC Technical Board at their meeting in London on 23 September 1991, the draft prEN 60335-2-40 as prepared by BTTF 49-1 was submitted to the CENELEC Unique Acceptance Procedure (UAP) in December 1991 for acceptance as a European Standard.

A decision was taken at the CENELEC Technical Board meeting in Brussels on 9 March 1993 to ratify the BTTF 49-1 document. However, noting that IEC 335-2-40 which had been firmly based on EN 60335-2-40 had been published, it was agreed that the final text of EN 60335-2-40 should be edited as an endorsement of IEC 335-2-40 with common modifications.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1994-03-01
- latest date of withdrawal of conflicting national standards (dow) 1994-03-01

For products which have complied with the relevant national standards before 1994-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-03-01.

This standard has to be used in conjunction with EN 60335-1 : 1988, *Safety of household and similar electrical appliances*, Part 1 : *General requirements*, including its amendments A2 : 1988, A5 : 1989, A6 : 1989, A51 : 1991, A52 : 1992, A53 : 1992, A54 : 1992 and A55 : 1993.

Where a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. Where this standard states 'addition', 'modification' or 'replacement', the relevant text of Part 1 is to be adapted accordingly. Subclauses or figures which are in addition to those in Part 1 are numbered starting with 101. Additional appendices are lettered AA, BB, etc. Other publications quoted in this standard:

- EN 60335-2-21 : 1992 *Safety of household and similar electrical appliances —*
Part 2 : Particular requirements for storage water heaters
- EN 60529 : 1991 *Degrees of protection provided by enclosures (IP Code)*

- HD 277 S1 : 1985 *Safety of household and similar electrical appliances —*
Part 2 : Particular requirements for motor-compressors
- HD 566 S1 : 1990 *Thermal evaluation and classification of electrical insulation*
- ISO 817 : 1974 *Organic refrigerants —*
Number designation
- ISO R1662 : 1971 *Refrigerating plants —*
Safety requirements
- prEN 378 (in preparation)

The following print types are used:

- requirements proper: in roman type;
- test specifications: in italic type;
- explanatory matter: in smaller roman type.

Foreword to amendment A51

A proposal to amend EN 60335-2-40 : 1993, document CLC/TC 61(FR)278, was discussed during the Dublin meeting in May 1995, when it was decided to submit a draft for an amendment to the formal vote.

This draft was circulated as prAA in January 1996 and was ratified by CENELEC as amendment A51 on 1996-07-02.

This amendment has been prepared by the secretariat of CENELEC Technical Committee TC 61.

The following dates are applicable:

- latest date of publication of an identical national standard (dop) 1997-01-01
- date of withdrawal of conflicting national standards (dow) 1997-01-01

For products which have complied with EN 60335-2-40 : 1993 before 1997-01-01, as shown by the manufacturer or by a certification body, this previous standard is not to be applied for production after this date.

This amendment supplements or modifies the corresponding clauses of EN 60335-2-40 : 1993.

There are no special national conditions causing a deviation from this amendment.

NOTE. Amendment numbers commencing A1 refer to the endorsement of IEC amendments, while those commencing A51 originate in CENELEC.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

Part 2: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

1 Scope

This clause of part 1 is applicable except as follows:

1.1 *Replacement:*

This part of EN 60335 applies to the safety of electric heat pumps, including heat pumps for sanitary (potable) hot water, air-conditioners, and dehumidifiers incorporating sealed motor-compressors.

The appliances referenced above may consist of one or more factory made assemblies. If provided in more than one assembly, the separate assemblies are to be used together, and the requirements are based on the use of matched assemblies.

A definition of "sealed motor-compressor" is given in HD 277 S1.

Requirements for refrigeration safety are covered by ISO R1662, and requirements for containers intended for storage of the heated water included in sanitary hot water heat pumps are, in addition, covered by EN 60335-2-21.

Supplementary electric heaters, or a provision for their separate installation, are within the scope of this standard, but only heaters which are designed as a part of the appliance package, the controls being incorporated in the appliance.

This standard does not apply to

- appliances designed exclusively for industrial processing;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

For appliances intended for use in vehicles or on board ships or aircraft, additional requirements may be necessary.

Attention is drawn to the fact that in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and the national authorities responsible for building design and regulation. In the case of appliances for permanent connection to the water supply system, all relevant requirements shall be observed.

2 Definitions

This clause of part 1 is applicable except as follows:

2.2.4 *Addition:*

If the appliance comprises electrical accessories, including fans, the rated input is based upon the total maximum electrical input with all accessories energized, when operating continuously under the appropriate environmental conditions. If the heat pump can be operated in the heating or cooling mode, the rated input is based upon the input in the heating or in the cooling mode, whichever is the greater.

2.2.29 *Replacement:*

Conditions of adequate heat discharge denote the conditions that apply when the appliance is mounted as in normal use and is operating under the most severe operating conditions specified by the manufacturer.

Additional definitions:

2.2.101 heat pump: Appliance which takes up heat at a certain temperature and releases heat at a higher temperature.

NOTE - When operated to provide heat (e.g., for space heating or water heating), the appliance is said to operate in the heating mode; when operated to remove heat (for example, for space cooling), it is said to operate in the cooling mode.

2.2.102 dehumidifier: Encased assembly designed to remove moisture from its surrounding atmosphere. It includes an electrically operated refrigeration system and the means to circulate air. It also includes a drain arrangement for collecting and storing and/or disposing of the condensate.

2.2.103 dehumidification - comfort: Dehumidification to reduce the humidity within a space to a level to satisfy the requirements of the occupants.

2.2.104 dehumidification - process: Dehumidification to reduce the humidity within a space to a level necessary for the process or the storage of goods and/or materials or the drying out of the building fabric.

2.2.105 dehumidification - heat recovery: Dehumidification where the latent and sensitive heat removed from the space together with the compressor heat is reused in another application rather than rejected outside to waste.

2.2.106 wet-bulb temperature (WB): Temperature indicated when the temperature-sensitive element in a wetted wick has reached a state of constant temperature (evaporative equilibrium).

2.2.107 dry-bulb temperature (DB): Temperature indicated by a dry, temperature-sensitive element shielded from the effects of radiation.

2.2.108 condenser: Heat exchanger in which refrigerant vapour is liquefied by extraction of heat.

2.2.109 compressor - evaporator unit: Assembly including one or more compressors and evaporators, with associated controls and wiring, intended for field connection to a remote condenser.

2.2.110 condensing unit: Assembly that may include one or more compressors, fans and condensers with interconnecting refrigerant piping, associated controls, and wiring. A condensing unit may be intended for field connection to a remote evaporator, which may be an integral part of other refrigeration or air conditioning appliances.

2.2.111 evaporator: Heat exchanger in which refrigerant liquid is vaporized by absorption of heat.

2.2.112 heat exchanger: Device specifically designed to transfer heat between two physically separated fluids.

2.2.113 indoor heat exchanger: Heat exchanger designed to transfer heat to the indoor parts of the building or to the indoor hot water supplies (e.g., sanitary water) or to remove heat there from.

2.2.114 outdoor heat exchanger: Heat exchanger designed to remove or release heat from the heat source, (for example, ground water, outdoor air, exhaust air, water or brine).

2.2.115 electric heating element assembly: Electric heating element or group of elements, and frame or adapter for holding the assembly together.

2.2.116 supplementary heater: Heater provided as part of the appliance to supplement or replace the output of the refrigerant circuit of the appliance by operation in conjunction with, or instead of, the refrigeration circuit.

2.2.117 air conditioner: Encased assembly or assemblies designed as an appliance to provide delivery of conditioned air to an enclosed space, room or zone. It includes an electrically operated refrigeration system for cooling and possibly dehumidifying the air. It may have means for heating, circulating, cleaning and humidifying the air.

2.2.118 sanitary hot water heat pump: Heat pump intended to transfer heat to sanitary (potable) water.

2.2.119 sanitary (potable) water: Water suitable for human consumption.

2.2.120 pressure-limiting device: Mechanism that automatically responds to a pre-determined pressure by stopping the operation of the pressure imposing element.

2.2.121 pressure-relief device: Pressure actuated valve or rupture member which functions to relieve excessive pressure automatically.

2.2.122 self-contained unit: Complete appliance, in suitable frames or enclosures, that is fabricated and shipped in one or more sections, and has no refrigerant containing parts connected in the field other than by companion or block valves.

NOTES

- 1 A self-contained unit in a single frame or enclosure is called a single package unit.
- 2 A self-contained unit in more than one frame enclosure is called a split package unit.

2.2.123 Void

2.2.124 appliances not accessible to the general public: Appliances which are intended to be maintained by qualified service personnel and located either in machine rooms or at high level or in secured rooftop areas.

3 General requirement

This clause of part 1 is applicable.

4 General notes on tests

This clause of part 1 is applicable except as follows:

4.5 Replacement:

The tests and test conditions of clauses 10 and 11 are carried out under the most severe operating conditions within the operating temperature range specified by the manufacturer (see 7.12).

4.9 Addition:

Appliances are operated continuously during each of the tests. Any controls which regulate the temperature or humidity of the conditioned space shall be short-circuited during the test.

4.10 Addition:

For split-system appliances, the refrigerant lines shall be installed in accordance with the installation instructions. The refrigerant line length shall be the maximum length stated in the installation instructions or 7,5 m, whichever is the shorter. The thermal insulation of the refrigerant lines shall be applied in accordance with the installation instructions.

Additional subclauses:

4.101 Motor-compressors are also subjected to the relevant test of 19.3 of HD 277 S1, unless the motor-compressor complies with that standard, in which case it is not necessary to repeat these tests.

4.102 Appliances designed for use with supplementary heaters are tested with the heaters having the highest input ratings. Tests on appliances having lower rated heaters may also be required if it can be determined that more severe results can occur.

5 Rating

This clause of part 1 is applicable, except as follows:

5.1 Replacement:

The maximum rated voltage is:

- 250 V for portable single-phase appliances;
- 600 V for all other appliances.

Compliance is checked by inspection of the marking.

6 Classification

This clause of part 1 is replaced as follows: