SLOVENSKI STANDARD

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Household and similar electrical appliances - Safety -- Part 2-79: Particular requirements for high pressure cleaners and steam cleaners

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke -- Teil 2-79: Besondere Anforderungen für Hochdruckreiniger und Dampfreiniger

Appareils électrodomestiques et analogues - Sécurité -- Partie 2-79: Règles particulières pour les appareils de nettoyage à haute pression et les appareils de nettoyage à vapeur

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EUROPEAN STANDARD

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English version

Household and similar electrical appliances - Safety - Part 2-79: Particular requirements for high pressure cleaners and steam cleaners

(IEC 60335-2-79:2002 + A1:2004 + A2:2007, modified)

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This European Standard was approved by CENELEC on 2009-09-01. 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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Foreword

In the light of the necessity to adapt EN 60335-2-79 with regard to the requirements of the Machinery Directive 2006/42/EC, a draft was prepared by CENELEC TC61/WG6/J in co-operation with the MD Consultant, taking also into account the results of CENELEC TC61/WG6 work on EN 60335-1.

The approach to amend EN 60335-2-79:2004 aiming toward listing the standard under the MD was discussed and approved during the Kista meeting of CENELEC TC 61 in June 2008 (see CLC/TC 61/SEC/1649), when it was decided to submit a draft for an amendment to the Unique Acceptance Procedure.

The draft was circulated as FprAC in December 2008 and was approved by CENELEC as a new edition of EN 60335-2-79 on 2009-09-01.

This European Standard supersedes EN 60335-2-79:2004 + A1:2006 + A2:2007.

In this European Standard the common modifications to the International Standard IEC 60335-2-79:2002 + A1:2004 + A2:2007 are indicated by a vertical line in the left margin of the text.

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)	2009-12-29
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2009-12-29

This Part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 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 high pressure cleaners and steam cleaners.

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

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2006/42/EC. See Annex ZZ.

NOTE 1 The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

– unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.;

– subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 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 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

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.

Contents

Introduction

It has been assumed in the drafting of this European Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of machines when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of machines.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the machine is connected to the supply mains. However, national wiring rules may differ.

If a machine within the scope of this standard also incorporates functions that are covered by another Part 2 of EN 60335, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

This standard is a product family standard dealing with the safety of machines and takes precedence over horizontal and generic standards covering the same subject.

A machine that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

A machine employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

1 Scope

This clause of Part 1 is replaced by the following.

This European Standard deals with the safety of high pressure cleaners without traction drive, intended for household and commercial indoor or outdoor use, having a **rated pressure** not less than 2,5 MPa and not exceeding 35 MPa.

It also applies to steam cleaners and those parts of hot water high pressure cleaners incorporating a steam stage which have a capacity not exceeding 100 l, a **rated pressure** not exceeding 2,5 MPa and a product of capacity and **rated pressure** not exceeding 5 MPa·l.

The following power systems of the drive for the high pressure pump are covered:

– mains powered motors up to a **rated voltage** of 250 V for single-phase machines and 480 V for other machines,
– battery powered motors,
– internal combustion engines,
– hydraulic or pneumatic motors.

This part 2 applies in conjunction with EN 60335-1:2002 and its amendments, which is referred to in this text as “Part 1”. This part 2 supplements or modifies the corresponding clauses of Part 1 as indicated in the text.

This standard does not apply to

– high pressure water jet machines as covered by EN 1829-1;
– steam cleaners intended for domestic use as covered by IEC 60335-2-54;
– machines designed to be part of a production process;
– machines designed for use in vehicles or on board of ships or aircraft;
– machines designed for use in corrosive or explosive environments (dust, vapour or gas);
– cleaners designed for medical application;
– hand-held motor-operated electric tools as covered by IEC 60745 (series);
– transportable motor-operated electric tools as covered by IEC 61029 (series);
– machines for application of coating;

NOTE Z101 EN 1953 gives requirements for atomising and spraying equipment for coating materials. EN 12621 gives requirements for machinery for the supply and circulation of coating and/or auxiliary materials under pressure.

– agricultural sprayers;

NOTE Z102 EN 907 gives requirements for sprayers and liquid fertilizer distributors for agricultural and forestry purposes.

– non-liquid, solid abrasive cleaners.

NOTE Z103 Attention is drawn to the fact that in many countries additional requirements on the safe use of the equipment covered may be specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-54, *Household and similar electrical appliances – Safety – Part 2-54: Particular requirements for surface cleaning appliances for household use employing liquids or steam*

IEC 60364-1, *Electrical installations of buildings – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60745 series, *Hand-held motor-operated electric tools – Safety*

IEC 61029 series, *Safety of transportable motor-operated electric tools*

IEC 61558-2-3, *Safety of power transformers, power supply units and similar – Part 2-3: Particular requirements for ignition transformers for gas and oil burners*

IEC 61770, *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose sets*

ISO 3743-1, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering method for small, movable sources in reverberant fields – Part 1: Comparison method for hard-walled test rooms*

ISO 3744, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering method for an essentially free field over a reflecting plane*

ISO 4871, *Acoustics – Declaration and verification of noise emission values of machinery and equipment*

ISO 5349-1, *Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1: General requirements*

ISO 11203, *Acoustics – Noise emitted by machinery and equipment – Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*

EN 1829-1, *High pressure water jet machines – Safety requirements – Part 1: Machines*[*)]

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation
conditions under which the machine is operated in normal use

It denotes the operation at **rated flow** and **rated pressure** with the appropriate nozzle and **hose line** fitted, all strainers and filters in a clean operating condition and the **unloader valve** set to the **rated pressure**. The **water heater**, if fitted, is operated at maximum power. Electric motor driven machines are supplied at **rated voltage**.

Power outlets for accessories are loaded with a resistive load in accordance with the marking.

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*) At draft stage.

The burner is operated at rated power. Machines designed for operation at more than one rated power setting are additionally tested at the most disadvantageous power.

On machines designed for use with a flue pipe, a section of flue pipe is attached to the machine. Flue gas determinations are taken in this flue pipe.

The draught is adjusted as recommended in the instructions

3.101
unloader valve
pressure operated device which, when the pump pressure exceeds a preset value, releases the pressure and leads the excess fluid into the inlet system. In addition it bypasses the total pump flow at reduced pressure when its outlet flow is cut off

3.102
safety valve
pressure operated device which, when the pump or steam cleaner pressure exceeds a preset value, releases the pressure and which may return the excess fluid or steam either to the inlet system or into the atmosphere

3.103
rated pressure
maximum working pressure at the pressure generator during **normal operation**

3.104
allowable pressure
maximum pressure up to which a machine and/or parts of the machine may be subjected without impairing its safety

3.105
rated flow
maximum flow at **rated pressure** at the nozzle during **normal operation**

3.106
water heater
device for heating the **cleaning agent** by means of electricity, gas, liquid fuel or heat exchange

3.107
cleaning agent
water with or without the addition of gaseous, soluble or miscible detergent or solid abrasive

3.108
pressure switch
device which, in response to varying fluid pressure, provides a controlling function at a pre-set value

3.109
flow switch
device which, in response to a varying rate of fluid flow, provides a controlling function at a pre-set value

3.110
flame safety control
control device that responds directly to flame properties sensing the presence of flame and, in event of ignition failure or unintentional flame extinguishment, causes safety shut down

NOTE **Flame safety controls** are also known as flame failure devices or primary safety controls.

3.111
trigger gun
hand-held spraying device where the flow of the **cleaning agent** is regulated by an integrated manually operated control device

3.112
continuous ignition
ignition of an oil or gas fired burner that is continuously maintained throughout the time the burner is operational, whether the burner is firing or not

3.113
rated temperature
maximum temperature of the **cleaning agent** during **normal operation**

3.114
pencil jet nozzle
nozzle that gives a concentrated, parallel water jet

NOTE **Pencil jet nozzles** are also known as needle jet nozzles, solid jet nozzles or 0 degree jet nozzles.

3.115
water jetter
pipe-cleaning device, connected to and controlled by a trigger gun, consisting of a high pressure hose and a cleaning head with nozzles

3.116
motorized cleaning head
hand-held or hand-guided cleaning device connected to the machine, with an integrated electrical motor

3.117
low pressure accessory
device, connected to and controlled by a **trigger gun**, with large nozzle openings generating a pressure below **rated pressure**

NOTE Typical examples of **low pressure accessories** are washing brushes, foam nozzles, washing sponges.

3.118
hand-guided machine
machine that needs to be moved on the floor

3.Z101
maximum flow rate
highest possible flow at the nozzle

NOTE Typically, the **maximum flow rate** occurs at working pressures lower than **rated pressure** and with a nozzle designed for spraying of **cleaning agents**.

3.Z102
hose line
assembly of high pressure hoses mounted with appropriate fittings

3.Z103
guard
part of the machine specifically designed to provide protection by means of a physical barrier

3.Z104
operator
person installing, operating, adjusting, maintaining, cleaning or moving the machine

3.Z105
test solution
a solution which consists of 20 g of NaCl and 1 ml of a solution of 28 % by mass of dodecyl sodium sulphate in each 8 l of water

NOTE The chemical designation of dodecyl sodium sulphate is $C_{12}H_{25}NaSO_4$.

3.Z106
risk
probability of being exposed to an injury or damage to health

3.Z107
commercial use
intended use of machines covered by this standard in a professional way

For the purpose of this standard **commercial use** may be read as not intended for domestic use

4 General requirement

This clause of Part 1 is applicable except as follows.

Replace the first paragraph by the following:

Machines shall be constructed so that they function safely so as to cause no danger to persons or surroundings during normal use, even in the event of carelessness, and during installation, adjusting, maintenance, cleaning, repairing or transportation.

Addition:

For the purpose of this standard, the term 'appliance' as used in Part 1 is to be read as 'machine'.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

Addition:

5.Z101 *The **test solution** is stored in a cool atmosphere and used within seven days after its preparation.*

5.Z102 ***Protective devices*** *and* ***safety valves*** *shall remain fully functional but not trip under* ***normal operation****.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

Machines shall be one of the following classes with respect to the protection against contact with **live parts**:

- **class I,**
- **class II,** or
- **class III**.

However, **hand-held appliances** and hand-held parts of steam cleaners and high pressure cleaners shall be **class II** or **class III.**

Compliance is checked by inspection and by the relevant tests.

6.2 *Replacement:*

The machines shall have a degree of protection against harmful ingress of water according to Table 101:

Table 101 – Degree of protection against harmful ingress of water

		Protection class (electric shock)	**Protection degree** (IEC 60529)
Steam cleaners	for indoor use only	I – II	IPX4
		III	IPX3
	for outdoor use	I-II-III	IPX5
	Hand-held parts	II	IPX7
		III	IPX3
High pressure cleaners	**Hand-held appliances**	II-III	IPX7
	Other types of machines	I-II-III	IPX5
	Hand-held parts	II-III	IPX7

However, **fixed appliances** that are specified for installation in a separate room, where they will not be subject to spillage or splashing of water, shall be at least IPX0.

Compliance is checked by inspection and by the relevant tests.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Replace the 4th dashed item as follows:*

– the business name and address of the manufacturer and, if applicable, his authorized representative; any address shall be sufficient to ensure postal contact;

Addition:

Machines shall be marked in addition with the following:

– serial number, if any;
– designation of the machine, may be achieved by a combination of letters and/or numbers;
– designation of series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers and may be combined with the designation of machine;
– the year of construction, that is the year in which the manufacturing process is completed;
– **rated pressure** in Pascal;
– **allowable pressure** in Pascal;
– **rated flow** in litre per minute;
– **maximum flow rate** in litre per minute, if necessary. The number of flow rate markings is limited to two;

- maximum **rated temperature** where this is above 50 ºC;
- maximum power of the water heater in kW, if applicable (for electric heaters the input power, for gas-fired or oil-fired heaters the output power).

Machines equipped with wheels shall be marked with the mass of the most usual configuration in kg.

A yellow label with black lines showing the substance of the warning symbols in accordance with Figure 101 shall be permanently fixed to the machine.

Machines shall be marked in addition with the following, if applicable:

- When the surface of a flue or duct for exhaust gases from the heater exceeds a temperature rise of 60 K, a warning notice shall be fitted near to the hot surface stating

  WARNING Hot. Do not touch.

  This wording may be replaced by symbol IEC 60417-5041. The height of the lettering shall be not less than 4 mm.
- Steam cleaners shall be marked with symbol IEC 60417-5597.
- Machines not intended to be connected to the potable water mains shall be marked with the symbol according to Figure 104, coloured as shown or in monochrome colour.
- Machines that are designed to be used indoors and are powered by internal combustion engines, except LPG-powered engines, shall be marked with the symbol according to Figure 105.

Compliance is checked by inspection.

7.1.Z101 All high pressure hoses shall be marked with the following:

- **allowable pressure** in Pascal or bar;
- maximum temperature in degrees Celsius;
- business name of the manufacturer of the hose and the date of production. These data may be coded.

Compliance is checked by inspection.

7.1.Z102 All high pressure accessories (e.g. **trigger gun**, spray lance) shall be marked with the following:

- **allowable pressure** in Pascal or bar;
- maximum temperature in degrees Celsius.

Compliance is checked by inspection.

7.1.Z103 **Motorized cleaning heads** shall be marked with their model or type reference.

Compliance is checked by inspection.

7.1.Z104 Power outlets for accessories shall be marked with the maximum load in watts on the power outlet or close to it.

Compliance is checked by inspection.