



UL 60335-2-79

STANDARD FOR SAFETY

Household and Similar Electrical Appliances –
Safety – Part 2-79: Particular Requirements for
High Pressure Cleaners and Steam Cleaners

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UL Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners, UL 60335-2-79

First Edition, Dated January 14, 2016

Summary of Topics

Adoption of IEC 60335-2-79, Household and Similar Electrical Appliances, Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners (Edition 2.2 issued July 2007) as a new IEC-based UL standard, UL 60335-2-79, with National Differences.

The new requirements are substantially in accordance with Proposal(s) on this subject dated September 4, 2015 and December 4, 2015.

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Household and Similar Electrical Appliances – Safety – Part 2-79:

Particular Requirements for High Pressure Cleaners and Steam Cleaners

First Edition

January 14, 2016

This ANSI/UL Standard for Safety consists of the First Edition.

The most recent designation of ANSI/UL 60335-2-79 as an American National Standard (ANSI) occurred on January 14, 2016. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page or Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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Preface

This UL Standard is based on IEC Publication 60335-2-79: Edition 2.2 Safety of Household and Similar Electrical Appliances, Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners. IEC publication 60335-2-79 is copyrighted by the IEC.

This UL Standard 60335-2-79 Standard for Safety for Household and Similar Electrical Appliances, Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners, is to be used in conjunction with the fifth edition of UL 60335-1. The requirements for High Pressure Cleaners and Steam Cleaners are contained in this Part 2 Standard and UL 60335-2-79.

Requirements of this Part 2 Standard, where stated, amend the requirements of UL 60335-1.

Where a particular subclause of UL 60335-1 is not mentioned in UL 60335-2-79, the UL 60335-1 subclause applies.

The text, figures and tables of IEC Publication Safety of Household and Similar Electrical Appliances, Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners, IEC 60335-2-79, copyright July, 2007 are used in this Standard with the consent of the IEC and the American National Standards Institute (ANSI). The IEC copyrighted material has been reproduced with permission from ANSI. ANSI should be contacted regarding the reproduction of any portion of the IEC material. The IEC Foreword and Introduction are not a part of the requirements of this Standard but are included for information purposes only. Copies of IEC Publication 60335-2-79 may be purchased from ANSI, 11 West 42nd Street, New York, New York, 10036, (212) 642-4900.

Note – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

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NATIONAL DIFFERENCES

General

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-79, Household and Similar Electrical Appliances – Safety – Part 2-79: Particular Requirements for High Pressure Cleaners and Steam Cleaners copyright 2007, are indicated by notations (differences) and are presented in bold text.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are national differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

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5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by sub-committee 61J: Electrical motor-operated cleaning appliances for industrial use, of IEC technical committee 61: Safety of household and similar electrical appliances.

This consolidated version of IEC 60335-2-79 consists of the second edition (2002) [documents 61J/128/FDIS and 61J/133/RVD], its amendment 1 (2004) [documents 61J/165/FDIS and 61J/171/RVD] and its amendment 2 (2007) [documents 61J/252/FDIS and 61J/258/RVD].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 2.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

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 fourth edition (2001) of that standard.

NOTE 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: Safety requirements for electric high pressure cleaners and steam cleaners.

101DV DE Modification: Replace the preceding two paragraphs and Note 1 with the following:

This part 2 standard is to be used in conjunction with UL 60335-1 Ed. 5: 2011-10 and its amendments.

NOTE When "Part 1" is mentioned in this standard, it refers to UL 60335-1 Ed. 5: 2011-10. When "Part 2" is mentioned in this standard, it refers to this document.

This Part 2 supplements or modifies the corresponding clauses in UL 60335-1 Ed. 5: 2011-10, so as to convert that publication into the UL 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.

102DV DE Modification: Add the following after NOTE 2:

The numbering system in this standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

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.

103DV DE Modification: Replace the last sentence of NOTE 3 with the following:

Words in SMALL ROMAN CAPS in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in SMALL ROMAN CAPS.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site 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.

104DV DE Modification: Replace the "in some countries" paragraph and dashed items below with the following:

The USA differences have been reviewed and developed into UL national differences in this Part 2 standard.

The following differences exist in the countries indicated below.

- Clause 1: Different pressure limitations apply (USA).
- 6.1: Ground fault current interrupters are required for appliances rated 250 V or less, single phase (USA).
- 7.12: No requirements for sound and vibration markings exist (USA).
- 11.101: The losses of burners are subject to regulations (Germany). Smoke spot requirements are different (USA).
- 20.103: The fuel tank capacity is limited (USA).
- 21.101, 21.101.2 and 21.102: Different burner tests are required (USA).
- 25.7: Different power supply cord lengths are required (Canada, USA).
- Clause 32: The connection with the water mains is subject to regulations (Canada).

A bilingual version of this publication may be issued at a later date.

105DV DE Modification: Delete the preceding paragraph.

This paragraph does not apply.

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.

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.

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.

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.

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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 for household, industrial and commercial use, in which the discharge line is hand supported and manipulated, having a pressure not less than 2,5 MPa and not more than 25 MPa and with an input to the drive for the high pressure pump not exceeding 10 kW, their RATED VOLTAGE being not more than 250 V for single-phase appliances and 480 V for other appliances.

It also applies to industrial and commercial steam cleaners having a water container with a capacity not exceeding 1 000 l, a RATED PRESSURE not exceeding 3,2 MPa and a product of capacity and RATED PRESSURE not exceeding 300.

It is also applicable to appliances making use of other forms of energy for the motor, but it is necessary that their influence is taken into consideration.

As far as it is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- the use of appliances by young children or infirm persons without supervision,
- playing with the appliance by young children.

NOTE 101 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;
- 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.

NOTE 102 This standard does not apply to

- appliances that are incorporated in process equipment;
- appliances intended to be used in locations where special conditions prevail, such as the presence of corrosive or explosive atmosphere (vapour or gas);
- audio, video and similar electronic apparatus (IEC 60065);
- appliances for medical purposes (IEC 60601);
- hand-held motor-operated electric tools (IEC 60745);
- personal computers and similar equipment (IEC 60950);

- transportable motor-operated electric tools (IEC 61029);
- steam cleaners for household use only (IEC 60335-2-54).

1DV.1 D2 Modification: Replace the second paragraph of Clause 1 of the Part 2 with the following:

1DV.1.1 This International Standard deals with the safety of high pressure cleaners for household, industrial and commercial use having a pressure not more than 38 MPa at the point of maximum system pressure and a pressure at the pump outlet while spraying of not less than 2,5 MPa and not more than 35 MPa and with an input to the drive for the high pressure pump not exceeding 20 kW, their RATED VOLTAGE being not more than 250 V for single-phase appliances and 600 V for other appliances.

1DV.1.2 A coin-operated product is investigated under these requirements and under such additional requirements as are applicable to the product under consideration.

1DV.2 D2 Modification: add the following to Clause 1 of the Part 2:

1DV.2.1 These requirements do not cover liquid sand blasters or other products using cleaning solutions containing insoluble particulates.

1DV.2.2 These requirements do not cover products that develop steam within a closed heated vessel or are connected to an external source of steam.

1DV.2.3 These requirements do not cover burners with input ratings greater than 733 kW.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

IEC 60704-1, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*

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*

ISO 5349 (all parts), *Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration*

2DV D2 Modification: Add the following to Clause 2 of the Part 2:

ANSI/OPEI B71.10-2013,
Off-Road Ground-Supported Outdoor Power Equipment – Gasoline Fuel Systems – Performance Specifications and Test Procedures

ANSI/NEMA Z535.3,
Criteria for Safety Symbols

**ANSI/NEMA Z535.4,
Product Safety Signs and Labels**

**UL 94
Tests for Flammability of Plastic Materials for Parts in Devices and Appliances**

**UL 295
Commercial-Industrial Gas Burners**

**UL 296
Oil Burners**

**UL 331
Strainers for Flammable Fluids and Anhydrous Ammonia**

**UL 514A
Metallic Outlet Boxes**

**UL 723
Test for Surface Burning Characteristics of Building Materials**

**UL 746B
Polymeric Materials – Long Term Property Evaluations**

**UL 943
Ground-Fault Circuit-Interrupters**

**UL 969
Marking and Labeling Systems**

**UL 1439
Test for Sharpness of Edges on Equipment**

**UL 2111
Overheating Protection for Motors**

**ASTM B858-2006,
Standard Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress
Corrosion Cracking in Copper Alloys**

**ASTM D256-1981,
Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics**

**ASTM D396 REV A,
Standard Specifications for Fuel Oils**

**ASTM D471 REV A,
Standard Test Method for Rubber Property, Effect of Liquids**

**ASTM D664 REV A,
Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration**

ASTM D1822,
Standard Test Method for Tensile-Impact Energy to Break Plastics and Electrical Insulating Material

ASTM D6751,
Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels

SAE J30,
Fuel and Oil Hose

SAE J1681,
Recommended Practice for Gasoline, Alcohol, and Diesel Fuel Surrogates for Material Testing

NFPA 69-2002,
Explosion Prevention Systems

NFPA 70,
National Electrical Code

ASME B1.20.1,
Pipe Threads, General Purpose (Inch)

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

NORMAL OPERATION operation of the appliance under the following conditions

The appliance is supplied at **RATED VOLTAGE** and operated at **RATED FLOW** and **RATED PRESSURE** with the nozzle and hose specified by the manufacturer fitted to it; all strainers and filters are in a clean operating condition and the **UNLOADER VALVE** is set to the **RATED PRESSURE**. The **WATER HEATER**, if fitted, is operated at maximum power.

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

3.1.9DV D2 Modification: Add the following to Subclause 3.1.9 of the Part 2:

The product is to be operated with the omission of all recommended maintenance and cleaning operations, except that combustion engines are to be maintained in accordance with the instructions.

3.5.1DV D2 Modification: Replace Subclause 3.5.1 of the Part 1 with the following:

PORTABLE PRODUCT an appliance that is intended to be carried or conveyed while in use, or that is mounted on wheels and can be readily moved

3.101 **UNLOADER VALVE** pressure operated valve which, when the pump pressure exceeds the preset value, returns the excess fluid to 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 valve which, when the pump or steam cleaner pressure exceeds the preset value, returns the excess fluid or steam to the inlet system or into the atmosphere

3.103 RATED PRESSURE maximum pressure at the pump or at the steam cleaner assigned to the appliance by the manufacturer

3.103DV DE Modification: replace 3.103 as follows:

RATED PRESSURE maximum pressure at the pump outlet or at the steam cleaner assigned to the appliance by the manufacturer

3.104 PERMISSIBLE PRESSURE limiting pressure up to which an appliance and/or parts of the appliance can be operated without impairing its integrity

3.105 RATED FLOW flow at RATED PRESSURE at the nozzle assigned to the appliance by the manufacturer

3.106 WATER HEATER means of heating water or CLEANING AGENT by electricity, gas, liquid fuel or heat exchanger

3.107 CLEANING AGENT water with or without the addition of a soluble or miscible chemical

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 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 PRIMARY SAFETY CONTROLS are also known as flame failure devices.

3.111 TRIGGER GUN device that shuts off the supply of fluid through its outlet if the trigger is not held in its operating position

3.112 CONTINUOUS IGNITION ignition by an energy source that is continuously maintained throughout the time the burner is in service, whether the burner is firing or not

3.113 RATED TEMPERATURE maximum temperature of the CLEANING AGENT assigned by the manufacturer

3.114 PENCIL JET NOZZLE nozzle that gives a concentrated, parallel water jet; also called needle jet nozzle, solid jet nozzle or 0 degree jet nozzle

3.115 WATER JETTER high-pressure pipe-cleaning device, consisting of a nozzle at the end of a high-pressure hose

3.116 MOTORIZED CLEANING HEAD accessory containing a motor that is supplied from the appliance and which is attached to the end of a hand-held hose or tube

NOTE The main cleaning head permanently attached is not regarded as a MOTORIZED CLEANING HEAD.

3.117 **LOW PRESSURE ACCESSORY** accessories to be connected to a high pressure cleaner equipped with one or more nozzles with an equivalent diameter exceeding 2 mm

NOTE 101 Nozzles with an equivalent diameter exceeding 2 mm used in a high pressure cleaner system are not considered to become clogged.

NOTE 102 Typical examples of **LOW PRESSURE ACCESSORIES** are washing brushes, foam nozzles, washing sponges.

3.118 **HAND-GUIDED APPLIANCE** appliance to be moved on the floor while in operation, guided by a mechanically coupled handle

3.119DV D2 Modification: Add the following to Clause 3 of the Part 2:

3.119DV.1 AIR SHUTTER – a manual or automatic adjustable device that varies the size of the air inlet, or inlets, regulating primary or secondary air

3.119DV.2 ALUMINUM COATED STEEL – aluminum coated steel in which the bond between the steel and the aluminum is an iron-aluminum alloy

3.119DV.3 COMBUSTIBLE MATERIAL – material made of or surfaced with wood, compressed paper, plant fibers, or other material that will ignite and burn. Such material shall be considered as combustible even though flameproofed, fire-retardant treated, or plastered.

3.119DV.4 COMPLETE COMBUSTION – combustion evidenced by

- a) absence of excessive smoke in the flue gases;
- b) absence of excessive concentrations of carbon monoxide;
- c) absence of noticeable quantities of aldehydes; and
- d) lack of evidence of unburned fuel

3.119DV.5 FLUE COLLAR – the portion of a product that is constructed for attachment of the chimney or vent connector

3.119DV.6 FUEL OIL – any hydrocarbon oil as defined by ASTM D396

3.119DV.7 GAS BURNER MANIFOLD – the conduit of a product that supplies gas to the individual burner

3.119DV.8 GUIDING HANDLE – the handle by which the operator supports the least percentage of product weight when the product is in use, transported, or both

This includes the handle of a hand-supported nozzle, lance, or wand.

3.119DV.9 HEATING SURFACES – all surfaces that transmit heat directly from flame or flue gases to the medium to be heated

3.119DV.10 HOT WATER PRESSURE WASHER – (also known as “hot pressure washer,” “hot water high-pressure cleaning machine,” “hot high-pressure cleaning machine,” “hot water power washer,” or “hot power washer”)

a pressure washer incorporating a heat source and a heat exchanger (usually a pipe or tubing coil) to heat the flowing water during operation of the machine

The heat may be derived from natural or LP gas, liquid fuel, or electricity. The heat source operates only when water is flowing through the open-ended heat exchanger. Water is not heated in a closed vessel.

3.119DV.11 HYDRAULIC POWER, KW – a measure of hydraulic power developed by a product and calculated by multiplying the flow rate (l/min) by the fluid pressure (MPa) as measured at the discharge nozzle and dividing by the constant 60

3.119DV.12 INTERLOCK – a switch or control intended to monitor the physical state of a required condition and to furnish an indication of that state to a safety-control circuit by means of a switch contact closure

3.119DV.13 INTERMITTENT IGNITION – ignition by an energy source that is continuously maintained throughout the time the burner is firing

3.119DV.14 INTERMITTENT PILOT – a pilot that is automatically lighted each time there is a call for heat

The pilot burns during the entire period that the main burner is firing.

3.119DV.15 INTERRUPTED IGNITION – ignition by an energy source that is automatically energized each time the main burner is fired and subsequently is automatically shut off during the firing cycle

3.119DV.16 INTERRUPTED PILOT – a pilot that is automatically lighted each time there is a call for heat

The pilot fuel is cut off automatically at the end of the main burner flame-establishing period.

3.119DV.17 LIMIT CONTROL – a safety control responsive to changes in liquid level, pressure, or temperature, normally set beyond the intended operating range of the product to limit its operation

3.119DV.18 LOW-VOLTAGE CIRCUIT – a circuit involving a potential of not more than 30 volts alternating current (42.4 peak) or direct current and supplied by a primary battery or by a standard Class 2 transformer or by a combination of a transformer and a fixed impedance having output characteristics in compliance with what is required for a Class 2 transformer. A circuit derived from a source of supply classified as a circuit involving a potential of not more than 600 volts and having characteristics in excess of those of a low-voltage circuit, by connecting resistance in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit.

3.119DV.19 MAIN BURNER FLAME-ESTABLISHING PERIOD – the interval of time the main burner fuel safety-shutoff valves are permitted to be open before the primary-safety control is required to supervise the main burner flame

3.119DV.20 NOZZLE – a device with one or more openings for discharge of the fluid from the system. A nozzle restricts the fluid flow in order to obtain the desired pressure, velocity, spray patterns, and the resulting volume of flow.

3.119DV.21 PILOT FLAME-ESTABLISHING PERIOD – the length of time fuel is permitted to be delivered to a proved pilot before the flame-sensing device is required to detect pilot flame

3.119DV.22 PRESSURE WASHER – (also known as “high-pressure cleaning machine” or “power washer” or “high pressure cleaner”)

a machine incorporating a water inlet, a high pressure pump to increase the pressure of the incoming water, and a manually controlled water outlet nozzle

Such a machine is intended for cleaning by means of water pressure and flow. Pressure washers are divided into three types according to 3.119DV.33 and 3.119DV.34.

3.119DV.23 PROVED PILOT – a pilot flame supervised by a primary-safety control that senses the presence of the pilot flame prior to permitting the main burner fuel to be delivered for combustion

3.119DV.24 RADIATION SHIELD – a separate panel or panels interposed between heating surfaces and adjacent objects to reduce heat transmission by radiation

3.119DV.25 REGULATING (OPERATING) CONTROL – a control, which may or may not be a safety control or interlock

3.119DV.26 SAFETY CONTROL – automatic controls, including relays, switches, and other auxiliary devices used in conjunction therewith to form a safety control system, that will reduce the risk of fire, electric shock, or injury to persons during operation of the product

3.119DV.27 SAFETY SHUTDOWN – the action of shutting off all fuel and ignition energy to the product by means of a safety control or other controls such that restart cannot be accomplished without manual reset

3.119DV.28 SAFETY SHUTOFF VALVE – a valve that is automatically closed by the safety control system or by an emergency device

Such valve may be of the automatic or manually opened type.

3.119DV.29 STEAM CLEANER – identical to a hot water pressure washer, except that water flowing through the heat exchanger is heated to a temperature greater than the atmospheric boiling point

No steam is generated within the product. Temperature and pressure of the flowing water are maintained by combination of the water pump, the heat source, and the discharge nozzle. Water is not heated in a closed vessel. Whereas a hot water pressure washer discharges hot water, the water flow of a steam cleaner, upon exiting the discharge nozzle, immediately vaporizes to saturated steam. The temperature of the saturated steam at the exit side of the discharge nozzle is given by the ASME Steam Tables; for example it is 164 °C for a water pressure of 0,7 MPa absolute.

3.119DV.30 STABLE COMBUSTION – combustion evidenced by

- a) constancy of fuel consumption; and

b) constancy of products in flue-gas analysis

3.119DV.31 SUPPORT HANDLE – the handle by which the operator supports the greatest percentage of product weight when the product is in use, transported, or both

This includes the handle of a pushcart mounted product, or any handle used to transport the product.

3.119DV.32 TRIAL-FOR-IGNITION PERIOD – that period of time the main burner fuel is permitted to be delivered into the ignition zone before the main flame-sensing device is required to detect main flame

3.119DV.33 TYPE 2 PRESSURE CLEANING MACHINE – a cleaning machine developing hydraulic power not greater than 6 kW and fluid pressure greater than 0,7 MPa, but not greater than 22 MPa, as measured at the discharge nozzle

3.119DV.34 TYPE 3 PRESSURE CLEANING MACHINE – a cleaning machine developing hydraulic power greater than 6 kW or fluid pressure greater than 22 MPa, as measured at the discharge nozzle

However, the cleaning machine shall not develop hydraulic power greater than 17 kW or fluid pressure greater than 35 MPa in any case.

3.119DV.35 WAND – tubing or piping used to extend the nozzle

Also known as a lance.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.1 Addition:

The burner is operated at rated power. Appliances intended for operation at more than one rated power are additionally tested at the most disadvantageous power.

The burner-air adjustment, where provided, is regulated to establish the air/fuel ratio to produce the combustion characteristics recommended in the user instructions. The combustion characteristics may be specified by the appearance of the flame, the percentage of carbon dioxide (CO₂) in the flue gases, or by other characteristics.

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

The draught is adjusted to that recommended in the instructions for use.

5.4DV D2 Modification: Add the following to Subclause 5.4 of the Part 1:

A product with a fuel-fired water-heating system shall comply with the applicable performance requirements when tested with each grade or type of fuel recommended by the manufacturer of the product.

5.5DV D2 Modification: Add the following to Subclause 5.5 of the Part 1:

Adjustable levelling features of the product are to be set such that the base of the product is at the minimum distance from the floor.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

Appliances shall be CLASS I, CLASS II OR CLASS III with respect to the protection against electric shock. 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 appliances 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	IP X5
	HAND-HELD PARTS	II	IPX7
		III	IP X3
HIGH PRESSURE CLEANERS	HAND-HELD APPLIANCES	II-III	IP X7
	Other types of appliances	I-II-III	IP X5
	HAND-HELD PARTS	II-III	IP X7

However, FIXED APPLIANCES that are specified for installation in an independent 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.

7DV D2 Modification: Add the following to Clause 7 of the Part 2:

7DV.1 Markings and instructions may be communicated in accordance with the provisions of the ANSI Z535 series of standards or equivalent.

7DV.2 Appliances having provision for connection to potable water supply as required by Clause 22.48DV.3 shall be marked with the following or equivalent wording:

WARNING: IF CONNECTION IS MADE TO A POTABLE WATER SYSTEM, THE SYSTEM SHALL BE PROTECTED AGAINST BACKFLOW.

7.1 Addition:

- RATED PRESSURE in Pascal;
- PERMISSIBLE PRESSURE in Pascal;
- maximum RATED FLOW in litre per minute;
- maximum RATED TEMPERATURE where this is above 50 °C;
- serial number;
- year of production. The year of production may be indicated by the last two digits of the year;
- maximum inlet water pressure in Pascal if not given in the instruction manual;
- maximum power of the water heater in kW.

NOTE 101 For electric heaters the input power is specified.

For gas-fired or oil-fired heaters the output power is specified.

7.1DV D2 Modify Clause 7.1 of Part 2 by adding the following:

7.1DV.1 Delete the 7th dashed item of Clause 7.1 of the Part 1. A product shall be marked in accordance with Table 7.1DV.1 or equivalent, as applicable.