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Højtryksvandstrålemaskiner – Sikkerhedskrav – Del 1: Maskiner

High-pressure water jet machines – Safety
requirements – Part 1: Machines

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EUROPÄISCHE NORM

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Supersedes EN 1829-1:2010

English Version

High-pressure water jet machines - Safety requirements - Part 1: Machines

Machines à jet d'eau à haute pression -
Exigences de sécurité - Partie 1 : Machines

Hochdruck-Wasserstrahlmaschinen -
Sicherheitsanforderungen - Teil 1: Maschinen

This European Standard was approved by CEN on 9 November 2020.

CEN 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 CEN 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 CEN 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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document ([EN 1829-1:2021](#)) has been prepared by Technical Committee CEN/TC 197 "Pumps", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2021, and conflicting national standards shall be withdrawn at the latest by July 2021.

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

This document supersedes [EN 1829-1:2010](#).

The main changes compared with the previous edition are as follows:

- general revision according to the state of the art;
- revision of the vibration test code requirements;
- deletion of previous normative [Annex A](#) on noise test code, which has been replaced by normative annex on emission of vibration;
- addition of informative Annex B on vibration report and informative [Annex C](#) on routine testing;
- clarification of hydrostatic pressure testing;
- transfer of [Clause 4](#) on the list of significant hazards to informative [Annex D](#);
- update of [Annex ZA](#) in relation to Directive 2006/42/EC.

[EN 1829](#), *High-pressure water jet machines — Safety requirements*, consists of the following parts:

- Part 1: *Machines*
- Part 2: *Hoses, hose lines and connectors*

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Directive 2006/42/EC.

For relationship with EU Directive, see informative [Annex ZA](#), which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This document is a type-C standard as stated in [EN 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.

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High-pressure water jet machines – Safety requirements –

Part 1: Machines

1 Scope

This document contains safety-related requirements for high pressure water jet machines 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 machines, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see [Annex ZA](#)). All references to high pressure water jet machines within this document includes 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 D](#).

This document applies to mobile and fixed high pressure water jet machines, 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 [EN 60335-2-79:2012](#).

NOTE 2 — 35 MPa is currently the upper limit for machines covered by [EN 60335-2-79:2012](#).

This document does not cover:

- requirements of the Pressure Equipment Directive 2014/68/EU;

NOTE 3 — In some cases, specific parts can be in the scope of that directive, but their application is not dealt with in this document.

- high pressure cleaners which are dealt with in [EN 60335-2-54:2008](#), [EN 60335-2-54:2008/A11:2012](#), [EN 60335-2-54:2008/A11:2012/AC:2015](#), [EN 60335-2-54:2008/A1:2015](#) and [EN 60335-2-79:2012](#);

NOTE 4 — [EN 60335-2-54:2008](#), [EN 60335-2-54:2008/A11:2012](#), [EN 60335-2-54:2008/A11:2012/AC:2015](#) and [EN 60335-2-54:2008A1:2015](#) applies to steam cleaners for household use. [EN 60335-2-79:2012](#) 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 machines 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;

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- high pressure water jet machines which are manufactured before the date of its publication as EN;
- hazards due to noise for what concerns the declaration of noise emission values in the instructions.

NOTE 5 — Noise emission measurement and noise declaration will be dealt with in an upcoming amendment to this document.

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

NOTE 6 — Routine tests are described in informative [Annex C](#).

Compliance with [EN 1829-1](#) and [EN 1829-2](#) 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.

[EN 614-1:2006+A1:2009](#), *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

[EN 809:1998+A1:2009](#), *Pumps and pump units for liquids — Common safety requirements*

[EN 809:1998+A1:2009/AC:2010](#), *Pumps and pump units for liquids — Common safety requirements*

[EN 981:1996+A1:2008](#), *Safety of machinery — System of auditory and visual danger and information signals*

[EN 1829-2:2008](#), *High-pressure water jet machines — Safety requirements — Part 2: Hoses, hose lines and connectors*

[EN 12096:1997](#), *Mechanical vibration — Declaration and verification of vibration emission values*

[EN 12162:2001+A1:2009](#), *Liquid pumps — Safety requirements — Procedure for hydrostatic testing*

[EN 60204-1:2018](#), *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

[EN 60335-2-79:2012](#), *Household and similar electrical appliances — Safety — Part 2-79: Particular requirements for high pressure cleaners and steam cleaners IEC 60335-2-79:2012)*

[EN 60529:1991](#), *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

[EN 60529:1991/AC:2016-12](#), *Degrees of protection provided by enclosures (IP code) (IEC 529:1989)*

[EN 60529:1991/A1:2000](#), *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989/A1:1999)*

[EN 60529:1991/A2:2013](#), *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989/A2:2013)*

[EN 60529:1991/A2:2013/AC:2019-02](#), *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989/A2:2013/Cor1:2019)*

[EN ISO 5349-1:2001](#), *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 1: General requirements (ISO 5349-1:2001)*

[EN ISO 7010:2020](#), *Graphical symbols — Safety colours and safety signs — Registered safety signs (ISO 7010:2019)*

[EN ISO 12100:2010](#), *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

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[EN ISO 13732-1:2008](#), *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

[EN ISO 13849-1:2015](#), *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

[EN ISO 13857:2019](#), *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

[EN ISO 17769-1:2012](#), *Liquid pumps and installation — General terms, definitions, quantities, letter symbols and units — Part 1: Liquid pumps (ISO 17769-1:2012)*

[EN ISO 20643:2008](#), *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission (ISO 20643:2005)*

[EN ISO 20643:2008/A1:2012](#), *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission Amendment 1: Accelerometer positions (ISO 20643:2005/Amd 1:2012)*

[IEC 62745:2017](#), *Safety of machinery — Requirements for cableless control systems of machinery*