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INTERNATIONAL STANDARD

High pressure water jet machines - Safety -
Part 3: High pressure spraying devices

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CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 7
3 Terms and definitions 8
4 Safety requirements and/or measures 9
4.1 Common requirements for spraying devices 9
4.2 Hand-held spraying devices 9
4.3 Stability of mechanically hand-held spraying devices 11
4.4 Requirements for vibration with hand-held spraying devices 11
4.5 Marking the control devices 11
5 Verification of the safety requirements and/or measures 11
5.1 General 11
5.2 Hydrostatic pressure test of spraying devices 11
5.3 Mechanical tests and/or visual inspection of spraying devices 11
5.4 Testing of manually operated hand-held spraying devices 11
5.5 Testing the stability of mechanically operated hand-held spraying devices 12
5.6 Vibration measurement 12
5.7 Verification of markings 12
6 Information for use 12
6.1 General 12
6.2 Marking the spraying devices 12
Annex A (normative) Emission of vibration 13
A.1 General 13
A.2 Symbols 14
A.3 Information on vibration emission 15
A.4 Characterization of vibration 15
A.4.1 Direction of measurement 15
A.4.2 Location of measurements 15
A.4.3 Magnitude of vibration 17
A.4.4 Combination of vibration directions 17
A.5 Instrumentation requirements 17
A.5.1 General 17
A.5.2 Mounting of transducers 18
A.6 Measurement and operating conditions of the hand-held spraying device 18
A.6.1 General 18
A.6.2 Operating conditions 19
A.6.3 Operators 20
A.7 Measurement procedure and validity 20
A.7.1 Reported vibration values 20
A.7.2 Declaration and verification of the vibration emission value 20
A.8 Test report 21
A.9 Determination of uncertainty 22
A.9.1 General 22
A.9.2 Measurements on batches of hand-held spraying devices 23
Annex B (informative) List of significant hazards 25

B.1 Mechanical hazards 25
B.1.1 Hazards from hand-held spraying devices 25
B.1.2 Hazards from mechanically held spraying devices 25
B.2 Hazards from vibration 25
Annex C (informative) Noise test code 26
C.1 General 26
C.2 A-weighted emission sound pressure level at workstation determination 26
C.3 A-weighted sound power level determination 26
C.4 Mounting and operating conditions 27
C.5 Measurement uncertainties 27
C.6 Information to be recorded 28
C.7 Information to be reported 28
C.8 Declaration and verification of noise emission values 28
Bibliography 29

Figure 1 – Hand-held spraying device with support – Principle 10
Figure 2 – Hand-held spraying device – Recoil force and torque generation 10
Figure A.1 – Hand-held spraying device 13
Figure A.2 – Hand-held spraying device with additional side handle 14
Figure A.3 – Measurement locations: Hand-held spraying device, main and secondary measuring point 16
Figure A.4 – Measurement locations: Hand-held spraying device with additional side handle, main and secondary measuring point 17
Figure A.5 – Maximum distance between transducer and surface of the handle 18
Figure A.6 – Operating conditions – Position of hand-held spraying device 19

Table A.1 – Description and units of the symbols used 14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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High pressure water jet machines - Safety - Part 3: High pressure spraying devices

FOREWORD

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IEC 63458-3 has been prepared by subcommittee 61J: Safety of 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.

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

Draft	Report on voting
61J/764/CDV	61J/794/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/publications.

A list of all parts of the IEC 63458 series, under the general title: *High pressure water jet machines - Safety*, can be found on the IEC website.

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

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

This document is a type-C standard as stated in ISO 12100. This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

– machine manufacturers (small, medium and large enterprises);
– health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

– machine users/employers (small, medium and large enterprises);
– machine users/employees (e.g. trade unions, organizations for people with special needs);
– service providers, e.g. for maintenance (small, medium and large enterprises).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document. The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the scope of this document. When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

1 Scope

This part of IEC 63458 contains safety-related requirements for spraying devices for high pressure water jet units with drives of all kinds (e.g. electric motor, internal combustion engine, air and hydraulic) in which pumps are used to generate pressure. This document deals with all significant hazards, hazardous situations and events arising during assembly, erection, operation and servicing relevant to spraying devices for high pressure water jet units, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer. All references to spraying devices for high pressure water jet units within this document include machines for one or more of the following industrial applications:

– cleaning;
– surface preparation;
– material removal;
– readjustment of concrete;
– cutting.

NOTE 1 A list of significant hazards is given in informative Annex B.

This document applies to spraying devices for mobile and fixed high pressure water jet units, in which the water pressure is generated by a pressure generator/pump and in which the maximum allowable working pressure is more than the upper limit fixed in the scope of IEC 60335-2-79.

NOTE 2 35 MPa is currently the upper limit for machines covered by IEC 60335-2–79.

This document does not cover:

– high pressure cleaners which are dealt with in IEC 60335-2-54;

NOTE 3 IEC 60335-2–54 applies to steam cleaners for household use. IEC 60335-2–79 applies to high pressure cleaners having a rated pressure not less than 2,5 MPa and not exceeding 35 MPa, as well as 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.

– additional hazards due to the incorporation of high pressure water jet units into other process-technology machines;
– specific hazards associated with explosive atmospheres, use on ships or ambient temperatures outside the range 5 °C to 40 °C;
– hazards due to the nature of liquids used for jetting, other than that due to pressure;
– hazards associated with the drives or specific hazards due to any heat generation function. However, the hazards due to high temperatures of touchable surfaces are dealt with;
– high pressure water jet units which are manufactured before the date of its publication as IEC;
– high pressure water jet hoses which are covered by IEC 63458-2.

Tests according to this document are type tests unless they relate to routine (informative) tests to be carried out during series manufacture.

Compliance with IEC 63458-1, IEC 63458-2 and IEC 63458-3 provide the full requirements for high pressure water jet machines.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60204-1, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

IEC 60335-2-79, *Household and similar electrical appliances - Safety - Part 2-79: Particular requirements for high pressure cleaners and steam cleaners*

IEC 61310-2, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking*

IEC 63458-1:2026, *Household and similar electrical appliances - Safety - Part 1: High pressure water jet units*

IEC 63458-2:2026, *Household and similar electrical appliances - Safety - Part 2: High pressure water jet hoses, hose lines and connectors*

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

ISO 7010, *Graphical symbols - Safety colours and safety signs - Registered safety signs*

ISO 12100, *Safety of machinery - General principles for design - Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design*

ISO 17769-1, *Liquid pumps and installation - General terms, definitions, quantities, letter symbols and units - Part 1: Liquid pumps*

ISO 20643:2005, *Mechanical vibration - Hand-held and hand-guided machinery - Principles for evaluation of vibration emission*
ISO 20643:2005/AMD1:2012

EN 614-1:2006*, Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles*
EN 614-1:2006/AMD1:2009

EN 12096:1997, *Mechanical vibration - Declaration and verification of vibration emission values*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100, ISO 17769-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.1
high pressure water jet unit
machine with variable opening which provides water at high pressure together with any additive (chemical and/or abrasive) to emerge as a free jet without a spraying device or externally connected hose lines

Note 1 to entry: In general, high pressure water jet units consist of a drive, a pressure generator, pipelines, safety devices, control and measurement devices.

Note 2 to entry: High pressure water jet units are covered within IEC 63458-1.

3.2
drive
power unit consisting of electric motors, combustion engines, hydraulic motors, or air motors depending on the application

3.3
pressure generator
unit to generate operating pressure and supply cleaning agent to the spraying device (e.g. pump, intensifier)

3.4
pipeline
pipe which is permanently fixed and operationally connected to pipe fittings or valves

3.5
hose
flexible, tubular semi-finished product consisting of several layers and inserts

Note 1 to entry: Hoses and hose lines are covered within IEC 63458-2.

3.6
hose line
hose mounted with appropriate fittings

Note 1 to entry: Hoses and hose lines are covered within IEC 63458-2.

3.7
spraying device
spraying device consisting of the activation devices, the spraying pipe, extension pipe or nozzle pipe as well as the nozzle

Note 1 to entry: This also includes foot switches, foot valves with hose lines and spraying lances, spraying heads and nozzle mounts.

3.8
hand-held spraying device
spraying device of which the recoil force is to be absorbed by the person activating the spraying device

Note 1 to entry: The activation mechanism can be separated from the spraying device for operating reasons in the form of a foot switch (e.g. for spraying lances).

3.9
safety device
device that automatically prevents any relevant critical parameter such as pressure or temperature being exceeded

3.10
maximum allowable working pressure
pressure without consideration of the pressure peaks in the system up to which the machine is functional and at which the machine can safely be run

3.11
cleaning agent
water with or without the addition of gaseous, soluble or miscible detergent or solid abrasive

3.12
normal operation
conditions under which the machine is operated in normal use

Note 1 to entry: It denotes the operation at which the drive is set at maximum power, the pressure is set at the maximum allowable working pressure, with the appropriate nozzle and hose line fitted.

Note 2 to entry: All strainers and filters are in a clean operating condition, if applicable. The water heater, if fitted, is operated at maximum power.

4 Safety requirements and/or measures

4.1 Common requirements for spraying devices

Spraying devices shall be able to withstand the impact and shock stresses which can be expected during normal operation without displaying any leakage or limitation of the intended function.

The activation mechanism shall be protected against unintended activation (e.g. by a guard).

4.2 Hand-held spraying devices

When the activation mechanism is released, one of the following shall occur:

a) no more liquid shall emerge from the nozzle (dry shut-off);
b) any liquid emerging from the spraying device shall generate a reaction force no greater than the weight of the spraying device;
c) the pressure generator shall be switched off. The safety related parts of the control system shall present a performance level of at least "c", defined in accordance with ISO 13849-1.

The release of the activation mechanism shall not be impaired or made impossible by recoil effects during shutting-off. The holding force that has to be exerted manually on the activation mechanism of the spraying device to maintain spraying shall not exceed 60 N for the whole hand.

The activation mechanism shall be lockable in the OFF-position. This can be achieved e.g. by a knob, hand lever or switch. There shall be no provision to lock the activation mechanism in the ON-position.