



SLOVENSKI STANDARD

SIST EN 1028-1:2003

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Fire-fighting pumps - Fire-fighting centrifugal pumps with primer - Part 1: Classification - General and safety requirements

Feuerlöschpumpen - Feuerlöschkreiselpumpen mit Entlüftungseinrichtung - Teil 1: Klassifizierung - Allgemeine und Sicherheitsanforderungen

Pompes a usage incendie - Pompes centrifuges a usage incendie avec dispositif d'amorçage - Partie 1 : Classification - Prescriptions générales et de sécurité

Ta slovenski standard je istoveten z: EN 1028-1:2002

ICS:

13.220.10 Gašenje požara Fire-fighting

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ICS 13.220.10

English version

Fire-fighting pumps - Fire-fighting centrifugal pumps with primer
- Part 1: Classification - General and safety requirements

Pompes à usage incendie - Pompes centrifuges à usage
incendie avec dispositif d'amorçage - Partie 1:
Classification - Prescriptions générales et de sécurité

Feuerlöschpumpen - Feuerlöschkreiselpumpen mit
Entlüftungseinrichtung - Teil 1: Klassifizierung - Allgemeine
und Sicherheitsanforderungen

This European Standard was approved by CEN on 8 April 2002.

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 Management Centre or to any CEN member.

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

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Foreword

This document (EN 1028-1:2002) has been prepared by Technical Committee CEN/TC 192 "Fire service equipment", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by February 2003, and conflicting national standards shall be withdrawn at the latest by February 2003.

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.

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

This part of this European Standard shall be applied only in conjunction with part 2 of EN 1028 "*Verification of general and safety requirements*".

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EN 1028 "*Fire-fighting pumps – Fire-fighting centrifugal pumps with primer*" comprises two parts:

– Part 1: Classification — General and safety requirements;

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– Part 2: Verification of general and safety requirements.

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0 Introduction

This European Standard is a type C standard as stated in EN 292 and EN 1070.

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

Where 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 in accordance with the provisions of this type C standard.

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

While producing this standard it was assumed that:

- a) only trained persons operate the machine;
- b) components without specific requirements are:
 - 1) designed in accordance with the usual engineering practice and calculation codes, including all failure modes;
 - 2) of sound mechanical construction;
 - 3) of materials with adequate strength and of suitable quality;
 - 4) of materials free of defects;

NOTE General hazards due to hydraulic and pneumatic equipment are dealt with in standards for common use such as EN 982, EN 983.

- c) harmful materials (e.g. asbestos) are not used as part of the machine;
- d) components are kept in good repair and working order, so that the required characteristics remain;
- e) by design of the load bearing elements, a safe operation of the machine is assured for loading, from 0 % to 100 % of the rated possibilities and during the tests;
- f) to ensure the correct functioning of the equipment, the ambient temperature is maintained between -15 °C (for special conditions, -30 °C; see 6.12) and 40 °C;

NOTE Directly around the pump the temperature can be 20 °C higher.

- g) the manufacturer and the user have agreed the features of the machinery and the operating conditions;
- h) the place of installation enables safe usage of the machine.

1 Scope

This standard applies for centrifugal pumps with priming devices for fire-fighting use supplied separately without driver and couplings. Fire-fighting centrifugal pumps with primer are defined as terminated by their inlet and outlet connections as well as by their shaft ends.

This standard applies for fire-fighting centrifugal pumps with priming devices for use under ambient temperatures between -15 °C and 40 °C.

NOTE For special conditions, -30 °C; see 6.12.

This standard does not apply to fire-fighting centrifugal pumps with primer of which the only power source is directly applied manual effort.

This standard specifies the classification and general requirements for fire-fighting centrifugal pumps with priming devices with a nominal delivery rate of up to 6000 l/min.

This standard deals with significant hazards listed in clause 4, hazardous situations and events during the commissioning, operation and maintenance of fire-fighting centrifugal pumps with priming devices, used as intended and under the conditions foreseen by the manufacturer or the manufacturer's authorized representative. In addition, fire-fighting centrifugal pumps with priming devices shall conform as appropriate to EN 292 for hazards not covered by this standard.

This standard does not deal with the detailed verification of general and safety requirements and/or protective measures. These are covered in EN 1028-2 "Verification of general and safety requirements".

This standard does not deal with the technical safety requirements for the design or manufacture of drivers or of auxiliary equipment. It does not cover risks directly arising from means provided for the portability, transportability, and mobility of pump units during or between periods of operation, or requirements for transmission shafts linking self-propelled machinery to a pump. In addition, this standard does not cover:

- operation subject to special rules (e. g. potentially explosive atmospheres);
- hazards occurring due to decommissioning;
- hazards occurring during handling;
- hazards occurring when in use (e. g. on public roads).

This standard does not apply to fire-fighting centrifugal pumps with primer that are manufactured before the date of publication by CEN of this standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

EN 292-2/A1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications; Amendment A1.*

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body.*

EN 547-2:1996, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings.*

EN 547-3:1996, *Safety of machinery — Human body measurements — Part 3: Anthropometric data.*

EN 842:1996, *Safety of machinery — Visual danger signals — General requirements, design and testing.*

EN 894-1:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators.*

EN 894-2:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays.*

EN 894-3:2000, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators.*

EN 953:1997, *Safety of machinery — General requirements for the design and construction of fixed and movable guards.*

EN 1028-2:2002, *Fire-fighting pumps — Fire-fighting centrifugal pumps with primer — Part 2: Verification of general and safety requirements.*

EN 1050:1996, *Safety of machinery — Principles for risk assessment.*

EN 1070:1998, *Safety of machinery — Terminology.*

EN 25199:1992, *Technical specifications for centrifugal pumps — Class II (ISO 5199:1986).*

EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:1997).*

EN 60529:1991+A1:2000, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989) + Amendment A1 (IEC 60529:1989/A1:1999).*

EN 61310-2:1995, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2:1995).*

EN ISO 9905:1997, *Technical specifications for centrifugal pumps — Class I (ISO 9905:1994).*

EN ISO 9908:1997, *Technical specifications for centrifugal pumps — Class III (ISO 9908:1993).*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1070 and the following apply.

3.1 Pumps and their applications

3.1.1

fire-fighting centrifugal pump

FP

mechanically driven fluid flow machine intended for delivery of fluids for fire-fighting purposes

NOTE 1 Fire-fighting centrifugal pumps are specially designed for use by fire brigades and can be suitable for installation in fire-fighting vehicles as specified in EN 1846-1 and motor pumps.

NOTE 2 A fire-fighting centrifugal pump generally consists of:

- pump unit;
- primer;
- shut off devices and connection couplings for suction line ports;
- shut off devices and connection couplings for pressure line ports;
- pipe connections between pump, shut off devices and connection couplings;
- sieves and dirt traps;
- measuring instruments;
- safety devices (if provided);
- additional equipment.

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3.1.2

vehicle mounted pump

pump permanently installed on a vehicle and driven by the motive power of the vehicle

3.1.3

motor pump

pump complete with a drive motor

3.1.3.1

portable pump

hand transportable motor pump not permanently mounted on a fire-fighting vehicle

3.1.3.2

trailer pump

motor pump mounted on a wheeled chassis that can be towed by a vehicle

3.1.3.3

skid-mounted pump

motor pump mounted on a fixed or transportable frame

3.1.4

normal-pressure pump

FPN

single or multiple stage fire-fighting centrifugal pump for operating pressures up to 20 bar

3.1.5**high-pressure pump****FPH**

fire-fighting centrifugal pump for operating pressures up to 54,5 bar

3.1.6**direction of rotation of the drive**

direction of rotation of the drive flange or coupling viewed from the drive motor

NOTE The direction of rotation is given by the following convention:

- to the right: clockwise;
- to the left: anticlockwise.

3.2 Suction heights

NOTE All suction heights are given in metres.

3.2.1**geodetic suction height**

$H_{S_{geo}}$

height difference between the centre of the first impeller inlet and the water level on the suction side at 1013 mbar and 4 °C water temperature

NOTE In case of deviating local air pressure (p_b) and deviating water temperatures, the corrected geodetic suction height ($H_{S_{geo}}$) should be used, defined as follows:

$$H_{S_{geo}} = H_{S_{geo}} - 10,25 + 0,0102 (p_b - p_D)$$

where

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p_b is the local air pressure in mbar;

p_D is the vapour pressure in mbar.

3.2.2**geodetic nominal suction height**

$H_{S_{geoN}}$

height difference between the centre of the first impeller inlet (in the direction of flow) and the water level on the suction side of the pump, at 1013 mbar and 4 °C water temperature, as specified for the nominal delivery rate

NOTE In case of deviating local air pressure (p_b) and deviating water temperatures, the corrected geodetic nominal suction height ($H_{S_{geoN}}$) is used, defined as follows:

$$H_{S_{geoN}} = H_{S_{geoN}} - 10,25 + 0,0102 (p_b - p_D)$$

3.3 Pressures

NOTE Pressures are manometric pressures given in bar.

3.3.1**inlet section pressure**

p_e

inlet pressure, measured at the measurement point specified in annex B of EN 1028-2: 2002

NOTE The pressure can be positive or negative.

3.3.2**outlet section pressure**

p_a

outlet pressure, measured at the measurement point specified in annex B of EN 1028-2: 2002

**3.3.3
maximum pressure**

$p_{a \max}$
maximum pressure that can be attained in the outlet section at geodetic nominal suction height $H_{S \text{ geoN}}$ and maximum speed n_0 (see Figure 1)

**3.3.4
limit pressure**

$p_{a \text{ lim}}$
maximum permissible outlet section pressure p_a during operation (see Figure 1)

**3.3.5
closing pressure**

p_{a0}
steady state pressure in the outlet section with a delivery flow rate $Q = 0$, at geodetic nominal suction height $H_{S \text{ geoN}}$ and maximum speed n_0 (see Figure 1)

**3.3.6
delivery pressure**

p
difference between the outlet section pressure p_a and the inlet section pressure p_e ;

$$p = p_a - p_e$$

**3.3.7
nominal delivery pressure**

p_N
delivery pressure specified for the nominal delivery rate

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**3.3.8
static test pressure**

p_{ps}
pressure used for testing the integrity of the inlet side of the pump when stationary

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**3.3.9
dynamic test pressure**

p_{pd}
pressure used for testing the integrity of the pressure parts of the pump with the pump running, given by $p_{a \text{ lim}} + 5,5 \text{ bar}$ (see Figure 1)