



BSI Standards Publication

Household and similar electrical appliances — Safety

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

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National foreword

This British Standard is the UK implementation of EN 60335-2-79:2012. It is derived from IEC 60335-2-79:2012. It supersedes BS EN 60335-2-79:2009 which will be withdrawn on 3 April 2015.

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 **Ⓒ** **Ⓒ**.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/10, Floor treatment machines (industrial).

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Date	Text affected
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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 60335-2-79:2012, modified)**

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
(CEI 60335-2-79:2012, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke -
Teil 2-79: Besondere Anforderungen für
Hochdruckreiniger und Dampfreiniger
(IEC 60335-2-79:2012, modifiziert)

This European Standard was approved by CENELEC on 2012-04-03. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 61J/485/FDIS, future edition 3 of IEC 60335-2-79, prepared by SC 61J, "Electrical motor-operated cleaning appliances for commercial use", of IEC/TC 61, "Safety of household and similar electrical appliances" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60335-2-79:2012.

A draft amendment, which covers common modifications to IEC 60335-2-79, was prepared by CLC/TC 61, "Safety of household and similar electrical appliances" and approved by CENELEC.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-04-03
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-04-03

This document supersedes EN 60335-2-79:2009.

The principal changes in EN 60335-2-79:2012 as compared with EN 60335-2-79:2009 are as follows (minor changes are not listed):

- the scope has been revised editorially to avoid misunderstandings;
- terms and definitions has been revised with regard to the requirements revised;
- the standard has been revised in general and updated regarding state-of-the-art, as far as necessary, in particular some changes have been made to Clauses 15, 22, and 25;
- a new Annex CC 'Emission of acoustical noise' was added;
- a new Annex DD 'Emission of vibration' was added;
- a new Annex EE with a model test report for vibration emission was added.

This part 2 is to be used in conjunction with the EN 60335-1:2012 and its amendments.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to EN 60335-1.

This part 2 supplements or modifies the corresponding clauses in EN 60335-1, so as to convert that publication 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 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 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.

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.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60335-2-79:2012 are prefixed “Z”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60335-2-79:2012 was approved by CENELEC as a European Standard with agreed common modifications.

☐ Modifications to Annexes Z

The annexes of Part 1 are applicable except as follows:

Apply the following changes to Annex ZC of EN 60335-1:2012:

Annex ZC (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
<i>Add:</i>				
IEC 60364-1	-	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	-
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	EN 61558-2-3	-
<i>Replace:</i>				
IEC 61770	2008	Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets	EN 61770 + AC	2009 2011☐

Annex ZE
(informative)

**Specific additional requirements for appliances and machines intended
for commercial use**

This annex is not applicable. 

Annex ZZ
(informative)

Coverage of Essential Requirements of Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex I of the EU Directive 2006/42/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

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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 International 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.

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 powered motors,
- internal combustion engines,
- hydraulic or pneumatic motors.

Ⓒ This standard deals with the reasonably foreseeable hazards presented by machines that are encountered by all persons.

However, in general, it does not take into account:

- **children** playing with the machine;
- the use of the machine by **children**;
- user maintenance by **children**, including the cleaning of the machine;
- the use by **vulnerable people** of machines intended for **commercial use**.

It is recognized that **very vulnerable people** may have needs beyond the level addressed in this standard.Ⓒ

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.

- steam cleaners intended for domestic use (IEC 60335-2-54);
- hand-held and transportable motor-operated electric tools (IEC 60745 series, IEC 61029 series);
- appliances for medical purposes (IEC 60601);
- agricultural sprayers;

NOTE 102 In Europe, EN 907 gives requirements for sprayers and liquid fertilizer distributors for agricultural and forestry purposes.

- 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 103 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 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**.

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

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.

3.6.3

accessible part

Modification:

Delete “and probe 18”. 

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 0 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, for example, 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, such as, 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 actually. For high-pressure cleaners, the **reaction force** is the relevant physical dimension.

3.2101

commercial use

intended use of machines, also covered by this standard. These machines are 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. 

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** is stored in a cool atmosphere and used within seven days after its preparation.*

5.102 ***Protective devices** and **safety valves** shall remain fully functional but shall 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 electric shock:

- **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 and series or type, allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers;

NOTE 101 Designation of machine, series or type includes the model or type reference as required in Part 1.

- 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 °C;
- 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 and other mobile machinery 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.

The height of the lettering shall be not less than 4 mm. This wording may be replaced by symbol IEC 60417-5041 (2002-10).

- Steam cleaners shall be marked with symbol IEC 60417-5597 (2002-10).
- 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 intended to be used indoors and powered by internal combustion engines, except LPG-powered engines, shall be marked with the symbol according to Figure 105. It is acceptable to show this symbol in monochrome colour.

7.1.101 All high pressure hoses shall be marked with the following:

- with a pressure of at least the **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.

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

- a pressure of at least the **allowable pressure** in Pascal or bar;
- maximum temperature in degrees Celsius.

Compliance is checked by inspection.

7.1.103 **Motorized cleaning heads** shall be marked with

- **rated voltage** or **rated voltage range** in volts;
- **rated power input** in watts;
- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- mass of the most usual configuration in kg.

Motorized cleaning heads for water-suction cleaning appliances, except those of **class III construction** having a **working voltage** up to 24 V shall be marked with symbol IEC 60417-5935 (2002-10).

NOTE This symbol is an information sign and, except for the colours, the rules of ISO 3864-1 apply.

Compliance is checked by inspection.

7.1.104 Socket-outlets for accessories shall be marked with the maximum load in watts on the socket-outlet or close to it.

Compliance is checked by inspection.

7.6 *Addition:*



[symbol IEC 60417-5597 (2002-10)]

steam



[symbol IEC 60417-5041 (2002-10)]

hot surface

7.12 *Modification:*

☐ Replace the 4th paragraph beginning with "This appliance can be used..." by the following:

"Machines shall not be used by children. Children should be supervised to ensure that they do not play with the machine.

The instructions for machines intended for **commercial use** shall include the substance of the following:

This machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge.

The instructions for machines not intended for **commercial use** shall include the substance of the following:

This machine can be used by people with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the machine in a safe way and understand the hazards involved." ☐

Addition:

The front cover of the instructions shall include the substance of the following warning:

CAUTION Read the instructions before using the machine.

This wording may be replaced by symbols ISO 7000-0434 (2004-01) and either ISO 7000-1641 (2004-01) or ISO 7000-0790 (2004-01).

The instructions shall contain at least the following:

- the business name and full address of the manufacturer and, if applicable, his authorized representative;
- designation of series or type of the machine as marked on the machine itself, except for the serial number;

NOTE 101 The designation of series or type can be abstracted, as long as the identification of the product is ensured.

- the general description of the machine;
- the intended use of the machine and the auxiliary equipment as covered by the scope of this standard;

NOTE 102 Examples of auxiliary equipment are lights and powered brushes.

- the meaning of the symbols used on the machine and in the instructions;
- drawings, diagrams, descriptions and explanations necessary for the safe use, maintenance and repair of the machine and for checking its correct functioning;
- technical data including the markings on the machine and the maximum inlet water pressure in Pascal;
- information regarding putting into service, safe operation, handling, transportation, and storage of the machine taking into account its weight;
- instructions to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;
- the conditions in which the machine meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;
- the procedure to be followed to prevent unsafe situations in the event of accident (e.g. contact with or spillage of detergents, battery acid, fuel or oil) or equipment breakdown (such as flat tire or component failure).

The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures. They shall, if applicable, give the specifications of the spare parts if they affect the health and safety of the **operator**.

In addition, the instructions shall give the following information, if applicable:

- information about appropriate personnel protection equipment (PPE) for high pressure cleaners in operation, e.g. safety boots, safety gloves, safety helmets with visors, hearing protection etc. which shall be worn while operating the equipment;
- instructions for **water jetters** shall be given, such as “Insert hose to red mark before turning on the machine”;
- adequate information about the connection with the water mains, including the maximum inlet pressure, if not given on the rating plate;
- adequate information about the nozzles to be used, the danger of the kickback force and the sudden torque on the spray assembly when opening the **trigger gun**;
- the kickback forces if they exceed 20 N;
- the functioning of the safety devices, e.g. **safety valves, flow switches, pressure switches**;
- for battery powered machines, the precautions to be taken for safe charging;
- information regarding safe disposal of batteries;
- if split rims are used for pneumatic tyres, instructions shall be given for the safe change of tyres;
- for mains operated machines, the substance of the following:

The electric supply connection shall be made by a qualified electrician and comply with IEC 60364-1. It is recommended that the electric supply to this machine should include either a residual current device that will interrupt the supply if the leakage current to earth exceeds 30 mA for 30 ms or a device that will prove the earth circuit.

- For oil fired machines without a **primary safety control**, the substance of the following:
This machine must be attended during operation.
- For **fixed appliances** intended to be used in a dry independent room, and for steam cleaners intended for indoor use only, the substance of the following:

Do not splash or wash down.

For machines intended to be connected to the potable water mains, the instructions shall give the following information, if applicable:

- adequate information for the correct connection to the potable water mains;
- necessary length and quality of the water supply hose;
- necessary measures for conversion of the connection from supply from the potable water mains to supply from other water sources.

For machines not intended to be connected to the potable water mains, the instructions shall give the following information, if applicable:

- adequate information for the correct connection to the water supply;
- adequate information about suction operation;
- necessary length and quality of the water supply hose;
- necessary measures for conversion of the connection from supply from other water sources to supply from the potable water mains.

7.12.101 The instructions shall include warnings concerning ways in which the machine shall not be used, which in the experience of the manufacturer are likely to occur. At least, they shall include the substance of the following warnings, if applicable.

- **WARNING** This machine has been designed for use with the cleaning agent supplied or recommended by the manufacturer. The use of other cleaning agents or chemicals may adversely affect the safety of the machine.
- **WARNING** High pressure jets can be dangerous if subject to misuse. The jet must not be directed at persons, live electrical equipment or the machine itself.
- **WARNING** Do not use the machine within range of persons unless they wear protective clothing.
- **WARNING** Do not direct the jet against yourself or others in order to clean clothes or foot-wear.
- **WARNING** Risk of explosion – Do not spray flammable liquids.
- **WARNING** High pressure cleaners shall not be used by children or untrained personnel.
- **WARNING** High pressure hoses, fittings and couplings are important for the safety of the machine. Use only hoses, fittings and couplings recommended by the manufacturer.
- **WARNING** To ensure machine safety, use only original spare parts from the manufacturer or approved by the manufacturer.
- **WARNING** Water that has flowed through backflow preventers is considered to be non-potable.