



SLOVENSKI STANDARD
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**Dvojno delujoče hidravlične reševalne naprave za gasilske in reševalne enote -
Varnostne zahteve za delovanje**

Double acting hydraulic rescue tools for fire and rescue service use - Safety and performance requirements

Doppelt wirkende hydraulische Rettungsgeräte für die Feuerwehr und Rettungsdienste - Sicherheits- und Leistungsanforderungen

Matériels hydrauliques de désincarcération à double effet à usage des services d'incendie et de secours - Prescriptions de sécurité et de performance

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Double acting hydraulic rescue tools for fire and rescue service use - Safety and performance requirements

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usage des services d'incendie et de secours - Prescriptions
de sécurité et de performance

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Feuerwehr und Rettungsdienste - Sicherheits- und
Leistungsanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 192.

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

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Contents

Page

Foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	8
4 Requirements	11
4.1 Safety Requirements	11
4.1.1 General.....	11
4.1.2 Spreaders	17
4.1.3 Cutters	19
4.1.4 Combi tools	19
4.1.5 Rams	21
4.1.6 Power packs	22
4.1.7 Manual pumps.....	24
4.1.8 Hose and hose assemblies	24
4.1.9 Hose reels	25
4.1.10 Accessories	25
4.1.11 Noise	26
4.2 Performance requirements	27
4.2.1 General.....	27
4.2.2 Spreaders	27
4.2.3 Cutters	29
4.2.4 Combi tools	31
4.2.5 Rams	33
4.2.6 Power pack	34
4.2.7 Manual pumps.....	37
4.2.8 Hoses assemblies and hose reels	37
4.2.9 Accessories	38
5 Information for use	38
5.1 General.....	38
5.2 Training.....	38
5.3 Safe and efficient operation.....	38
5.4 Stowage and cleaning	39
5.5 Inspection and testing.....	39
5.6 Environmental provision.....	39
6 Marking	39
6.1 General.....	39
6.2 The marking of equipment.....	39
6.3 Marking of the control device.....	40
6.4 Marking of hose assemblies	40
6.5 Marking of power packs	40
6.6 Marking of manual pumps	40
6.7 Marking of accessories	40
Annex A (normative) List of hazards.....	41
Annex B (normative) Noise test code (Grade 2 of accuracy)	44

Annex C (normative) Product Performance Data Sheet	47
Annex D (informative) Examples of technical measures for noise reduction	48
Annex E (normative) General verification requirements	49
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	51
Bibliography	52

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Foreword

This document (prEN 13204:2015) has been prepared by Technical Committee CEN/TC 192 “Fire and Rescue Service Equipment”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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Introduction

This document is a type C standard as stated in EN ISO 12100.

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

When provisions of this type C standard are different from those which are stated in type A or type 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.

When compiling this document, it was assumed that:

- a) the manufacturer will design and/or use components without specific requirements in accordance with the usual engineering practice and calculation codes, including all failure modes;
- b) only trained and competent persons will use and operate the machinery;
- c) the machinery is kept in good repair and working order, by a trained and competent person, so that the required characteristics remain despite wear;
- d) the working place is adequately lit;
- e) negotiations occur between the manufacturer and the purchaser concerning particular conditions for the use and places of use for the machinery related to health and safety.
- f) The manufacturer will consider and minimize the impact to the environment during all stages of the product life cycle.

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1 Scope

This European Standard deals with the technical requirements to minimize the risks of hazards listed in Annex A which can arise during the operation and/or maintenance of double acting hydraulic rescue tool systems, when carried out as intended by the manufacturer or his authorized representative.

All the safety requirements of this document apply to double acting hydraulic rescue tools manufactured after the date of publication.

Double acting hydraulic rescue tool systems are intended for use by the firefighting and rescue services, principally for cutting through, spreading or pushing apart the structural parts of road vehicles, ships, trains, aircraft and building structures involved in accidents. They consist of a separate power pack, the tool[s] and the necessary interconnections and intended accessories, as defined in Clause 3 – Terms and definitions.

NOTE 1 The aim is to assist whilst extracting the casualties or to create a working space for paramedical services taking the local conditions into account.

This European Standard does not establish the additional requirements for:

- a) operation in severe conditions (e.g. extreme environmental conditions such as: temperatures outside the range $-20\text{ }^{\circ}\text{C}$ $+55\text{ }^{\circ}\text{C}$, corrosive environment, tropical environment, contaminating environments, strong magnetic fields, potentially explosive atmospheres);
- b) the risk directly arising from the means provided for the portability, transportability and mobility of double-acting hydraulic rescue tools during periods of their operation.

NOTE 2 For the EU/EEA other Directives can be applicable to the equipment in the scope, for example the Electro Magnetic Compatibility Directive.

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 659:2003+A1:2008, *Protective gloves for firefighters*

EN 837-1:1996, *Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*

EN 853:1996, *Rubber hoses and hose assemblies — Wire braid reinforced hydraulic type — Specification*

EN 854:1996, *Rubber hoses and hose assemblies — Textile reinforced hydraulic type — Specification*

EN 856:1996, *Rubber hoses and hose assemblies — Rubber-covered spiral wire reinforced hydraulic type — Specification*

EN 857:1996, *Rubber hoses and hose assemblies — Wire braid reinforced compact type for hydraulic applications — Specification*

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

EN 10025-1:2004, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

- EN 10025-2:2004, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*
- EN 10210-2:2006, *Hot finished structural hollow sections of non-alloy and fine grain steels — Part 2: Tolerances, dimensions and sectional properties*
- EN 50565-2:2014, *Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V (U0/U) — Part 2: Specific guidance related to EN 50525 cable types*
- 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 codes) (IEC 60529:1989)*
- EN 61000-6-1:2007, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)*
- EN 61000-6-3:2007, *Electromagnetic compatibility (EMC) — Part 6-3: Generic Standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:2005)*
- EN ISO 1402:2009, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing (ISO 1402:2009)*
- EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*
- EN ISO 3949:2014, *Plastics hoses and hose assemblies — Textile-reinforced types for hydraulic applications - Specification (ISO 3949:2009)*
- EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*
- EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*
- EN ISO 7751:1997, *Rubber and plastics hoses and hose assemblies — Ratios of proof and burst pressure to design working pressure (ISO 7751:1991)*
- EN ISO 10619-1:2011, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature (ISO 10619-1:2011)*
- EN ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*
- EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*
- EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*
- EN ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732:2006)*
- ISO/TR 14121-2:2012, *Safety of machinery — Risk assessment — Part 2: Practical guidance and examples of methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1 accessories
additional attachable parts that are used to adapt a tool enabling it to perform a certain special task, e.g. pulling attachments (e.g. chains, straps), manifolds, saddles, extension tubes, etc.

3.2 detachable parts
parts or components that can be removed by hand (without tools) under no load conditions

3.3 control device
device connected to the hydraulic control circuit and used for controlling the operation of the tool (e.g. hydraulic valves, relay, magnetically operated valve)

3.4 manual control actuator
component of the control device which, when operated, activates the control device, and is designed to be operated by one person

3.5 operator
for the purpose of this document the operator [EN ISO 12100] is the only person operating the manual control actuator of the tool

3.6 combination tool (combi tool)
hydraulic rescue tool able to perform a minimum of at least three functions namely: spreading, squeezing and cutting

3.6.1 spreading
outward movement of the jaw(s) or arm(s) to force apart structural parts or elements

3.6.2 pulling
inward movement of the jaw(s) or arm(s) when fitted with pulling attachments to draw structural parts or elements together. Hoisting or lifting actions do not fall under the definition of pulling

3.6.3 squeezing
inward movement of the jaw(s) or arm(s) to compress structural parts or elements

3.6.4 cutting
inward movement of the cutting area of the jaw(s) or blade(s) to cut or shear structural parts or elements

3.6.5 spreading force
force at a position within the spreading distance, expressed in kN

3.6.6 spreading distance
distance of travel at the tips between the fully closed position and fully open position, expressed in mm

3.6.7**pulling force**

force at a position within the pulling distance, expressed in kN

3.6.8**pulling distance**

distance of travel between an open position and the fully closed position, expressed in mm

3.7**cutter**

hydraulic rescue tool able to perform a cutting function with the aid of one or more blade(s)

3.7.1**cutter opening**

distance between the blade tips when the blades are in an open position, expressed in mm

3.7.2**cutter reach**

distance from the base of the cutting edge to the midpoint between the tips of the blades when opened, expressed in mm

3.8**hose assembly**

one or more hydraulic hoses complete with hose fittings, one or more quick action couplings and hydraulic fluid

3.8.1**hoses**

flexible tubes designed for fluid power transfer

3.8.2**hose fittings**

fittings attached at each end of the hose in order to mount the hose to a tool/pump or to equip it with quick action couplings

3.8.3**quick action couplings**

replaceable connectors, attached to the fittings of the hose assemblies and/or equipment with the purpose of connecting and releasing these hose assemblies to/from other matching connectors within the system, with the aim to transfer the hydraulic fluid from one item in the system to another

3.9**hose reel**

reel fitted with length[s] of hose assemblies

3.10**hydraulic fluid**

fluid medium for power transfer

3.11**manual pump**

hydraulic pump activated by hand or foot force to power double acting hydraulic rescue tool(s)

prEN 13204:2015 (E)

3.12

mass

3.12.1

mass of a hydraulic rescue tool

measured in the fully closed position, including hydraulic fluid, integrated hose assemblies or quick action couplings and detachable tips (where fitted), expressed in kg to one decimal point

3.12.2

mass of power packs

including all permanently attached components (i.e. hose reels, integrated hose assemblies or quick action couplings) hydraulic fluid reservoir filled to the maximum fluid level and a full fuel tank, expressed in kg to one decimal point

3.12.3

mass of hose assemblies or hose reels

including all permanently attached components, hydraulic fluid, expressed in kg to one decimal point

3.13

power pack

pump comprising a prime mover, a hydraulic pump with a fluid reservoir, valves and tool connections, designed to power double acting hydraulic rescue tool(s)

3.13.1

prime mover

E.g. electric motor, internal combustion engine, pneumatic motor or hydraulic motor

3.13.2

smart system

device for automatic energy management

3.14

ram

hydraulic rescue tool able to perform pushing functions with the aid of removable or integral feet at both ends of the tool operated by a single, double or telescopic piston(s)

3.14.1

pushing

outward movement of the piston(s) to push structural parts or elements apart

3.14.2

stroke

distance of travel of the hydraulically operated piston(s) from a fully closed to an open position, expressed in mm

3.14.3

pushing force

force at a position within the range of the stroke, expressed in kN

3.15

spreader

hydraulic rescue tool able to perform a minimum of three functions namely: Spreading – Pulling – Squeezing

3.16

tool integrity

capability of a hydraulic rescue tool:

a) to maintain the position it has reached;

b) to withstand the effects of internal pressure intensification

3.17

competent person

designated person, suitably trained (see EN ISO 9001:2008) qualified by knowledge and practical experience, and provided with the necessary instructions to enable the required operation (test and/or examination) to be carried out safely

3.18

nominal

where requirements refer to nominal characteristics, these will be the manufacturers claimed characteristics used for classification

3.19

allowable pressure

maximum operating pressure for each component of the system, stated in bar or Mpa

3.20

hold to run device

actuating device that automatically returns to its neutral position when released, i.e. dead man's handle

4 Requirements

NOTE For General Verification requirements refer to Annex E.

4.1 Safety Requirements

4.1.1 General

4.1.1.1 Introduction

Rescue tools and their accessories shall comply with the safety requirements and/or protective measures of this clause.

In addition, they shall be designed according to the principles of ISO 12100 for relevant but not significant hazards which are not dealt with by this part of EN 13204 (see Annex A).

The safe operation of rescue tools and their accessories also depends on the safe environment associated with the use of personal protective equipment (PPE), such as gloves, footwear, eye and head protective equipment, as well as safe working procedures (see Clause 6).

For the application of type B standards such as EN ISO 4413:2010 and EN 60204-1, the manufacturer shall carry out an adequate risk assessment.

NOTE This specific risk assessment is part of the general risk assessment relating to the hazards not covered by this type C standard.

Particular attention should be given to protection against parts and/or materials ejected during use of the tool(s).

Hydraulic rescue tool systems shall comply with all safety requirements specified in EN ISO 4413:2010.

All electric power supply cables on the equipment covered by this standard shall comply to standard EN 50565-2:2014, 4.3, type H07RN-F

prEN 13204:2015 (E)

All electric components in the equipment covered by this standard shall comply to EN 60529 and provide a minimum protection level of IP44

All electric components in the equipment covered by this standard shall have sufficient immunity to electromagnetic disturbances to enable them to operate safely as intended and not fail to danger when exposed to the levels and types of disturbances as specified in EN 60204-1:

EN 61000-6-1:2007, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)*

EN 61000-6-3:2007, *Electromagnetic compatibility (EMC) — Part 6-3: Generic Standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:2005)*

Verification:

Verify from manufacturers data.

4.1.1.2 Speed

The opening or closing times of any hydraulic rescue tools shall not be less than 2 s.

Verification:

Connect the tool to the power pack designated by the manufacturer for use with that tool. Conduct a functional test by operating the manual control actuator for maximum speed. Measure and record the times for each full cycle (e.g. fully open to fully closed) five times. Repeat the test for each direction. Verify that all the times are longer than 2 s.

4.1.1.3 Manual control actuator

4.1.1.3.1 The manual control actuator shall be:

- a) located on the tool itself;
- b) designed to be activated by one operator only;
- c) designed to enable to operate the tools with a variable speed;
- d) designed as a hold-to-run control device;
- e) designed for operators wearing gloves (complying to EN 659) during the operation.

Verification:

- a) Conduct a visual inspection.
- b) Operate the manual control actuator by one person.
- c) Conduct a functional test.
- d) Conduct a functional test.
- e) Conduct a functional test.

4.1.1.3.2 When the manual control actuator is engaged the arm(s)/jaw(s)/blade(s) or in the case of rams the feet, shall only move in the direction that is indicated on the tool or the actuator itself.

Verification:

Operate the manual control actuator and verify that the movements are in accordance with the indication(s) on the tool or the actuator.

4.1.1.3.3 When the manual control actuator is moved from the engaged position to the neutral position, all moving parts (i.e. arms, blades, jaws, feet) of the tool shall stop within 0,5 s and remain within 1 % of the nominal opening distance at their respective positions for at least 5 min \pm 15 s whilst the power pack is providing hydraulic fluid to the tool.

Verification:

Operate the manual control actuator to different operating positions, including the maximum position and allow the tool to move. Hold the manual control actuator in an operating position for 3 s. Release the manual control actuator from the different operating positions. Verify that the manual control actuator returns to the neutral position and verify that the moving parts of the tool stop within 0,5 s and remain in their respective positions for a period of at least 5 min \pm 15 s. Record any movement and verify that any movement does not exceed 1 % of the nominal opening distance.

4.1.1.3.4 In all operating directions, there shall be no movement under nominal load more than 1 % of the nominal opening distance of all tools (cutters excluded), when the manual control actuator is in the neutral position. The tool shall be allowed a settling time of no more than 5 min. The measurement shall start immediately after the settling time and shall terminate after 5 min \pm 15 s.

Verification:

Operate the manual control actuator in spreading (pushing) mode to allow the tool to reach under nominal load at approximately half its spreading distance or stroke. Release the manual control actuator. After a 5 min settling time record any movement during the next 5 min period. Repeat the test in the pulling (closing) mode. Verify that the movement (if any) does not exceed 1 % of the nominal opening distance.

4.1.1.4 Handling positions

4.1.1.4.1 Tools, power packs and hose reels shall be equipped with carrying means (handles) designed to carry and /or operate the equipment safely.

Handles installed to carry tools shall be designed to prevent the operator extending his finger(s) and contacting any moving parts (i.e. arms, blades, jaws) which are within 200 mm and likely to create a hazard (as listed in Annex A) (Figure 1 shows examples).