



SLOVENSKI STANDARD
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**Stroji za podzemne rudnike - Varnostne zahteve za hidravlično podporje - 3. del:
Hidravlični in elektrohidravlični krmilni sistemi**

Machines for underground mines - Safety requirements for hydraulic powered roof supports - Part 3: Hydraulic and electro hydraulic control systems

Maschinen für den Bergbau unter Tage - Sicherheitsanforderungen für hydraulischen Schreitausbau - Teil 1: Ausbaugestelle und allgemeine Anforderungen

Machines pour mines souterraines - Exigences de sécurité relatives aux soutènements marchants applicables aux piles - Partie 3 : Systèmes de commande hydrauliques et électro-hydrauliques

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73.100.10 Oprema za gradnjo predorov Tunnelling and tubbing
in podzemnih železnic equipment

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Machines pour mines souterraines - Exigences de sécurité relatives aux soutènements marchants applicables aux piles - Partie 3 : Systèmes de commande hydrauliques et électro-hydrauliques

Maschinen für den Bergbau unter Tage - Sicherheitsanforderungen für hydraulischen Schreitausbau - Teil 1: Ausbaugestelle und allgemeine Anforderungen

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 1804-3:2019) 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 1804-3:2006+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 1804-3:2006+A1:2010 are as follows:

- a) Normative references (updated);
- b) Terms and definitions (revised/modified/enhanced);
- c) List of significant hazards (revised/enhanced);
- d) Requirements for automatic hydraulic functions (deleted);
- e) Requirements for in- and inter-shield hose routing (added);
- f) Requirements for pipe and hose assemblies (updated);
- g) Requirements for type “A” valves (modified);
- h) Requirements for electro hydraulic control systems (added);
- i) List of verification tests (updated/enhanced);
- j) Figures and pictures (revised/added).

prEN 1804-3:2019 (E)**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.

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.

While preparing this document, it was assumed that:

- only trained and competent persons operate the machine;
- components without specific requirements are:
 - a) designed in accordance with the usual engineering practice and calculation code;
 - b) of sound mechanical construction;
 - c) free of defects;
- components are kept in good working condition / order;
- a negotiation took place between the user and the manufacturer concerning the use of the machinery.

1 Scope

This document specifies the safety requirements for hydraulic and electro hydraulic control devices, including hydraulic valves and their control elements, valve combinations, control systems, pipes and hose assemblies, fittings, shut-off devices, measuring devices, filters, built-in pressure limiting and check valves in legs and rams and water spraying and dust suppression valves, as well emergency stop, start warning, locking- and control unit when used as specified by the manufacturer or his authorized representative. Excluded are pressure generators, and internal valves of legs and rams (e.g. leg bottom valves, see EN 1804-2).

NOTE Some components are dealt with in other parts of this standard.

This document applies to hydraulic and electro hydraulic control devices at ambient temperatures from $-10\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$.

This document identifies and takes into account:

- possible hazards which may be caused by the operation of hydraulic and electro hydraulic control devices;
- areas and operating conditions which may create such hazards;
- hazardous situations which may cause injury or may be damaging to health;
- hazards which may be caused by firedamp and/or combustible dusts.

This document describes methods for the reduction of these hazards.

A list of significant hazards covered appears in Clause 4.

This document does not specify any additional requirements for:

- use in particularly corrosive environments;
- hazards occurring during construction, transportation, decommissioning;
- earthquakes.

This document is applicable to all hydraulic and electro hydraulic control unit 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 853:2015, *Rubber hoses and hose assemblies — Wire braid reinforced hydraulic type — Specification*

EN 854:2015, *Rubber hoses and hose assemblies — Textile reinforced hydraulic type — Specification*

EN 856:2015, *Rubber hoses and hose assemblies — Rubber-covered spiral wire reinforced hydraulic type — Specification*

EN 857:2015, *Rubber hoses and hose assemblies — Wire braid reinforced compact type for hydraulic applications — Specification*

EN 981, *Safety of machinery — System of auditory and visual danger and information signals*

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EN 1804-1, *Machines for underground mines — Safety requirements for hydraulic powered roof supports — Part 1: Support units and general requirements*

EN 1804-2, *Machines for underground mines — Safety requirements for hydraulic powered roof supports — Part 2: Power set legs and rams*

EN ISO 3949:2018, *Plastic hoses and hose assemblies — Textile-reinforced types for hydraulic applications — Specification (ISO 3949:2018)*

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

EN 61508 series, *Functional safety of electrical/electronic/programmable electronic safety-related systems*

EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 12100:2010, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2012)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

ISO 6805:1994, *Rubber hoses and hose assemblies for underground mining — Wire-reinforced hydraulic types for coal mining — Specification*

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 1804-2 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 hydraulic control devices

system required to control all the functions of the hydraulic powered roof supports

3.2 sensor

measuring element

3.3 pressures

**3.3.1
yield pressure of a pressure limiting valve**
hydraulic pressure to which a pressure limiting valve is adjusted and at which it should operate

**3.3.2
cracking pressure of a pressure limiting valve**
hydraulic pressure at which a valve begins to open and hydraulic fluid is passing through it

**3.3.3
working pressure of a pressure limiting valve**
pressure during operation of a pressure limiting valve

**3.3.4
closing pressure of a pressure limiting valve**
pressure at which the valve is closed and the flow of hydraulic fluid is shut off

**3.3.5
maximum permissible working pressure of a pressure limiting valve**
pressure specified by manufacturer

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3.4 valves

**3.4.1
type A valves**
(pressure limiting valves) limit the internal hydraulic pressure of actuators

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**3.4.2
type B valves**
(e.g. check valves) shut off the hydraulic fluid directly from the actuators

**3.4.3
type C valves**
(e.g. directional control valves) in their neutral position, block off the fluid supply to the actuators and supply fluid to the actuators in all other positions

**3.4.4
type D valves**
all those valves, valves combination and control units which cannot be classified specifically in one of the types A to C

3.5 type of control systems

**3.5.1
adjacent control system**
type of control system in which the individual functions of one support unit are manually operated from an adjacent support unit

prEN 1804-3:2019 (E)**3.5.2****unit sequence control system**

control system in which a functional sequence, (e.g. lowering - advancing - setting) operates in one single support unit

3.5.3**sequence control**

control type with a sequence of processes in a defined number of roof supports

3.5.4**automatic guaranteed setting control**

type of control system where the setting function of legs and/or support rams is operated automatically, at least until the rated value of the setting pressure of legs and/or support rams in the support unit has been attained

3.6**dead man's control**

function is only activated, for the time the button or lever is being operated

3.7**type of control****3.7.1****automatic water spray control**

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3.7.1.1**automatic canopy water spray control system**

control system where the canopy water spray system is operated as a function of the time/date and/or position of the mineral production machine and/or the internal condition of the working face or the shield

3.7.1.2**automatic water curtain control system**

control system where the water spraying system for the mineral production machine track is operated as a function of the mineral production machine position, direction and speed of travel, and direction of ventilation

3.7.2**automatic control system for conveyor push**

control system, which pushes the conveyor automatically by initiated different criteria

3.7.3**automatic conveyor horizon control system**

control system where the transverse inclination of the conveyor above the steering ram is controlled as a function of the position and direction of travel of the mineral production machine, the rate of advance and the inclination of the conveyor from set points

3.7.4**automatic base lift control system**

control system where the base lift ram(s) are operated as a function of the movement of the support unit

3.7.5**automatic conveyor creep control system**

control system where the anchor rams can be control by a number of functions including the movement of the support unit, the position and direction of travel of the mineral production machine

3.7.6**automatic face sprag control system**

control system where the face sprags are operated as a function of the position and direction of travel of the mineral production machine and the movement of the support unit

3.7.7**automatic control system for the stabilizing rams**

control system where the stabilizing ram(s) are operated as a function of the movement of the support unit and of the pressure in the legs

3.7.8**automatic control system for support steering**

control system where the steering rams of the advancing support and of the adjacent support units are operated, in order to steer the advancing support

3.7.9**automatic control system for conveyor pullback**

control system where the conveyor is pulled back a specified amount

3.7.10**limited remote**

control system where support units, beyond the adjacent unit (e.g. next but one) are operated as in the normal adjacent control mode (visible range)

3.7.11**remote control**

control system where support units are controlled by a means other than adjacent control

3.7.12**cordless control unit**

control system where data and control commands are transmitted by a means other than galvanic or fibre-optic connections

3.7.13**minimum setting pressure for pushing the conveyor**

minimum pressure in at least one of the legs of the support unit to allow automatic pushing of the conveyor

3.7.14**minimum setting pressure for pulling back the conveyor**

minimum pressure in at least one leg of the support unit to allow automatic pulling back of the conveyor

3.7.15**transfer pressure**

minimum pressure in at least one leg of a support unit to allow an auto sequence in the adjacent support unit(s)

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