



SLOVENSKI STANDARD
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**Stroji za podzemne rudnike - Varnostne zahteve za hidravlično podporje - 2. del:
Deli hidravličnih stojk in potisnih cilindrov**

Machines for underground mines - Safety requirements for hydraulic powered roof supports - Part 2: Power set legs and rams

Maschinen für den Bergbau unter Tage - Sicherheitsanforderungen für hydraulischen Schreitausbau - Teil 2: Stempel und Zylinder

Machines pour mines souterraines - Exigences de sécurité relatives aux soutènements marchants applicables aux piles - Partie 2 : Etaçons et vérins à pose mécanisée

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73.100.10	Oprema za gradnjo predorov in podzemnih železnic	Tunnelling and tubbing equipment
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Machines for underground mines - Safety requirements for hydraulic powered roof supports - Part 2: Power set legs and rams

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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 196.

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European foreword

This document (prEN 1804-2:2019) has been prepared by Technical Committee CEN/TC 196 “Mining machinery and equipment - Safety”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1804-2:2001+A1:2010.

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 (are) an integral part of this document.

The main differences between this document and EN 1804-2:2001+A1:2010 are as follows:

- a) Normative references (updated);
- b) Terms and definitions (modified);
- c) List of significant hazards (revised);
- d) Requirements for Steel (updated/modified);
- e) Requirements for static and dynamic overload (revised/modified);
- f) Requirements for overload fully retracted (deleted);
- g) List of tests (updated).

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Introduction

This European standard is a type C standard, as specified in EN ISO 12100:2010.

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

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

machine users/employers (small, medium and large enterprises);

- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in the case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

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

The extent to which hazards are covered is indicated in the scope of this document. When drawing up this standard, the underlying assumptions were that:

- only trained and qualified personnel operate the machine;
- components without specific requirements are:
 - a) designed in accordance with the usual engineering practice and calculation codes;
 - b) of sound mechanical construction;
 - c) are free of defects;
- components are kept in good working order;
- the implementation conditions and requirements imposed on the machine have been agreed between manufacturer of the legs and cylinders and their user (manufacturers of the support unit or users in the case of spare parts).

1 Scope

This document stipulates the safety requirements for use of legs and rams as intended by the manufacturer or the manufacturer's authorized representative. These include legs, support rams and rams, including the mechanical extensions, the inner valves and safety devices, seals, the hydraulic connections, (up to the 1st hose line or to the valve of design B, see Part 3) and their lifting points but excluding protective pipes and gaiters, external valves and hydraulic and electrohydraulic control systems.

NOTE Some components are discussed in other parts of this standard series.

This document applies for legs, support rams, and cylinders that are used at ambient temperatures between $-10\text{ }^{\circ}\text{C}$ and $60\text{ }^{\circ}\text{C}$.

This document identifies and takes account of:

- possible hazards which may be caused by the operation of legs, support rams and rams;
- the hazardous areas and the operating conditions that can cause any type of hazard;
- the situations that can result in hazards that cause an injury or impair health;
- dangers that can be caused through mine gas and/or flammable dusts.

This document describes methods for reducing these hazards.

Clause 4 contains a list of the hazards discussed.

This document does not specify any additional requirements for:

- specially corrosive environments;
- risks associated with manufacturing, transport, and decommissioning;
- earthquake.

This standard is applicable to all legs, support rams and rams placed on the market for the first time and which are manufactured after the date on which this standard was published.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1804-1, *Machines for underground mines — Safety requirements for hydraulic powered roof supports — Part 1: Support units and general requirements*

EN 1804-3, *Machines for underground mines — Safety requirements for hydraulic powered roof supports — Part 3: Hydraulic and electrohydraulic control systems*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN ISO 80079-36:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36:2016)*

EN ISO 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

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prEN ISO 643:2017, *Steel — Micrographic determination of the apparent grain size (ISO/DIS 643:2017)*

EN ISO 3834-3:2005, *Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements (ISO 3834-3:2005)*

EN ISO 6892-1:2016, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2016)*

EN ISO 9606-1:2017, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules (ISO 15607:2003)*

EN ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Electron beam welding (ISO 15609-3:2004) Note: new version Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO/DIS 15609-1:2018)*

EN ISO 15614-1:2017, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017, Corrected version 2017-10-01)*

EN ISO 14732:2013, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

ISO 7745:2010, *Hydraulic fluid power — Fire-resistant (FR) fluids — Requirements and guidelines for use*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and EN 1804-1, EN 1804-3 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 support unit

type of hydraulic powered roof support e.g. frame support, chock support, shield support, consisting of support components and support accessories

[Source: prEN 1804-1:2019]

3.2 support components

all components which lie within the flow of the support bearing force

3.2.1**actuator**

any type of hydraulic linear reciprocating device referred to in this standard

3.2.2**legs and support rams**

hydraulic actuators for producing the support bearing force of the support unit

3.2.3**single telescopic legs and support rams**

hydraulic legs and support rams with one extension stage

3.2.4**multi telescopic legs and support rams**

hydraulic legs and support rams with several extension stages

3.3**rams**

all actuators which do not lie within the flow of the support bearing force but which are necessary for the functioning of the powered roof support

3.4**control devices****3.4.1****valve**

device for controlling the flow of hydraulic fluid

3.4.2**bursting blank**

singleacting hydraulic fuse

3.4.3**internal valve**

valve inside actuator without access from outside

3.4.4**external valve**

valve attached outside of the actuator

3.4.5**safety devices**

Type A valves according to EN 1804-3

3.5**pressures****3.5.1****setting pressure**

hydraulic pressure in the legs and support rams on completion of the setting procedure

Note 1 to entry: This pressure is supplied by the hydraulic system.

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3.5.2

yield pressure of an actuator

Hydraulic pressure in an actuator when the relevant pressure limiting valve is opened

Note 1 to entry: This pressure in the actuator is induced by external forces (yield forces; see prEN 1804-1:2019, 3.5.1).

3.5.3

maximum permissible working pressure of an actuator

maximum hydraulic pressure at which a hydraulic component is intended be operated and/or yielded

3.6

rated actuator force

Maximum force to which an actuator is designed. It is a calculated value which is determined from the actuator geometry and the maximum permissible working pressure, neglecting friction

3.7

functions

3.7.1

extension

pushing out of the actuator operating piston by means of hydraulic pressure

3.7.2

retraction

drawing in of the actuator operating piston by means of hydraulic pressure

3.7.3

setting

extending of the support unit between the roof and the floor by pressuring the legs and support rams

3.7.4

yielding

alteration in length of an actuator which occurs when external forces cause the yield pressure to be exceeded

4 List of significant hazards

All the items in the following list of significant hazards refer to continuous operation and to installation and maintenance.

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

Table 1 — List of significant hazards with cross-references to safety requirements

No.	Hazards	EN ISO 12100:2010	Safety Requirement (Clause)
1	Mechanical Hazard, due to:		
1.3	Mass and Stability (potential energy of elements which may move under the influence of gravity;	6.2.6; 6.3.2.1; 6.3.2.6	5.1; 5.15
1.5	Insufficient mechanical strength	6.4.4	5.2; 5.5; 5.6; 5.7; 5.8; 5.10 to 5.13
1.6	Crushing	6.2.2.1;	5.8
1.7	Shearing	6.2.2.1; 6.3.2.1;	5.8
1.8	Cutting	6.2.2.1	5.8
1.13	Friction or abrasion	6.2.3	5.2; 5.5; 5.6; 5.7; 5.8; 5.10 to 5.13
1.14	Injection or ejection from fluid under high pressure	6.2.10	5.2; 5.4
2	Electrical Hazards due to:		
2.4	Electrical energy - resulting from electrostatic processes	6.2.9	5.12.3
7	Risks related to materials and other materials (and their chemistry), which are processed or used in machines		
7.1	Inhaling of harmful dust	6.3.4.4	5.9
7.2	Fire or explosion	6.2.4; 6.3.3.2.1; 6.4.4	5.3; 5.12.2
10	Unexpected start, unexpected spin/overspeeding due to: operator error	6.2.8	5.1; 5.15
15	Incorrect assembly	6.2.6	5.15
17	Falling or ejected parts or fluids	6.3.2.1; 6.2.11.1	5.2; 5.4 to 5.14
Additional hazards due to lifting			
27	Mechanical hazards and hazardous events		
27.8	Due to abnormal conditions for assembly / test / use / maintenance	6.3.5.6	5.1; 5.15