SLOVENSKI STANDARD
SIST EN 809:2000+A1:2009

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Ļrpalke in deli ļrpalk za tekoļine - Sploġne varnostne zahteve

Pumps and pump units for liquids - Common safety requirements

Pumpen und Pumpenaggregate für Flüssigkeiten - Allgemeine sicherheitstechnische Anforderungen

Pompes et groupes motopompes pour liquides - Prescriptions communes de sécurité

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23.080 Ļrpalke Pumps

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Pumps and pump units for liquids - Common safety requirements

Pompes et groupes motopompes pour liquides - Prescriptions communes de sécurité

Pumpen und Pumpenaggregate für Flüssigkeiten - Allgemeine sicherheitstechnische Anforderungen

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Foreword

This document (EN 809:1998+A1:2009) 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of an identical text or by endorsement, at the latest by April 2010, and conflicting national standards shall be withdrawn at the latest by April 2010.

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

This document includes Amendment 1, approved by CEN on 2009-08-20 and Corrigendum 1, issued by CEN on 2001-02-14.

This document supersedes EN 809:1998.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags ⟨AC⟩ ⟨AC⟩.

This European Standard 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).

⟨A1⟩ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

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

Introduction

This Standard has been prepared to be a harmonized standard to provide one means of conformity with the Essential requirements of the Machinery Directive and associated EFTA Regulations.

〈A1〉 This European Standard is a type C standard as stated in EN ISO 12100-1.

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

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.

The extent to which hazards are covered is indicated in Clause 4 "List of hazards" of this European Standard. 〈A1〉

1 Scope

〈A1〉 This European Standard establishes the technical safety requirements for:

— constructing;

— assembling;

— erecting;

— operating;

— servicing;

a liquid pump or pump unit. It contains a list of significant hazards, which can arise with the use of a liquid pump or pump unit, and establishes the requirements and/or protective measures which will lead to a reduction of the risks.

Liquid pumps covered by this European Standard are:

— rotodynamic pumps;

— rotary positive displacement pumps;

— reciprocating displacement pumps;

supplied separately without drive (electric motor or internal combustion engine).

In general, pumps are defined as being terminated by their inlet and outlet connections as well as by their shaft ends. Pumps supplied in this form are usually called bareshaft pumps. They are 'machines' in the definition of the Machinery Directive.

The assembly of a bareshaft pump with its driver can require measures that are outside the scope of this European Standard.

Pump units are described as:

Liquid pumps together with a driver and including transmission elements, baseplates, and any auxiliary equipment.

This European Standard does not deal either with the technical safety requirements for the design or manufacture of drivers nor of auxiliary equipment. It does not set down either requirements for the risks directly arising from means provided for the portability, transportability and mobility of pump units during or between periods of their operation, nor the requirements for transmission shafts linking a tractor or other self-propelled machinery to a pump.

This European Standard does not cover pumps and pump units for the following applications:

— pumps and pump units whose only power source is directly applied manual effort;

— pumps and pump units for medical use used in direct contact with the patient;

— pumps and pump units specially designed or put into service for nuclear purposes which, in the event of failure, can result in an emission of radioactivity;

— pumps and pump units for use on seagoing vessels or mobile off-shore units;

— pumps and pump units specially designed for military or police purposes.

Neither does it cover pumps and pump units for hydraulic power transmission.

Specific requirements for particular features of pumps additional to the common requirements set out in this standard can be found in other standards such as EN 1028, EN 1151, EN 1829, and in the European Standards on submersible pump units and for liquid pumps for the use in agrifoodstuff industries.

This European Standard is not applicable to pumps and pump units which are manufactured before the date of publication of this European Standard by CEN.

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 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 894-1, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays control actuators*

EN 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1037, *Safety of machinery — Prevention of unexpected start-up*

EN 12162, *Liquid pumps — Safety requirements — Procedure for hydrostatic testing*

EN 12723, *Liquid pumps — General terms for pumps and installations — Definitions, quantities, letter symbols and units*

EN 60034-5:2001, *Rotating electrical machines — Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) — Classification (IEC 60034-5:2000)*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

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

EN ISO 5199, *Technical specifications for centrifugal pumps — Class II (ISO 5199:2002)*

EN ISO 9905, *Technical specifications for centrifugal pumps — Class I (ISO 9905:1994)*

EN ISO 9908, *Technical specifications for centrifugal pumps — Class III (ISO 9908:1993)*

EN ISO 12100-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13732-1, *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 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

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

EN ISO 14121-1, *Safety of machinery — Risk assessment — Part 1: Principles (ISO 14121-1:2007)*

EN ISO 14847, *Rotary positive displacement pumps — General requirements (ISO 14847:1999)*

EN ISO 20361, *Liquid pumps and pump units — Noise test code — Grades 2 and 3 of accuracy (ISO 20361:2007)* ⟨A1⟩

3 Definitions

For the purposes of this Standard, the definitions contained in ⟨A1⟩ EN 12723 ⟨A1⟩ shall apply.

Further the following definition applies :

3.1
Auxiliary equipment
Components or sub-assemblies mounted as part of the pump unit and necessary for the operation of the pump or pump unit, for example, seal flush system, lubrication system, cooling system, etc..

⟨A1⟩ **3.2**
partly completed machinery/pump
assembly of components which still needs a considerable number of additional components or at least one major component to fulfil its task

NOTE Subassemblies without any hydraulic component is not be classified as partly completed machinery. ⟨A1⟩

4 List of hazards

[A1] The significant hazards are set out in the following listing based on EN ISO 12100-1 and EN ISO 12100-2. Also shown are the sections references in this European Standard in which the safety requirements and/or measures or rules are described for showing the conformity to the safety requirements.

In addition, machinery shall comply as appropriate with EN ISO 12100-1 for hazards which are not covered by this European Standard. [A1]

[A1] Table 1 — List of hazards [A1]

[A1] *deleted text* [A1]	Significant hazards	EN 809 Reference to subclause	
		Safety measures	Verification
	Mechanical hazards	5.2.1	6.2.1
	Crushing, cutting and severing, entanglement or enwrapment, drawing in or trapping, friction or abrasion	5.2.1.1	6.2.1 6.2.6
	High pressure fluid ejection	5.2.1.2 5.2.1.2.2	6.2.1 6.2.2 6.2.3 6.2.4
	Ejection of parts	5.2.1.3	6.2.1 6.2.2
	Loss of stability	5.2.1.4	6.2.7
	Electrical hazards	5.2.2	6.2.2
	Electrical contact	5.2.2.1	6.2.2
	Electrostatic phenomenon	5.2.2.2	6.2.1
	External influences on electrical equipment	5.2.2.3	6.2.2
	Thermal hazards	5.2.3	6.2.2 6.2.8
	Hazards generated by noise	5.2.4 5.2.4.1	6.2.2 6.2.5
	Hazards generated by vibrations	5.2.4.2	6.2.2
	Hazards generated by materials	5.2.5	6.2.2
	Contact with or inhalation of harmful fluids, gases, mists, steam	5.2.5.1	6.2.1
	Fire and explosion hazards	5.2.5.3	6.2.1 6.2.2 6.2.8
	Hazards from neglecting ergonomic principles in machine design	5.2.6	6.2.1 6.2.2
	Hazards caused by failure of energy supply, breaking down of machinery parts and other functional disorders	5.2.7	6.2.1
	Failure, malfunction of control system	5.2.7.2 5.2.7.3 5.2.7.5	6.2.1 6.2.2
	Errors of fitting	5.2.7.1 5.2.7.4 [A1] and 7.3 [A1]	6.2.1
	Hazards caused by missing and/or incorrectly positioned safety related measures/means	5.2.8	6.2.1
	All kinds of guards	5.2.8.1	6.2.1 6.2.6
	All kinds of safety related protection devices	5.2.8.1 5.2.8.5	6.2.1 6.2.6
	All kinds of information or warning devices	5.2.8.2	6.2.1
	Emergency devices	5.2.8.3	6.2.2
	Essential equipment and accessories for safe adjusting and/or maintenance	5.2.8.4	6.2.2
	[A1] Resulting from machinery lifting	5.2.1.5 and 7.2.2	6.2.2 and 6.2.3 [A1]

5 Safety requirements and/or measures

5.1 General requirements

The operating conditions and features required of every pump and/or pump unit falling within the scope of this standard shall be defined in a specification. This may be in the form of a manufacturer´s description, or as a published national or international standard or in a data sheet within a contract. In the event of essential data not being provided by the purchaser, the manufacturer shall advise the purchaser of the data being adopted for the design and being incorporated into the specification. The supplier shall assess the risks arising from the machine together with its operating conditions and the equipment shall be designed to reduce them to an acceptable level giving full regard to the requirements set out in this standard. A1 A risk assessment according to EN ISO 14121-1 shall be carried out by the manufacturer. This has to be done for machinery as well as for partly completed machinery to the extent necessary to assess the conformity with the essential health and safety requirements. When assessing the risks arising from the machinery or partly completed machinery, the manufacturer shall take into account any reasonable foreseeable misuse and the lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and disposal. A1

NOTE The technical specifications will vary with the application, and some technical specifications are already stated in EN or ISO-Standards, such as :

— A1 EN ISO 5199 A1 ;

— A1 EN ISO 14847 A1 ;

— A1 EN ISO 9908 A1 ;

— A1 EN ISO 9905 A1.

Further safety information from the manufacturer/supplier for:

— planning ;

— installation ;

— operation ;

— maintenance.

shall be contained in the information/instruction for use, including personnel protection equipment required and warning notices.

5.1.1 Environmental and working conditions

In constructing the specification for the pump or pump unit particular attention shall be given to any special environmental and/or working conditions. Examples of such special conditions are, amongst others :

Environmental Conditions at the place of installation, such as :

— abnormal temperature ;

— high humidity ;

— corrosive atmospheres ;

— explosive and/or fire danger zones ;

— dust, sandstorms ;

— earthquakes and other external imposed such conditions ;

— vibrations ;

— altitude ;

— flooding.

Type of liquid to be pumped, such as :

— pumped liquid (Denomination) ;

— mixture (Analysis) ;

— solid containing (solid matter content) ;

— gaseous (content).

Property of the liquid when being pumped, such as :

— flammable ;

— toxic ;

— corrosive ;

— abrasive ;

— crystallising ;

— polymerizing ;

— viscosity.

Operating fluctuation in the system, such as :

— temperature ;

— pressure ;

— flow rate ;

— dry running of the pump.