IEC 60335-2-79

Edition 5.0 2021-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

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

IEC 60335-2-79:2021-06(en-fr)

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ELECTROTECHNICAL
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ELECTROTECHNIQUE
INTERNATIONALE

ICS 97.080

ISBN 978-2-8322-9933-3

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CONTENTS

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-79: Particular requirements for high pressure cleaners and steam cleaners

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60335-2-79 has been prepared by subcommittee 61J: Electrical motor-operated cleaning appliances for commercial use, of IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2016. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition (minor changes are not listed):

– editorial and technical alignment with IEC 60335-1:2020;
– clarification on hand-held and battery-operated high pressure cleaners;
– general editorial improvements.

The text of this International Standard is based on the following documents:

Draft	Report on voting
61J/739/CDV	61J/746A/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for high pressure cleaners and steam cleaners.

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

NOTE 2 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 sub clause 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.

NOTE 3 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.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

It has been assumed in the drafting of this International 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 appliances 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 appliances.

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 appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 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.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

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

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance 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.

An appliance 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-79: Particular requirements for high pressure cleaners and steam cleaners

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 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.

They are not equipped with a traction drive. 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-operated motors,
– internal combustion engines,
– hydraulic or pneumatic motors.

This standard does not apply to

– high pressure water jet machines having a **rated pressure** exceeding 35 MPa;

NOTE 101 In Europe, those machines are covered by EN 1829-1.

– liquid or steam cleaners intended for domestic use (IEC 60335-2-54);
– hand-held and transportable motor-operated electric tools (IEC 60745 series, IEC 61029 series, IEC 62841 series);
– appliances for medical purposes (IEC 60601);
– agricultural sprayers (ISO 4254-6);
– non-liquid, solid abrasive cleaners;
– machines designed to be part of a production process;
– machines designed for use in corrosive or explosive environments (dust, vapour or gas);
– machines designed for use in vehicles or on board of ships or aircraft.

NOTE 102 Attention is drawn to the fact that in many countries additional requirements on the safe use of the equipment covered can 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 60364-1, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

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

Replacement:

IEC 61770:2008, *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Addition:*
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**.

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.

3.1.12 *Addition:*
Functions not controlling the starting and stopping of the high pressure jet exiting the nozzle are not regarded as remote operation. Functions for other purposes e.g. detergent or water flow control are not considered to be remote operation.

3.5.2 *Addition:*

NOTE 101 to entry: High pressure cleaners are regarded as **hand-held**, if the motor/pump unit and the **trigger gun**/spray lance/nozzle element form a single unit while in operation and being held by hand. High pressure cleaners where the motor/pump unit and the **trigger gun** are separated and connected to each other through a high pressure **hose line** are not regarded as **hand-held**.

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
maximum flow rate
highest possible flow rate at the nozzle

Note 1 to entry: Typically, the **maximum flow rate** occurs at working pressures lower than **rated pressure** and with a nozzle designed for spraying of **cleaning agents**.

3.107
rated temperature
maximum temperature of the **cleaning agent** during **normal operation**

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

3.111
pencil jet nozzle
nozzle that gives a concentrated, parallel water jet

Note 1 to entry: **Pencil jet nozzles** are also known as needle jet nozzles, solid jet nozzles or zero degree jet nozzles.

3.112
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

3.113
cleaning agent
water with or without the addition of gaseous, soluble or miscible detergent or solid abrasive

3.114
water heater
device for heating the **cleaning agent** by means of electricity, gas, liquid fuel or heat exchange

3.115
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

3.116
primary 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 1 to entry: **Primary safety controls** are also known as flame failure devices or flame safety controls.

3.117
motorized cleaning head
hand-held or hand-guided cleaning device connected to the machine, with an integrated electrical motor

3.118
low pressure accessory
device, connected to and controlled by a **trigger gun**, with large nozzle openings generating a pressure below **rated pressure**

Note 1 to entry: Typical examples of **low pressure accessories** are washing brushes, foam nozzles, washing sponges.

3.119
hand-guided machine
machine that needs to be moved on the floor

3.120
hose line
assembly of high pressure hoses mounted with appropriate fittings

3.121
guard
part of the machine specifically designed to provide protection by means of a physical barrier, such as a casing, a shield, a cover, a screen, a door, an enclosure or a fence; other parts of the machine that fulfil a primarily operational function, for example, the frame of the machine, may also fulfil a protective function but are not referred to as **guards**

Note 1 to entry: Three main kinds of **guards** can be distinguished: fixed **guards**, interlocking moveable **guards** and adjustable **guards**. Interlocking movable **guards** are required where frequent access is envisaged, while fixed **guards** can be used where frequent access is not envisaged.

3.122
operator
person installing, operating, adjusting, cleaning, moving, or performing **user maintenance** on the machine

3.123
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 1 to entry: The chemical designation of dodecyl sodium sulphate is $C_{12}H_{25}NaSO_4$.

3.124
reaction force
force which reacts on the spraying device (and thereby on the **operator**) as a result of the action force by the water jet leaving the nozzle

Note 1 to entry: The **reaction force** can also be called recoil force. For other standards with regard to hand-arm-vibration, the technical term is feed force (e.g. ISO 28927 series) or push force (e.g. ISO 15230) what describes another force. For high-pressure cleaners, the **reaction force** is the relevant physical dimension.

3.125
commercial use
intended use of machines covered by this standard, i.e. not intended for normal housekeeping purposes by private persons but which may be a source of danger to the public

I.e. in particular that

– the machines may be used by cleaning contractors, cleaning staff, etc.;
– they are used in commercial or public premises (i.e. offices, shops, hotels, hospitals, schools, etc.) or in industrial (plants, etc.) and light industrial (workshops, etc.) environments.

Note 1 to entry: **Commercial use** is also called professional use.

3.126
typical operational mass
mass of the most usual configuration of a machine ready for use including the following, if applicable:

– hose,
– spraying device (lance and gun),
– standard nozzle,
– fuel tank filled to max level, and
– tank for descaling filled to max level,

excluding the following:

– any contents of the hydraulic system (supply- and high pressure hoses, pump, tank for **cleaning agent**),
– any accessory, not required for normal operation (e.g., additional nozzles, foam bottle), and
– **supply cord** with plug

NOTE 1 to entry: **typical operational mass** is also known as **ToM**

4 General requirement

This clause of Part 1 is applicable except as follows.

Replacement of 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 purposes 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.

5.101 *The **test solution** shall be stored in a sealed container, in an ambient between 3 °C and 8 °C and used within seven days after its preparation.*

5.102 ***Protective devices** and **safety valves** shall remain fully functional but shall not operate under **normal operation**.*

5.103 *If a requirement is based upon the mass of the appliance, the **typical operational mass** shall be applied.*

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 electric shock:

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

However, **hand-held appliances** and hand-held parts containing electrical components 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.