

Safety of household and similar electrical appliances —

Part 2.40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

The European Standard EN 60335-2-40:1997, with the incorporation of amendments A1:2000 and A11:2004, has the status of a British Standard

ICS 27.080; 91.140.30

National foreword

This British Standard is the English language version of EN 60335-2-40:1997, including amendments A1:2000 and A11:2004. It was derived by CENELEC from IEC 60335-2-40:1995, including amendment 1:2000 and 2:2004. It supersedes BS EN 60335-2-40:1993 which will be withdrawn on 2000-02-01.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags [C] [C].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1]. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by [A1] [A1].

The UK participation in its preparation was entrusted to Technical Committee CPL/61, Safety of electrical appliances, to Subcommittee CPL/61/4, Room air-conditioners, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

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This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 March 1998

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English version

Safety of household and similar electrical appliances — Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

(includes amendment A1:2000 and A11:2004)
(IEC 60335-2-40:1995 + A1:2000 + A11:2004, modified)

Sécurité des appareils
électrodomestiques et analogues —
Partie 2-40: Règles particulières pour les
pompes à chaleur électriques, les
climatiseurs et les déshumidificateurs
(inclut les amendements A1:2000 et A11:2004)
CEI 60335-2-40:1995 + A1:2000 + A11:2004,
modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke —
Teil 2-40: Besondere Anforderungen für
elektrisch betriebene Wärmepumpen,
Klimageräte und Raumluft-Entfeuchter
(enthält Änderungen A1:2000 und A11:2004)
(IEC 60335-2-40:1995 + A1:2000 + A11:2004,
modifiziert)

This European Standard was approved by CENELEC on 1997-10-01. Amendment A1 was approved by CENELEC on 2000-04-01, and amendment A11 was approved by CENELEC on 2004-09-22. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovenia, 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

This draft was circulated in May 1997 and was approved by CENELEC as EN 60335-2-40 on 1997-10-01.

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

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-02-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2000-02-01

For products which have complied with EN 60335-2 40:1993 and its amendment A51:1996 before 2000-02-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2005-02-01.

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This Part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric heat pumps, air-conditioners and dehumidifiers.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text of Part 1 is to be adapted accordingly.

Subclauses, tables and figures which are additional to those in Part 1 are numbered starting with 101. Annexes which are additional to those in Part 1 are lettered AA, BB, etc.

There are no special national conditions causing a deviation from this European Standard, other than those listed in Annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

NOTE The following print types are used:

- requirements: in roman type;
- test specifications: in italic type;
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 2. When a definition of Part 1 concerns an adjective, the adjective and the associated noun are also in bold.

Foreword to amendment A1

The text of document 61D/82/FDIS, future amendment to IEC 60335-2-40:1995 prepared by SC 61D of the IEC Technical Committee 61, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60335-2-40 on 2000-04-01.

The following dates are applicable:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-01-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2003-04-01

This amendment supplement or modifies the corresponding clauses of EN 60335-2-40:1997.

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

There are no national deviations from this amendment.

Introduction

An investigation by CENELEC TC 61 has shown that all risks from products within the scope of this standard are fully covered by the Low Voltage Directive, 73/23/EEC. If the product has mechanical moving parts, a risk assessment in accordance with the Machinery Directive, 89/392/EEC, has shown that the risks are mainly of electrical origin and consequently this directive is not applicable. However, the relevant essential safety requirements of the Machinery Directive are covered by this standard together with the principal objectives of the Low Voltage Directives. Products within the scope of this standard may incorporate pressurized components for which the Pressure Equipment Directive, 97/23/EC, applies. Further guidance is given in Annex ZAA.

Foreword to amendment A11

A proposal to amend EN 60335-2-40, document CLC/TC 61(SEC)1397, was discussed during the Brussels meeting of CENELEC TC 61 in November 2002, when it was decided to submit a draft for an amendment to the Unique Acceptance Procedure.

The draft was circulated in June 2003 and was approved by CENELEC as amendment A11 to EN 60335-2-40:1997 on 2004-09-22.

The following dates are applicable:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-10-01
- date on which national standards conflicting with the amendment have to be withdrawn (dow) 2007-03-01

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1 Scope

This clause of Part 1 is replaced by:

This part of IEC 60335 applies to the safety of electric **heat pumps**, including **sanitary hot water heat pumps**, **air-conditioners**, and **dehumidifiers** incorporating sealed motor-compressors  and room fan coils , their maximum **rated voltages** being not more than 250 V for single phase appliances and 600 V for all other appliances.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard.

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.

NOTE 1 A definition of “sealed motor-compressor” is given in IEC 60335-2-34.

NOTE 2 Requirements for refrigeration safety are covered by ISO 5149, and requirements for containers intended for storage of the heated water included in **sanitary hot water heat pumps** are, in addition, covered by IEC 60335-2-21.

NOTE 3 For appliances using flammable refrigerants, additional requirements are under consideration.

Supplementary 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.

NOTE 4 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- for appliances intended to be used in tropical countries special requirements may be necessary;
- for appliances subjected to pressure, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities. In the case of appliances for permanent connection to the water supply system, all relevant requirements need to be observed.

NOTE 5 This standard does not apply to

- humidifiers intended for use with heating and cooling equipment (IEC 60335-2-88);
- 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).

2 Definitions

This clause of Part 1 is applicable except as follows:

2.2.4 Addition:

NOTE If the appliance comprises electrical accessories, including fans, the **rated power input** is based upon the total maximum **electrical power 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 power input** is based upon the input in the heating or in the cooling mode, whichever is the greater.

2.2.9 Replacement:

normal operation

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

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.

2.102

sanitary hot water heat pump

heat pump intended to transfer heat to water suitable for human consumption

2.103

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

2.104

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

2.105

dehumidification — comfort

dehumidification to reduce the humidity within a space to a level to satisfy the requirements of the occupants

2.106

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

2.107

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

2.108

wet-bulb temperature (WB)

temperature indicated when the temperature-sensitive element in a wetted wick has reached a state of constant temperature (evaporative equilibrium)

2.109

dry-bulb temperature (DB)

temperature indicated by a dry, temperature sensitive element shielded from the effects of radiation

2.110

evaporator

heat exchanger in which refrigerant liquid is vaporized by absorption of heat

2.111

heat exchanger

device specifically designed to transfer heat between two physically separated fluids

2.112

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

2.113

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)

2.114

supplementary heater

electric 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

2.115**pressure-limiting device**

mechanism that automatically responds to a predetermined pressure by stopping the operation of the pressure imposing element

2.116**pressure-relief device**

pressure actuated valve or rupture member which functions to relieve excessive pressure automatically

2.117**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

NOTE 1 A self-contained unit in a single frame or enclosure is called a single package unit.

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

2.118**appliances accessible to the general public**

appliances intended to be located in residential buildings, or in commercial buildings

2.119**appliances not accessible to the general public**

appliances which are intended to be maintained by qualified service personnel and located either in machine rooms and the like or at a level not less than 2,5 m or in secured rooftop areas

A1 2.120**fan coil/air handling unit**

factory-made assembly which provides one or more of the functions of forced circulation of air, heating, cooling, dehumidification and filtering of air, but which does not include the source of cooling or heating.

The device is normally designed for free intake of air from a room and delivery of air into the same room, but may be applied with duct work. This device may be designed for furred-in application or with an enclosure for application within the conditioned space. A1

3 General requirement

This clause of Part 1 is applicable.

4 General conditions for the tests

This clause of Part 1 is applicable except as follows:

4.6 Addition:

Any controls which regulate the temperature or humidity of the conditioned space are rendered inoperative during the test.

4.7 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. Annex AA provides examples of such temperature conditions.

4.10 Addition:

For split-package units, 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.

4.101 *Motor-compressors are also subjected to the relevant test of 19.3 of IEC 60335-2-34, unless the motor-compressor complies with that standard, in which case it is not necessary to repeat these tests.*

5 Void

6 Classification

6.1 Modification:

Appliance shall be of **class I**, **class II** or **class III**.

6.2 Addition:

Appliances shall be classified according to degree of protection against harmful ingress of water in accordance with IEC 60529.

- Appliances or parts of appliances intended for outdoor use shall be at least IPX4.
- Appliances intended only for indoor use (excluding laundry rooms) may be IPX0.
- Appliances intended to be used in laundry rooms shall be at least IPX1.

6.101 Appliances shall be classified according to the accessibility either as **appliance accessible to the general public** or as **appliance not accessible to the general public**.

7 Marking and instructions

This clause of Part 1 is applicable except as follows:

7.1 Modification:

Replace the second dash by:

- symbol for nature of supply including number of phases, unless for single phase operation.

Addition:

- **rated frequency**;
- the mass of the refrigerant, or of each refrigerant in a blend other than those of the azeotropic type;
- the refrigerant identification:

for a single component refrigerant, one of the following:

- the chemical name;
- the chemical formula;
- the refrigerant number;

for a blended refrigerant, one of the following:

- the chemical name of each of the components;
- the chemical formula for each of the components;
- the refrigerant numbers of each of the components;
- the refrigerant number of the refrigerant blend.
- permissible excessive operating pressure for the storage tank (for **sanitary hot water heat pumps**);
- for the refrigerant circuit; should the permissible excessive operating pressure for the suction and discharge side differ, a separate indication is required;
- **A₁** the maximum operating pressure for the heat exchanger; **A₂**
- IP number according to degree of protection against ingress of water, other than IPX0.

Appliances shall be marked with all of the designations and the rated inputs of the **supplementary heaters** for which they are intended to be used, and shall have provision for identifying the actual heater that is field installed.

Unless it is evident from the design, the enclosure of the appliance shall be marked, by words or by symbols, with the direction of the fluid flow.

7.12 Addition:

For **appliances not accessible to the general public**, the classification according to **6.101** shall be included.

7.12.1 Addition:

In particular, the following information shall be supplied:

- that the appliance shall be installed in accordance with national wiring regulations;
- the dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures;
- for appliances with **supplementary heaters**, the minimum clearance from the appliance to combustible surfaces;
- a wiring diagram with a clear indication of the connections and wiring to external control devices and **supply cord**;
- the range of external static pressures at which the appliance was tested (add-on **heat pumps**, and appliances with **supplementary heaters**, only);
- the method of connection of the appliance to the electrical supply and inter-connection of separate components;
- indication of which parts of the appliance are suitable for outdoor use, if applicable;
- details of type and rating of fuses;
- details of supplementary heating elements that may be used in conjunction with the appliance, including fitting instructions either with the appliance or with the **supplementary heater**;
- maximum and minimum water or brine operating temperatures;
- maximum and minimum water or brine operating pressures.

Open storage tanks of **heat pumps** for water heating shall be accompanied by an instruction sheet which shall state that the vent shall not be obstructed.

Ⓒ For appliances which are intended to be permanently connected to fixed wiring and which may have leakage currents exceeding 10 mA, the instructions for installation shall specify the rating of the residual current device (RCD) to be installed. Ⓒ

7.15 Addition:

A marking may be located on a panel that can be removed for installation or service, providing that the panel shall be in place for the intended operation of the appliance.

7.101 A marking shall be provided for a replaceable fuse or a replaceable overload **protective device** provided as a part of a product or remote control assembly. It shall be visible when the cover or door of the compartment is open.

- This marking shall specify the rating of the fuse in amperes, the type and voltage rating; or
- This marking shall specify the manufacturer and model designation of the replaceable overload **protective device**.

7.102 If the product is intended for permanent connection to fixed wiring with aluminium wires, the marking shall so state.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.