SLOVENSKI STANDARD
SIST EN 1829-1:2021

01-marec-2021

Nadomešča:
SIST EN 1829-1:2010

Visokotlačni stroji z vodnim curkom - Varnostne zahteve - 1. del: Stroji

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

Hochdruck - Wasserstrahlmaschinen - Sicherheitsanforderungen - Teil 1: Maschinen

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

Ta slovenski standard je istoveten z: **EN 1829-1:2021**

ICS:

97.080	Aparati za čiščenje	Cleaning appliances

SIST EN 1829-1:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1829-1

January 2021

ICS 43.180; 97.080

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.

CEN members are the national standards bodies of 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 United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 1829-1:2021 E

Contents

Page

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.

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.

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;

— 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)*

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*

3 Terms and definitions

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

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

— IEC Electropedia: available at http://www.electropedia.org/

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

3.1
high pressure water jet machine
machine with nozzle or other variable opening which allows water at high pressure together with any additive (chemical and/or abrasive) to emerge as a free jet

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

3.2
program controlled high pressure water jet machine
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 EN 1829-2:2008.

3.8
hose line
hose mounted with appropriate fittings

Note 1 to entry: Hoses and hose lines are covered within EN 1829-2:2008.

3.9
spraying device

3.9.1
general
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.

3.9.2
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).

3.9.3
mechanically operated spraying device
spraying device of which the recoil force is absorbed by a mechanical restraint

3.10
activation device

3.10.1
dry shut-off device
device for hand-held spraying devices by which the feed of liquid to the high pressure nozzle is actuated by opening or shutting a valve

Note 1 to entry: When shut no liquid exits the nozzle.

3.10.2
dump device
device for hand-held spraying devices where by opening or shutting of a valve the feed of liquid is directed to a bypass pipe by which the generated pressure is limited by the means of the larger bypass nozzle while the pipe to the high pressure nozzle is kept open

3.10.3
dump gun
hand-held spraying device in which the dump device is incorporated

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 may safely be run

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

3.14
retooling
modification of the machines performance by using alternative components (e.g. replacement inserts and alternative nozzles)

3.15
replacement inserts
changeable installation to a pressure generator, with pistons/plungers/seals/safety valves for different diameters resulting in different displacements and pressures

3.16
pulsation damper
device to diminish the amplitude of pressure pulsations

3.17
test pressure
gauge pressure to which a part, component or pump is subjected for the purpose of strength or leak testing

3.18
cleaning agent
water with or without the addition of gaseous, soluble or miscible detergent or solid abrasive

3.19
two hand device
device requiring at least simultaneous operation by both hands in order to activate and use the high-pressure operation of the machine

3.20
safety pressure
pressure at which the safety device of the system must activate

3.21
normal operation
conditions under which the machine is operated in normal use. 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 1 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 General

Machinery shall comply with the safety requirements and/or protective measures of this clause.

Pumps and pump units shall conform to EN 809:1998+A1:2009, EN 809:1998+A1:2009/AC:2010.

If fixed guards are used, their fixing systems shall remain attached to the guards or to the machinery when the guards are removed.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards which are not dealt with by this document.