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AMENDMENT 2
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Household and similar electrical appliances – Safety –

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

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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FOREWORD

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

The text of this amendment is based on the following documents:

FDIS	Report on voting
61J/252/FDIS	61J/258/RVD

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

The committee has decided that the contents of this amendment and the base publication 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- withdrawn,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.

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

3 Definitions

3.116 *Delete this definition.*

3.117 *Renumber the definition as 3.116 and modify the note as follows:*

*Print "*motorized cleaning head*" in bold letters.*

Add the following new definitions:

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

7 Marking and instructions

7.1 *Addition:*

Replace the third paragraph after Note 101 by:

All pressure hoses shall be marked with a pressure of at least the **permissible pressure** in megapascals and the maximum temperature in degrees Celsius and shall be marked with the name of the manufacturer and the date of production. These data may be coded.

Add the following new note after the new third paragraph:

NOTE 102 For low pressure accessories, no marking of the **permissible pressure** is necessary.

Renumber Note 102 as Note 103.

Add the two following new paragraphs:

Appliances not intended to be connected to the potable water mains shall be marked with the symbol according to Figure 104. It is acceptable to show this symbol in monochrome colour.

Appliances that can be used indoors and are 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.

7.12 *Addition:*

Add the following new paragraphs:

The instructions shall contain the substance of the following, if applicable.

– WARNING: Do not use combustion engine powered appliances indoors unless adequate ventilation is assessed by national labour authorities.
– WARNING: Ensure that any exhaust emissions are not in the vicinity of air intakes.

For appliances intended to be connected to the potable water mains, the instruction shall contain the substance of the following, 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 water mains supply to supply from other water sources.

For appliances not intended to be connected to the water mains, the instruction shall contain the substance of the following, 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 (if applicable).

For all appliances, the instruction shall contain the substance of the following:

– water that has flown through backflow preventers is considered to be non-potable.

7.101 *Delete, in the second paragraph, "for water-suction cleaning appliances".*

10 Power input and current

10.101 *Modify the last line as follows:*

Print "permissible pressure" *and* "rated pressure" *in bold letters.*

15 Moisture resistance

15.2 *Replacement:*

Replace the first paragraph by:

Appliances shall be constructed so that spillage of liquid due to **normal operation**, overfilling or overturning of unstable, **hand-guided appliances** and **hand-held appliances** does not affect their electrical insulation.

Replace the fourth paragraph of the test by:

Hand-guided appliances *and* ***hand-held appliances*** *and appliances that are unstable are then, with the containers completely filled for the float tank, if any, and with the most conductive detergent recommended by the manufacturer for the detergent tank, if any, and with the cover lid in place, overturned from the most unfavourable of the normal positions of use, and are left in that position for 5 min, unless the appliance returns automatically to its normal position of use.*

15.2 *Delete, in the penultimate paragraph before Note 102,* "of water-suction cleaning appliances".

15.101 *Delete in the first paragraph* "of **water-suction cleaning appliances**".

21 Mechanical strength

Add the following new subclause:

21.101.3 A **low pressure accessory** is subjected to a static pressure test of two times the measured pressure in the system, when connected to the most severe high pressure cleaner it is intended to be used with, for 5 min at room temperature.

21.103 *Replace the first paragraph by:*

Hand-held appliances, hand-guided appliances and appliances carried on the operator's body in normal use and spray guns shall be resistant to dropping.

22 Construction

Add the following new subclauses:

22.47 This clause of Part 1 is not applicable.

22.48 This clause of Part 1 is applicable except as follows:

Replace the existing text of the test by:

Compliance is checked by the relevant tests of IEC 61770, as modified in Annex AA of this standard.

22.103 *Replace the existing sixth paragraph by:*

Compliance is checked by inspection and the following test:

*The operating means of the **trigger gun** of a high pressure cleaner or of a hand-held washing device shall be locked in the non-operating condition. The pressure in the fluid system is adjusted to 2,5 MPa. The actuator of the operating means shall then be stressed for 1 min at room temperature with a force of 150 N, applied in the middle of the actuator in the normal direction of operation.*

During and after the test, there shall be no leakage of water. After the test, the locking device shall still be functional.

25 Supply connection and external flexible cords

25.7 *Addition:*

Replace the first sentence by:

Supply cords of non-fixed appliances shall not be less than 5 m in length.

32 Radiation, toxicity and similar hazards

Replace the existing text by:

This clause of Part 1 is applicable.

Add the following new figures:

IEC 1256/07

Figure 104 – Warning symbol: Appliance not suitable for connection to the potable water mains

IEC 1257/07

Figure 105 – Warning symbol: Do not inhale fumes

Add the following new annex:

Annex AA
(normative)

Requirements to avoid backsiphonage

The requirements of IEC 61770 are applicable except as follows:

1 Scope

Replace the text of this clause by the following new text:

This standard specifies requirements for the connection of high pressure cleaners and steam cleaners to water mains having a water pressure not exceeding 1,2 MPa. These requirements are intended to prevent the backsiphonage of non-potable water into the potable water mains.

NOTE The connection of the appliance to the water mains may be temporary or permanent.

3 Definitions

3.3 *Replace the note by:*

NOTE Examples are airgaps and backflow preventers with reduced pressure zone.

3.4 *Add, after "feed pipe and", the following:*

"…. the maximum or ……"

3.9 *Add the following Note:*

NOTE For three-phase appliances 5 s and for single phase appliances 2 s may be appropriate.

Add the following new definitions:

3.101
backflow preventer with reduced pressure zone
safety device which artificially provides disconnection by the action or the reaction of one or more hydromechanical closing and venting devices activated by pressure differences

3.102
protection point
location in a hydraulic circuit where a safety device is installed

4 General requirements

4.2 *Replace the existing text by:*

Backflow prevention devices shall be incorporated in, or fixed to, the appliance or to the water supply system and constructed so that

– their functional characteristics cannot be changed, even intentionally,
– their selection of the necessary safety level is in compliance with Annex BB.

4.3 Not applicable.

4.4 Not applicable.

5 General conditions for the tests

5.4 *Replace the text by:*

Tests, except the functional and endurance tests on airgaps and backflow preventers with reduced pressure zone, are made on the appliance, unless this is impracticable. The compliance is then checked by the tests according to Annex A of IEC 61770.

NOTE During the functional and endurance tests, additional samples may be required.

7 Pipe interrupters

This clause of IEC 61770 is not applicable.

8 Dynamic backflow preventers

This clause of IEC 61770 is not applicable.

9 Hose-sets

This clause of IEC 61770 is not applicable.

Add the following new clause:

10 Backflow preventer with reduced pressure zone

10.1 The settings of the action- and difference pressure of the device shall be fixed and not adjustable.

Only the pressure of the water of the supply network can operate the control of the internal components of the device.

Possible additional control devices (electric, pneumatic) shall not adversely affect the backflow protection function.

When installed according to the instructions for use, the drain of the backflow preventer with reduced pressure zone shall point downwards.

The design of the relief valve operation shall be such that when the differential pressure over the upstream check valve is less than 14 kPa (140 mbar), the relief valve shall be open to ensure positive safety.

Any water retention shall not be possible within the reduced pressure zone.

The cross-sections of the passage orifices and of the pilot tube for operation of the relief device shall be equal to or greater than 12,5 mm^2, no dimension for the calculation of the cross-section shall be less than 4 mm.

An air break to drain shall exist between any waste drain and any means of collecting the discharged water.

The backflow preventer with reduced pressure zone, with an air break to drain fitted, shall evacuate the full relief flow rate without spilling to the outside.

This air break to drain shall be directly incorporated into the backflow preventer with reduced pressure zone.

The relief orifice of the device shall permit neither the fitting of a standardized threaded pipe nor the connection of a standardized pipe or shape, be it by glue, welding or interlocking.

10.2 Verification of the pressure difference between the upstream and the reduced pressure zones

For the following tests, the manufacturer has to provide a special sample having the necessary test ports to verify the function of the backflow preventer with reduced pressure zone.

Test ports have to be provided on the type test sample:

– upstream of the first anti-pollution check valve;
– in the reduced pressure zone;
– downstream of the second anti-pollution check valve.

Compliance is checked as follows (static test):

Record the pressure difference between upstream and reduced pressure zone over the upstream pressure from 0,1 MPa to 1 MPa (1 bar to 10 bar).

The pressure difference between the upstream zone and the reduced pressure zone shall be greater than 14 kPa (140 mbar).

10.3 Verification of the tightness of the downstream check valve (in the closing direction)

Compliance is checked as follows:

Downstream of the backflow preventer with reduced pressure zone, apply a pressure of 1,6 MPa (16 bar) with water at 20 °C, the upstream zone being at atmospheric pressure. The pressure is to be applied in increments of 0,1 MPa (1 bar) per 5 s.

Hold the pressure for 2 min.

Isolate the backflow preventer with reduced pressure zone from the supply system for 10 min.

There shall be no leakage, no permanent deformation or deterioration of the downstream anti-pollution check valve after the test.

10.4 Verification of the tightness of the upstream check valve at low pressure

Compliance is checked as follows:

Fill the backflow preventer with reduced pressure zone with water so that the water column has a height of (200 ± 50) mm in the tube (diameter inside 10 $^{0}_{-2}$) mm.

Isolate for 5 min ± 30 s.

Raise the level in the tube to (1 000 ± 50) mm.

Isolate for 5 min ± 30 s.

Raise the level in the tube to (2 000 ± 50) mm.

Isolate for 5 min ± 30 s.

The tightness of the upstream anti-pollution check valve shall be verified by the water level in the tube which shall be constant at each test stage.

No sagging of the water level in the tube is allowed at any of the stages.

10.5 Verification of opening start of the relief valve and of its closing

Compliance is checked as follows:

The following pressures are applied upstream of the device:

0,175 MPa - 0,3 MPa - 0,6 MPa and 1 MPa (1,75 bar – 3 bar – 6 bar and 10 bar).

Each of these pressure values is reduced slowly.

The value of the pressure when the relief valve opens has to be checked.

In each case, the pressure difference between upstream and reduced pressure zone shall be greater than 14 kPa.

After this test, the pressure is increased to its initial value.

The device shall then close again in an absolutely tight manner.

10.6 Durability test

The complete device is conditioned for 72 h in an environment at a temperature of (65 ± 5) °C, and at a relative humidity of (50 ± 5) %.

There shall be no distortion of any part of the device to such an extent that compliance with the standard is impaired.

Without replacement of any component, the device shall be capable of fulfilling the requirements of 10.2 to 10.5.

Compliance is checked as follows:

A test arrangement has to be provided according to Figure AA.1. The device is submitted to 5 000 $^{+50}_{0}$ cycles at a temperature of (65 ± 5) °C.

Each cycle has to be performed in the following order:

– *Stage 1: open valve 5, then valve 1, circulation at a flow rate as given in Table AA.1 at the value ± 5 % for (6 ± 2) s;*
– *Stage 2: close valve 5, then immediately close valve 1;*
– *Stage 3: open valve 3, static pressure at 0,3 MPa (3 bar) for (6 ± 2) s;*
– *Stage 4: close valve 3, open valve 4. Upstream drain for (6 ± 2) s (opening of the relief valve);*
– *Stage 5: close valve 4;*
– *Stage 6: open valve 5, then immediately open valve 1, circulation at a flow rate as specified in Table AA.1 at the value ± 5 % for (6 ± 2) s;*
– *Stage 7: Close valve 5, then immediately close valve 1;*
– *Stage 8: Open valve 2, static pressure at 1 MPa (10 bar) for (6 ± 2) s;*
– *Stage 9: Close valve 2, open valve 4. Upstream drain (opening of the relief valve) for (6 ± 2) s;*
– *Stage 10: Close valve 4.*

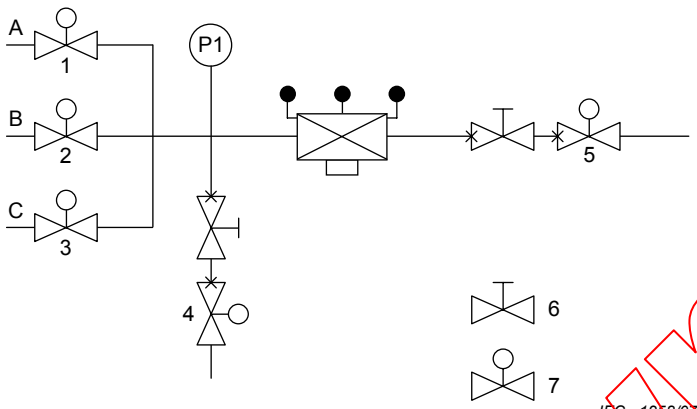
The complete series of test cycles is divided into the following test cycles:

– *1 250 cycles;*
– *the device is at rest for 14 h at ambient temperature;*
– *1 250 cycles;*
– *after this test cycle, the device is stored under a static pressure of 1 MPa (10 bar) for 14 h at room temperature;*
– *1 250 cycles;*
– *after this test cycle, the device is submitted for 14 h to an upstream pressure of 0,3 MPa (3 bar) and to a downstream pressure of 1 MPa (10 bar) at room temperature;*
– *1 250 cycles.*

Table AA.1 – Nominal size versus durability test flow rate

Nominal size of check valve DN mm	8	10	15	20	25
Flow rate m^3/h	0,4	0,6	1,3	2,2	3,5

At the end of the test, the device shall be fit for further use. Compliance is checked by the tests of 9.2 to 9.6.



Key

A	flow rate:	maximum pressure 0,3 MPa (3 bar) at zero-flow rate
B	static pressure:	1 MPa ± 0,05 MPa (10 bar ± 0,5 bar)
C	static pressure:	0,3 MPa ± 0,03 MPa (3 bar ± 0,3 bar)
P1	pressure gauge	
6	regulating valve	
7	valve with time control of opening and closing	

Figure AA.1 – Arrangement for the durability test on backflow preventers with reduced pressure zone