

Fire-fighting pumps — Portable pumps — Safety and performance requirements, tests

ICS 13.220.10

National foreword

This British Standard is the UK implementation of EN 14466:2005+A1:2008. It supersedes BS EN 14466:2005 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

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A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Contents

	Page
Foreword.....	4
0 Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	8
4 List of significant hazards	8
5 Requirements	13
5.1 Safety requirements and/or protective measures	13
5.1.1 General.....	13
5.1.2 Mechanical devices	13
5.1.3 Electrical facilities.....	14
5.1.4 Thermal hazards	14
5.1.5 Noise	15
5.1.6 Hazards generated by materials and substances	15
5.1.7 Ergonomic design principles	16
5.1.8 Overspeed protection.....	17
5.1.9 Stopping device	17
5.1.10 Indication of limit pressure ($p_{a\ lim}$)	17
5.1.11 Special tools.....	17
5.2 Performance requirements	17
5.2.1 General.....	17
5.2.2 Hydraulic performance.....	17
5.2.3 Vibration during operation.....	17
5.2.4 Inclination	17
5.2.5 Cold start	18
5.2.6 Clutch.....	18
5.2.7 Generator.....	18
5.2.8 Cooling system	18
5.2.9 Starting device	18
5.2.10 Fuel system	19
5.2.11 Corrosion.....	19
5.2.12 Priming time	19
5.2.13 Operating controls and instrumentation	19
5.2.14 Number of delivery outlets	20
6 Verification	20
6.1 Verification of safety requirements and/or measures.....	20
6.1.1 General.....	20
6.1.2 Mechanical devices	21
6.1.3 Electrical facilities.....	21
6.1.4 Thermal hazards	21
6.1.5 Noise	21
6.1.6 Hazards generated by materials and substances	21
6.1.7 Ergonomic principles	22
6.1.8 Overspeed protection.....	22
6.1.9 Stopping device	22
6.1.10 Indication of limit pressure ($p_{a\ lim}$)	22
6.1.11 Special tools.....	22

6.2	Verification of performance requirements	22
6.2.1	General	22
6.2.2	Hydraulic performance	22
6.2.3	Vibration during operation	23
6.2.4	Inclination	23
6.2.5	Cold start	23
6.2.6	Clutch	23
6.2.7	Generator	23
6.2.8	Cooling system	23
6.2.9	Starting device	23
6.2.10	Fuel system	23
6.2.11	Corrosion	24
6.2.12	Priming time	24
6.2.13	Operating controls and instrumentation	24
6.2.14	Number of delivery outlets	24
7	Classification and designation	24
8	Test report	25
9	Information for use	25
9.1	General	25
9.2	Signs and warning signs	25
9.3	Accompanying documents	25
9.3.1	General	25
9.3.2	Contents	26
9.4	Marking	29
Annex A (informative)	Example of the dimension of contour of a transporting device	31
Annex B (informative)	Examples of technical measures for noise reduction	32
Annex C (informative)	Example of an exhaust tail pipe (coupling)	33
Annex D (informative)	Guidance for acceptance tests on delivery	34
Annex E (normative)	Noise test code	35
E.1	General	35
E.2	Grade of accuracy	35
E.3	Installation and mounting conditions	35
E.4	Operating conditions	35
E.5	Measurement uncertainties	35
E.6	Declaration	36
Annex F (normative)	Test of inclination during operation	37
Annex G (normative)	Test of inclination during transport (out of operation)	38
Annex H (normative)	Requirements for non-text safety signs for use on portable pumps	39
H.1	General	39
H.2	Safety alert symbol (see figure H.1)	39
H.3	Non-text hazard pictorials	39
H.4	Dimensions	39
H.5	Colours of safety signs	39
H.6	Location	39
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC	41
Annex ZB (informative)	 Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC 	42
Bibliography		43

Foreword

This document (EN 14466:2005+A1:2008) 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 January 2009, and conflicting national standards shall be withdrawn at the latest by January 2009.

This document includes Amendment 1, approved by CEN on 2008-06-06.

This document supersedes EN 14466:2005.

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

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).

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..

0 Introduction

This document 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 document.

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.

1 Scope

This document applies to portable pumps using fire-fighting centrifugal pumps as defined in EN 1028, driven by an internal combustion engine and not intended to be permanently installed in fire-fighting and rescue service vehicles and not intended for prolonged unattended operation.

NOTE 1 If use of the portable pump is foreseen for prolonged unattended operation, this should be agreed between the purchaser and the manufacturer or the manufacturer's authorized representative at the time of ordering. In this case an additional risk analysis should be carried out.

This document deals with all significant hazards, hazardous situations and events relevant to portable fire-fighting pumps as described above, when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4). It addresses the design, setting up, and operation of the portable pump.

This document also specifies performance requirements for portable pumps in its scope.

This document applies to portable pumps used in ambient temperatures between $-15\text{ }^{\circ}\text{C}$ and $+35\text{ }^{\circ}\text{C}$.

NOTE 2 Additional measures may be necessary for ambient temperatures beyond the limits $-15\text{ }^{\circ}\text{C}$ and $+35\text{ }^{\circ}\text{C}$

This document does not cover the effect on performance of water inlet temperatures above $+20\text{ }^{\circ}\text{C}$.

This document does not contain any requirements for inlet and outlet connection couplings.

NOTE 3 For inlet and outlet connection couplings national regulations apply. The design should be agreed at the time of ordering between purchaser and the manufacturer or manufacturer's authorized representative.

This document does not contain specific requirements for the driving engine but deals with the hazards related to the interface between engine and pump.

While producing this document it was assumed that:

- only trained persons operate and maintain the machine;
- components are kept in good repair and working order, so that the required characteristics are maintained.

The noise test code considered in this document (see Annex E) will allow experience in the measurement of noise emission to be gained with a view to future revisions.

This document does not apply to portable pumps that are manufactured before the date of publication by CEN of this document.

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

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

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

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

EN 563, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces.*

EN 659, *Protective gloves for firefighters.*

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 and 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 1028-1:2002, *Fire-fighting pumps — Fire-fighting centrifugal pumps with primer — Part 1: Classification — General and safety requirements.*

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

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

EN 12639:2000, *Liquid pumps and pump units — Noise test code — Grade 2 and grade 3 of accuracy.*

EN 13202, *Ergonomics of the thermal environment — Temperatures of touchable hot surfaces — Guidance for establishing surface temperature limit values in production standards with the aid of EN 563.*

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

EN 60254-1, *Lead-acid traction batteries — Part 1: General requirements and methods of test (IEC 60254-1:1997).*

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

EN 61310-1:1995, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995).*

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

EN 61310-3, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators (IEC 61310-3:1999).*

EN 62079, *Preparation of instructions — Structuring, content and presentation (IEC 62079:2001).*

EN ISO 3744, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994).*

prEN ISO 10085, *Firefighting vehicles and equipment — Symbols for operator controls and other displays (ISO/DIS 10085:2000).*

EN ISO 11102-1, *Reciprocating internal combustion engines — Handle starting equipment — Part 1: Safety requirements and tests (ISO 11102-1:1997).*

EN ISO 11102-2, *Reciprocating internal combustion engines — Handle starting equipment — Part 2: Method of testing the angle of disengagement (ISO 11102-2:1997)*.

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

EN ISO 11688-1:1998, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*.

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

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

EN ISO 14314, *Reciprocal internal combustion engines — Recoil starting equipment — General safety requirements (ISO 14314:2004)*.

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*.

ISO 9244:1995, *Earth-moving machinery — Safety signs and hazard pictorials — General principles*.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and EN 1028-1:2002 and the following apply.

3.1

motor pump

pump complete with a drive motor

[EN 1028-1:2002]

3.2

portable pump

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

[EN 1028-1:2002]

4 List of significant hazards

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

The significant hazards are given in Table 1, which is based upon EN 1050. Also shown are the subclause references to the safety requirements and/or protective measures in this document.

Before using the standard it is important to carry out a risk assessment of the portable pump to check that its significant hazards are identified in this clause.

Table 1 — List of significant hazards

No.	Hazard identification	Risk evaluation	Remarks	Solution	Clause reference in this document
1	Mechanical hazards due to: Machine parts or work pieces, e.g.: a) mass and stability; (potential energy of elements which may move under the effect of gravity); 1) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion); 2) inadequacy of mechanical strength. b) accumulation of energy inside the machine, e.g. 1) liquids and gases under pressure.	Medium Medium Medium Medium	Weight No rough external parts High pressures, high velocity, (e.g. impeller) e.g. breaking off of handle	Sufficient handles, ergonomic design, nearly same loading for every porter Choice of materials Specification of choice of materials, test pressures, and max. working pressures	5.1.1 5.1.2.1, 5.1.2.3, 5.1.10
1.2	Shearing hazard	Medium	Impeller; operation without suction screen	Operating instructions	5.1.2.2, 5.1.7.4
1.3	Cutting or severing hazard	Medium	Edges, burrs	Accurate processing, burring of parts	5.1.2.2
1.5	Drawing-in or trapping hazard	Medium	Fan wheel; connection between drive assembly and pump; other rotating parts	Protective grating or other forms of covering	5.1.2.2
1.6	Impact hazard	High	Kick back of hand starter/freewheel	Devices to avoid dangerous operation	5.1.2.3
1.9	High pressure fluid injection or ejection hazard	Medium		Specification of test pressures	5.1.8, 5.1.10

Table 1 — List of significant hazards (continued)

No.	Hazard identification	Risk evaluation	Remarks	Solution	Clause reference in this document
2	Electrical hazards due to:				
2.1	Contact of persons with live parts (direct contact)	Medium	Extra low voltage only	Electrical installations corresponding to state of the art; engine with declaration of the manufacturer	5.1.3
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	Medium	Extra low voltage only		5.1.3
2.3	Approach to live parts under high voltage	Medium	Ignition		5.1.3
3	Thermal hazards , resulting in:				
3.1	Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	Medium	Exhaust area Engine parts such as cylinder heads Handles	Shielding or covering	5.1.4
4	Hazards generated by noise , resulting in:				
4.1	Hearing loss (deafness) other physiological disorders (e.g. loss of balance, loss of awareness)	Medium	Noise at operating position		5.1.5
4.2	Interference with speech communication, acoustic signals, etc.	Medium	Communications and acoustic signals not audible at operating position	No signals (work, warning, information) that are audible only	5.1.5, 9.2.1

Table 1 — List of significant hazards (continued)

No.	Hazard identification	Risk evaluation	Remarks	Solution	Clause reference in this document
7	Hazards generated by materials and substances				
7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Medium	Exhaust gases, gasoline vapours, battery acid	Exhaust pipe outlet should not be within the working area; operation in enclosed spaces only with precautions	5.1.6
7.2	Fire or explosion hazard	Medium	Fuel system, explosive atmosphere		5.1.6.3
8	Hazards generated by neglecting ergonomic principles in machinery design e.g. hazards from:				
8.1	Unhealthy postures or excessive effort	High	Carrying of the portable pump Maintenance	Suitable and ergonomic handles Adequate tools	5.1.2.1, 5.1.7.1, 5.1.7.3, 5.1.7.5 5.1.11
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	Medium			5.1.7.4, 5.1.7.5
8.4	Inadequate local lighting	Medium			5.1.7.2
8.6	Human error, human behaviour	Medium	Superheated steam caused by pumping against closed shut off valve; spilling of fuel whilst refuelling → exhaust pipe	Temperature indicators or control Design: overflowing fuel shall not drop on hot exhaust parts	5.1.6.3 a), 5.1.7.3

Table 1 — List of significant hazards (continued)

No.	Hazard identification	Risk evaluation	Remarks	Solution	Clause reference in this document
8.8	Inadequate design or location of visual display units	Medium	e.g. temperature indicator	All controls and warning and signalling indicators shall be easily visible from the operating position	5.1.7.3
10	Unexpected start-up, unexpected overrun/ overspeed (or any similar malfunction) from:				
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	Medium	See 8.6	The indication of the limit pressure $p_{a\ lim}$ shall be easily visible from the operator position	5.1.7.3, 5.1.10
11	Impossibility of stopping the machine in the best possible conditions	Medium	Engine shall be disengageable	Stopping device	5.1.9
18	Loss of stability/overturning of machinery	Medium	Overturning of the pump during transportation and use	Operating instructions: correct installation and securing of the pump	5.1.2.1
24	Due to the power source and to the transmission of power				
24.1	Hazards from the engine and the batteries	Medium		Secure fixing of the battery	5.1.6.4