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High pressure water jet machines - Safety -
Part 1: High pressure water jet units

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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High pressure water jet machines - Safety - Part 1: High pressure water jet units

FOREWORD

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IEC 63458-1 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/762/CDV	61J/792/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 663458 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– withdrawn, or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 12100:2010. 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 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 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 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 List of significant hazards is given in informative Annex B.

This document applies to 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;
– hazard 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 standard;
– high pressure water jet hoses which are covered by IEC 63458-2;
– high pressure water jet spraying device which are covered by IEC 63458-3;

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

NOTE 4 Routine tests are described in informative Annex A.

Compliance with IEC 63458-1, IEC 63458-2 and IEC 63458-3 provides 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 60204-1:2016, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
IEC 60204-1:2016/AMD1:2021

IEC 60335-1:2020, *Household and similar electrical appliances - Safety - 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 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61310-1:2007, *Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2:2007, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking*

IEC 62745, *Safety of machinery - Requirements for cableless control systems of machinery*

IEC 63458-2, *High pressure water jet machines - Safety - Part 2: High pressure hoses, hose lines and connectors*

IEC 63458-3, *High pressure water jet machines - Safety - Part 3: High pressure spraying devices*

ISO 3743-1, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for a hard-walled test room*

ISO 3744:2025, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane*

ISO 4871, *Acoustics - Declaration and verification of noise emission values of machinery and equipment*

ISO 7010:2019, *Graphical symbols - Safety colours and safety signs - Registered safety signs*

ISO 11203, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a workstation and at other specified positions from the sound power level*

ISO/TR 11688-1:1995, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning*

ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction*

ISO 12162:2009, *Thermoplastics materials for pipes and fittings for pressure applications − Classification, designation and design coefficient*

ISO 13732-1, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces*

ISO 13857, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14119, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection*

ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards*

ISO 17769-1:2012, *Liquid pumps and installation - General terms, definitions, quantities, letter symbols and units - Part 1: Liquid pumps*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 17769-1:2012 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 and 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.

3.2
program controlled high pressure water jet unit
machine characterised by spatial separation of the installation site of the pressure generator and the workplace, by permanently installed high pressure lines between the installation site and one or more workplaces having spraying devices incorporating start-up/shut-down of the system by means of external switching mechanisms not activated by the operator of a spraying device

Note 1 to entry: In this context, the activation device of the spraying device is not considered to be a switching mechanism.

3.3
drive
power unit consisting of electric motors, combustion engines, hydraulic motors, or air motors depending on the application

3.4
pressure generator
unit to generate operating pressure and supply cleaning agent to the spraying device (e.g. pump, intensifier)

3.5
high pressure line
pipeline or hose line in which the high pressure water is fed to the point of use

3.6
pipeline
pipe which is permanently fixed and operationally connected to pipe fittings or valves

3.7
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.

3.8
hose line
hose mounted with appropriate fittings

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

3.9
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.

3.10
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).

3.11
safety device
device that automatically prevents any relevant critical parameter such as pressure or temperature being exceeded

3.12
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

3.13
operating temperature of the liquid
temperature of the liquid at any specified point

3.14
replacement inserts
changeable installation to a pressure generator, with pistons/plungers/seals/safety valves for different diameters resulting in different displacements and pressures

3.15
pulsation damper
device to diminish the amplitude of pressure pulsations