



SLOVENSKI STANDARD
oSIST prEN 1829-2:2005
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High-pressure cleaners, high-pressure water jet machines - Safety requirements - Part 2:
Hoses lines and connecting elements

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ICS:

97.080 Aparati za nego tal Floor treatment appliances

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1829-2

July 2005

ICS

English version

**High-pressure Cleaners - High-pressure water jet machines -
Safety requirements - Part 2: Hoses, hose lines and joints for
high-pressure cleaners, high-pressure water jet machines and
water jet cutters as well as safety devices to safeguard joints for
hose lines**

Nettoyeurs haute pression - Machines à jet d'eau à haute
pression - Prescriptions de sécurité - Partie 2 : Tuyauteries
et éléments de raccordement

Hochdruckreiniger - Hochdruckwasserstrahlmaschinen -
Sicherheitstechnische Anforderungen - Teil 2: Schläuche,
Schlauchleitungen und Verbindungselemente für
Hochdruckreiniger, Hochdruckwasserstrahlmaschinen und
Wasserstrahlschneideanlagen sowie
Sicherungseinrichtungen zur Sicherung aller
Schlauchleitungsverbindungen

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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.

This draft European Standard was established by CEN 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 Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 1829-2:2005) has been prepared by Technical Committee CEN/TC 197 "Pumps", the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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

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

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Introduction

This European Standard has been prepared to be a harmonised standard to provide one means of conforming with the essential safety requirements of the 98/37/EC Directive ("Machinery") and associated EFTA Regulations.

Any machinery affected by this Standard may have pressurized components which are subject to the 97/23/EC Directive for "Pressure Parts", such as hose lines exceeding a nominal diameter of 32 mm. Such components are subject to the additional regulations of the 97/23/EC Directive ("Pressure Part Directive").

This European Standard is a C-type standard in accordance with EN 1070.

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

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1 Scope

This European Standard contains the safety-related requirements, testing procedures, and markings for hoses, hose lines, and connectors as well as for safety mechanisms applied to interconnect lines and to safeguard the connections from the pressure generator to the spraying device on hose lines for the application of high-pressure cleaners, high-pressure water jet machines, and water jet cutters in accordance with EN 1829, part 1, in which the maximum allowable working pressure is more than 250 bar.

All references to high pressure water jet machines within this European Standard shall also include high pressure cleaners. The word "spray" is used for spraying as well as for cutting procedures.

For machines of similar application that are outside of the scope of this European Standard and for which there is no alternative European Standard available, the relevant clauses of this European Standard may be used where applicable.

The high pressure water jet machines treated by this standard are mainly intended for use in industrial applications such as:

- Cleaning
- Readjustment of concrete
- Cutting applications

This European Standard does not apply to high pressure water jet machines which are dealt with in EN 60335-2-54 and EN 60335-2-79.

This European Standard deals with technical safety requirements to minimise the hazards listed in clause 4 which can arise from constructing, assembling, erecting, operating and servicing of high pressure water jet machines.

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This European Standard does not cover specific situations where high pressure water jet machines are incorporated within other installations.

This European Standard does not cover specific hazards associated with explosive atmospheres, use on ships or specific temperatures (less than 5 °C or higher than 40 °C).

Any hazard due to the nature of fluid other than that due to pressure is excluded from the scope of this standard.

This European Standard applies to high pressure water jet machines that were manufactured/introduced to the market after the date of publication of this standard.

2 Normative references

The following referenced documents are indispensable for the application 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 563:1994	Safety of machinery – temperatures of accessible surfaces – ergonomic data to determine thermal limits for hot surfaces.
EN 775	Safety of industrial robots.
EN 954-1	Safety of machinery – safety-related parts of control systems - part 1: general principles of design.

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EN 1070	Safety of machinery – terminology.
EN 60335-2-54	Safety of household and similar electrical appliances - part 2: particular requirements for surface-cleaning appliances employing liquids.
EN 60335-2-79	Safety of household and similar electrical appliances - part 2: particular requirements for high-pressure cleaners and steam cleaners for industrial and commercial applications.
EN ISO 12100-1	<i>Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology</i>
EN ISO 12100-2	<i>Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles</i>
ISO 3864	Safety colours and safety signs.

3 Terms and definitions

For the purpose of this document the usual arrangement of items within the scope of this European Standard are shown, for illustrative purposes only, in Figure 1.



Key:

- 1 – Pressure generator
- 2 – Fixing device (Whip restraint)
- 3 – Connector
- 4 – Safety mechanism for connectors
- 5 – Safety mechanism operator spray shield

Figure 1

For the purpose of this document, the following terms and definitions shall apply:

3.1 High pressure water jet machine
A machine with nozzle or other variable opening which allow water with high pressure (greater than 250 bar) together with any additive (chemical and/or abrasive) to emerge as a free jet

NOTE: In general, high pressure water jet machines consist of a driver, a pressure generator, pipelines, hose lines, spraying devices, safety mechanisms, control and measurement devices.

3.2

Programme controlled high pressure water jet machines

Those are 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 the workplace with one or more connection sites for spraying devices as well as by a start-up of the system by means of external switching mechanisms.

NOTE: In this context, the actuating mechanism is not regarded as an operating mechanism.

3.3

High pressure line

Describes a pipeline or hose line used to feed pressurized water from the pressure generator to the spraying device.

3.4

Pipelines

Pipes which are permanently fixed and operationally connected to suitable pipe fittings or valves.

3.5

Hoses

In accordance with the scope of this standard hoses are flexible, tubular semi finished products that are designed from one or several layers and fitted with inserts that accommodate hose fittings.

3.6

Hose lines

A hose line is an operational hose which has been connected with appropriate hose fittings.

3.7

Spraying device

A device to yield a liquid stream.

NOTE: A spraying device usually consists of an actuating unit, a spraying pipe / an extension pipe / nozzle pipe as well as the nozzle. This also includes a foot switch, foot valves with hose lines and spraying lances, spraying heads, and nozzle mounts.

3.8

Rated outlet pressure

The pressure that occurs at the pressure generator at a certain volume flow with the appropriate nozzle.

3.9

Maximum allowable working pressure

The maximum pressure up to which the machine is functional and at which the machine may safely be run.

3.10

Bursting pressure

Static pressure that destroys the hose and allows the liquid escape.

3.11

Hose test pressure

Pressure applied to test a hose under certain test conditions.

3.12

Operating temperature of the liquid

The temperature of the liquid at any specified point.

3.13

Pulsation damper

A device to damp pressure pulsation.

prEN 1829-2:2005 (E)**3.14****Interconnected hose lines**

Several hose lines which have been connected with each other.

3.15**Connector**

Hose fittings and components applied to connect hose lines.

3.16**Safety mechanism**

1 Part or component of a hose line to restrain axial tensile forces from the hose line to the pressure generator or to the spraying device or from one hose line to another if the fitting has accidentally come off or has unintentionally been torn off (e.g. by use of a locking collar, hose sleeve, etc.).

2 A shield to protect the operator from spray if a leak occurs close to a hand held spraying device.

3.17**Fixing device (Whip restraint)**

Part or interconnected parts to transmit the reactive forces released when the hose line has come off accidentally or has been torn off unintentionally and would otherwise act like a whip.

4 List of hazards**4.1 General**

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt within this standard, identified by risk assessment as significant for this type of machinery and which requires action to eliminate or reduce the risk.

4.2 Hazards due to bursting or leaking of hose lines

Hazard can occur when a hose line bursts or leaks, The escaping stream of liquid can cause physical damage, and also cause a sudden repositioning of the hose line in a dangerous manner.

The hazard due to scalding from hot liquid, or from irritation / burning of any added chemicals is not covered in this European Standard.

4.3 Hazards due to a hot medium inside the hose line

Hazardous situations can occur when the hot surface of a hose line is touched (burns).

4.4 Hazards due to hose line repositioning

Hazardous situations can also occur when the operator loses their firm hold and when there is a loss of operational control due to extreme movements of the hose line (whip).

4.5 Hazards due to failure of connectors and components used to connect hose lines

Hazardous situations can occur when connectors between two hose lines come off, fracture, or are torn off and cause a spray of liquid and / or the hose line to flap like a whip.

4.6 Hazards due to poor connection between the safety mechanism and the hose line

Hazardous situations can occur when the hose line has come off accidentally or when the connector has been torn off unintentionally and the subsequent failure of a safety mechanism or its fixing to the hose line malfunction.

Note This is a second level failure and the probability is very small.

4.7 Hazards due to a failure of the fixing device

Hazardous situations can occur when the hose line comes off accidentally or when the hose line has been torn off unintentionally and failure of the fixing device (e.g. fracture of the device, accidental disengaging, missing safeguard against accidental disengaging).

Note This is a second level failure and the probability is very small.

5 Requirements

5.1 General requirements

Hoses, hose lines, and connectors have to feature a certain structure in order to guarantee safe operation when used properly. They must not bear any risks for the operator or for the workplace and its environment. However, improper use of a hose line or the connectors may result in hazardous situations and must be avoided.

The hoses, connectors and fittings combined to hose lines have to match each other in terms of structure, composition, and design.

The design of any safety mechanisms to protect interconnected hose lines and to safeguard spraying device connections and pressure generator connections of hose lines has to provide safe operational performance to eliminate any risk or hazard for the operator or their environment. However, improper use of a hose line or the connectors may result in hazardous situations and must be avoided.

5.2 Mechanical requirements

All components of a hose line as well as the particular connectors shall be capable of withstanding at least the hose test pressure

5.3 Requirements concerning the maximum allowable working pressure for the hose line

The maximum allowable working pressure shall not exceed 40% of the minimum bursting pressure of the particular parts and devices.

5.4 Thermal requirements

The design of the hose lines connectors and fittings shall comply with the regulations as stated in EN 563 concerning the workplace when subjected to the maximum operating temperature of the liquid.

None of the parts of the hose line and connections that can be touched during normal operation shall exceed the temperature limits of Table 1.

If the temperature of other surfaces can exceed the values in Table 1 during normal operation, measures should be taken to reduce the risk of contacting such surfaces. If this is not possible then warnings to the user / operator shall be given.