



**SLOVENSKI STANDARD**  
**oSIST prEN 1829-1:2018**  
**01-november-2018**

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**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: prEN 1829-1:2018**

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**ICS:**

97.080      Aparati za čiščenje      Cleaning appliances

**oSIST prEN 1829-1:2018**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 1829-1**

August 2018

ICS 43.180; 97.080

Will supersede 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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 197.

If this draft becomes a European Standard, 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.

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

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## 122 **European foreword**

123 This document (prEN 1829-1:2018) has been prepared by Technical Committee CEN/TC 197  
124 “Pumps”, the secretariat of which is held by AFNOR.

125 This document is currently submitted to the enquiry.

126 This document will supersede EN 1829-1:2010.

127 This document has been prepared under a mandate given to CEN by the European Commission and  
128 the European Free Trade Association, and supports essential requirements of EU Directive(s).

129 For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this  
130 document.

131 EN 1829, *High-pressure water jet machines — Safety requirements*, consists of the following parts:

132 — *Part 1: Machines*

133 — *Part 2: Hoses, hose lines and connectors*

134 Compliance with the clauses of Part 1 together with those of Part 2 of EN 1829 provides one means  
135 of conforming with the essential health and safety requirements of the Directive concerned.

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## 136 **Introduction**

137 This European Standard is a type C standard as stated in EN ISO 12100.

138 The machinery concerned and the extent to which hazards, hazardous situations and hazardous  
139 events are covered, are indicated in the scope of this document.

140 When provisions of this type C standard are different from those which are stated in type A or B  
141 standards, the provisions of this type C standard take precedence over the provisions of the other  
142 standards, for machines that have been designed and built according to the provisions of this type C  
143 standard.

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## 144 1 Scope

145 This document contains safety-related requirements for high pressure water jet machines with  
146 drives of all kinds (e.g. electric motor, internal combustion engine, air and hydraulic) in which  
147 pumps are used to generate pressure. This document deals with all significant hazards, hazardous  
148 situations and events arising during assembly, erection, operation and servicing relevant to high  
149 pressure water jet machines, when they are used as intended and under conditions of misuse which  
150 are reasonably foreseeable by the manufacturer (see Clause 4). All references to high pressure  
151 water jet machines within this document includes machines for one or more of the following  
152 industrial applications:

- 153 — cleaning;
- 154 — surface preparation;
- 155 — material removal;
- 156 — readjustment of concrete;
- 157 — cutting.

158 This document applies to mobile and fixed high pressure water jet machines, in which the water  
159 pressure is generated by a pressure generator/pump and in which the maximum allowable working  
160 pressure is more than the upper limit fixed in the scope of EN 60335-2-79.

161 NOTE 1 35 MPa (350 bar) is currently the upper limit for machines covered by EN 60335-2-79.

162 NOTE 2 In general the machines in the scope will not be in the scope of the Pressure Equipment Directive  
163 2014/68/EU. In some cases specific parts may be in the scope of that directive, but their application is not  
164 dealt with in this document.

165 This document does not apply to high pressure cleaners which are dealt with in EN 60335-2-54 and  
166 EN 60335-2-79.

167 NOTE 3 EN 60335-2-54 applies to steam cleaners for household use. EN 60335-2-79 applies to high  
168 pressure cleaners having a rated pressure not less than 2,5 MPa and not exceeding 35 MPa, as well as steam  
169 cleaners and those parts of hot water high pressure cleaners incorporating a steam stage which have a  
170 capacity not exceeding 100 l, a rated pressure not exceeding 2,5 MPa and a product of capacity and rated  
171 pressure not exceeding 5 MPa·l.

172 This document does not cover additional hazards due to the incorporation of high pressure water  
173 jet machines into other process-technology machines.

174 This document does not cover specific hazards associated with explosive atmospheres, use on ships  
175 or ambient temperatures outside the range 5 °C to 40 °C.

176 This document does not cover hazards associated with the drives or specific hazards due to any  
177 heat generation function. However, the hazards due to high temperatures of touchable surfaces are  
178 dealt with.

179 Any hazard due to the nature of liquids used for jetting, other than that due to pressure, is excluded  
180 from the scope of this document.

181 This document is not applicable to high pressure water jet machines which are manufactured  
182 before the date of its publication as EN.

183 Tests according to this standard are type tests.

184 NOTE 4 Routine tests are described in Annex D.

## prEN 1829-1:2018 (E)

185 **2 Normative references**

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

190 EN 614-1:2006, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and*  
191 *general principles*

192 EN 809:1998+A1:2009, *Pumps and pump units for liquids - Common safety requirements*

193 EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and*  
194 *construction of fixed and movable guards*

195 EN 981:1996+A1, *2008 Safety of machinery — System of auditory and visual danger and*  
196 *information signals*

197 EN 1088:1995+A2:2008, *Safety of machinery — Interlocking devices associated with guards —*  
198 *Principles for design and selection*

199 EN 12162:2001+A1:2009, *Liquid pumps - Safety requirements - Procedure for hydrostatic testing*

200 EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General*  
201 *requirements*

202 EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

203 EN ISO 3743-1:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise*  
204 *sources using sound pressure - Engineering methods for small movable sources in reverberant fields -*  
205 *Part 1: Comparison method for a hard-walled test room (ISO 3743-1:2010)*

206 EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise*  
207 *sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane*  
208 *(ISO 3744:2010)*

209 EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and*  
210 *equipment (ISO 4871:1996)*

211 EN ISO 7010:2003, *Graphical symbols — Safety colours and safety signs — Safety signs used in*  
212 *workplaces and public areas*

213 EN ISO 11203:2009, *Acoustics - Noise emitted by machinery and equipment - Determination of*  
214 *emission sound pressure levels at a work station and at other specified positions from the sound power*  
215 *level (ISO 11203:1995)*

216 EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk*  
217 *reduction (ISO 12100:2010)*

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

220 EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General*  
221 *principles for design (ISO 13849-1:2015)*

222 EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by*  
 223 *upper and lower limbs (ISO 13857:2008)*

### 224 3 Terms and definitions

225 For the purposes of this document, the definitions given in EN ISO 12100, EN 12723 and the  
 226 following apply.

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

229 • IEC Electropedia: available at <http://www.electropedia.org/>

230 • ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 231 3.1

#### 232 **high pressure water jet machine**

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

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

#### 237 3.2

#### 238 **program controlled high pressure water jet machine**

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

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

#### 245 3.3

#### 246 **drive**

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

#### 249 3.4

#### 250 **pressure generator**

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

#### 253 3.5

#### 254 **high pressure line**

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

#### 256 3.6

#### 257 **pipeline**

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

#### 259 3.7

#### 260 **hose**

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

262 Note 1 to entry: Hoses and hose lines are covered within part 2 of EN 1829.

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- 263 **3.8**  
 264 **hose line**  
 265 hose mounted with appropriate fittings
- 266 Note 1 to entry: Hoses and hose lines are covered within part 2 of EN 1829.
- 267 **3.9**  
 268 **spraying device**  
 269 **3.9.1**  
 270 **general**  
 271 spraying device consisting of the activation devices, the spraying pipe, extension pipe or nozzle pipe  
 272 as well as the nozzle
- 273 Note 1 to entry: This also includes foot switches, foot valves with hose lines and spraying lances, spraying  
 274 heads and nozzle mounts
- 275 **3.9.2**  
 276 **hand-held spraying device**  
 277 spraying device of which the recoil force is to be absorbed by the person activating the spraying  
 278 device
- 279 Note 1 to entry: The activation mechanism can be separated from the spraying device for operating reasons  
 280 in the form of a foot switch (e.g. for spraying lances).
- 281 **3.9.3**  
 282 **mechanically operated spraying device**  
 283 spraying device of which the recoil force is absorbed by a mechanical restraint
- 284 **3.10**  
 285 **activation device**  
 286 **3.10.1**  
 287 **dry shut-off device**  
 288 device for hand-held spraying devices by which the feed of liquid to the high pressure nozzle is  
 289 actuated by opening or shutting a valve
- 290 Note 1 to entry: When shut no liquid exits the nozzle.
- 291 **3.10.2**  
 292 **dump device**  
 293 device for hand-held spraying devices where by opening or shutting of a valve the feed of liquid is  
 294 directed to a bypass pipe by which the generated pressure is limited by the means of the larger  
 295 bypass nozzle while the pipe to the high pressure nozzle is kept open
- 296 **3.10.3**  
 297 **dump gun**  
 298 hand-held spraying device in which the dump device is incorporated
- 299 **3.11**  
 300 **safety device**  
 301 device that automatically prevents any relevant critical parameter such as pressure or temperature  
 302 being exceeded
- 303 **3.12**  
 304 **maximum allowable working pressure**  
 305 pressure without consideration of the pressure peaks in the system up to which the machine is  
 306 functional and at which the machine may safely be run

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- 307 **3.13**  
 308 **operating temperature of the liquid**  
 309 temperature of the liquid at any specified point
- 310 **3.14**  
 311 **retooling**  
 312 modification of the machines performance by using alternative components (e.g. replacement  
 313 inserts and alternative nozzles)
- 314 **3.15**  
 315 **replacement inserts**  
 316 changeable installation to a pressure generator, with pistons/plungers/seals/safety valves for  
 317 different diameters resulting in different displacements and pressures
- 318 **3.16**  
 319 **pulsation damper**  
 320 device to diminish the amplitude of pressure pulsations
- 321 **3.17**  
 322 **test pressure**  
 323 gauge pressure to which a part, component or pump is subjected for the purpose of strength or leak  
 324 testing
- 325 **3.18**  
 326 **cleaning agent**  
 327 water with or without the addition of gaseous, soluble or miscible detergent or solid abrasive
- 328 **3.19**  
 329 **two hand device** [https://standards.iteh.ai/catalog/standards/sist/d2a7bce8-eea5-48fc-836a-  
bc9d0e5c2cbb/sist-en-1829-1-2021](https://standards.iteh.ai/catalog/standards/sist/d2a7bce8-eea5-48fc-836a-bc9d0e5c2cbb/sist-en-1829-1-2021)  
 330 device requiring at least simultaneous operation by both hands in order to activate and use the  
 331 high-pressure operation of the machine
- 332 **3.20**  
 333 **safety pressure**  
 334 pressure at which the safety device of the system must activate
- 335 **4 List of significant hazards**
- 336 **4.1 General**
- 337 This clause contains all the significant hazards, hazardous situations and events within the scope of  
 338 this European Standard, identified by risk assessment as significant for this type of machinery and  
 339 which require action to eliminate or reduce the risk.
- 340 **4.2 Hazards from the intended exit of water under high pressure**
- 341 The jet of water leaving the nozzle of a high pressure water jet machine is a hazard; by the abrasive  
 342 cutting effect, by intruding into objects or by swinging or deflecting the high pressure water jet  
 343 nozzle and hose.