SLOVENSKI STANDARD
SIST EN 16228-2:2014+A1:2022

01-marec-2022

Oprema za vrtanje in temeljenje - Varnost - 2. del: Prenosna vrtalna oprema za gradbeništvo in geotehniko, kamnolomstvo in rudarstvo (vključno z dopolnilom A1)

Drilling and foundation equipment - Safety - Part 2: Mobile drill rigs for civil and geotechnical engineering, quarrying and mining

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 2: Mobile Bohrgeräte für Tiefbau, Geotechnik und Gewinnung

Machines de forage et de fondation - Sécurité - Partie 2 : Machines mobiles de forage de génie civil, de géotechnique, de puits d'eau, d'exploration de sol, d'énergie géothermique dans le sol ou mélange roche et sol

Ta slovenski standard je istoveten z: **EN 16228-2:2014+A1:2021**

ICS:

25.080.40	Vrtalniki	Drilling machines
53.100	Stroji za zemeljska dela	Earth-moving machinery
93.020	Zemeljska dela. Izkopavanja. Gradnja temeljev. Dela pod zemljo	Earthworks. Excavations. Foundation construction. Underground works

SIST EN 16228-2:2014+A1:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16228-2:2014+A1

December 2021

ICS 93.020

Supersedes EN 16228-2:2014

English Version

Drilling and foundation equipment - Safety - Part 2: Mobile drill rigs for civil and geotechnical engineering, quarrying and mining

Machines de forage et de fondation - Sécurité - Partie 2 : Machines mobiles de forage de génie civil, de géotechnique, de puits d'eau, d'exploration de sol, d'énergie géothermique dans le sol ou mélange roche et sol

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 2: Mobile Bohrgeräte für Tiefbau, Geotechnik und Gewinnung

This European Standard was approved by CEN on 6 March 2014 and includes Amendment 1 approved by CEN on 22 November 2021.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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

Contents

Page

European foreword

This document (EN 16228-2:2014+A1:2021) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety”, the secretariat of which is held by DIN.

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 June 2022 and conflicting national standards shall be withdrawn at the latest by June 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes A1⟩ EN 16228-2:2014 ⟨A1.

This document includes Amendment 1 approved by CEN on 22 November 2021.

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 Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

This European Standard is divided into several parts and covers drilling and foundation equipment.

Part 1 contains requirements that are/may be common to all drilling and foundation equipment. Other parts contain additional requirements for specific machines that supplement or modify the requirements of part 1. Compliance with the clauses of part 1 together with those of a relevant specific part of this standard giving requirements for a particular machine provides one means of conforming with the essential health and safety requirements of the Directive concerned.

When a relevant specific part does not exist, part 1 can help to establish the requirements for the machine, but will not by itself provide a means of conforming to the relevant essential health and safety requirements of the Directive.

This European Standard, EN 16228, *Drillling and foundation equipment – Safety*, consists of the following parts:

— *Part 1: Common requirements*

— A1⟩ *Part 2: Mobile drill rigs for civil and geotechnical engineering in soil or soil and rock mixture* ⟨A1

— *Part 3: Horizontal directional drilling equipment (HDD)*

— *Part 4: Foundation equipment*

— *Part 5: Diaphragm walling equipment*

— *Part 6: Jetting, grouting and injection equipment*

— *Part 7: Interchangeable auxiliary equipment*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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

The machinery concerned and the extent to which hazards, hazardous situation 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 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.

1 Scope

This European Standard, together with part 1, deals with all significant hazards for mobile drill rigs for A1⟩ in soil or soil and rock mixture in ⟨A1 civil and geotechnical engineering, A1⟩ *deleted text* ⟨A1 when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer associated with the whole life time of the machine (see Clause 4).

The requirements of this part are complementary to the common requirements formulated in A1⟩ EN 16228-1:2014+A1:2021 ⟨A1.

This document does not repeat the requirements from A1⟩ EN 16228-1:2014+A1:2021 ⟨A1, but adds or replaces the requirements for application for mobile drill rigs.

In this document the general term "mobile drill rig" covers several different types of machines for use in:

— civil engineering;

— geotechnical engineering (including ground investigation, anchoring, soil nailing, mini-piling, ground stabilization, grouting);

— water well drilling;

— geothermal installations;

— landfill drilling;

— A1⟩ underpinning and tunnelling ⟨A1;

— for use above ground as well as underground.

Typically, the process of drilling involves the addition of drill rods, tubes, casings or augers etc., normally threaded, as the borehole extends to depth.

NOTE 1 A1⟩ EN 16228–4:2014+A1:2021 covers machines with a rotary torque greater than 35 kNm. ⟨A1

NOTE 2 The term "drill rigs" includes rigs with a separate power pack supplied by the rig manufacturer.

A1⟩ The following machines are excluded from the scope of this document:

— tunnelling machines, unshielded tunnel boring machines and rodless shaft boring machines for rock according to prEN 16191;

— raise boring machines;

— drill rigs used in oil and gas industry;

— specialized mining machinery and equipment for opencast mining (e.g. rock drill rigs, blast hole drills) (under the scope of CEN/TC 196);

— all underground mining machinery and equipment for the extraction of solid mineral substances (e. g. rock drill rigs, raise boring machines, shaft boring machines, mining auger boring machines, jumbos) as well as machinery and equipment for underground mine development (under the scope of CEN/TC 196);

— core drilling machines on stand covered by EN 12348;

— hand-held machines (in particular machines covered by ISO 11148-5).

This document is not applicable to mobile drill rigs for in soil or soil and rock mixture in civil and geotechnical engineering manufactured before the date of its publication. 〈A1〉

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

〈A1〉 EN 280:2013+A1:2021 〈A1〉, *Mobile elevating work platforms — Design calculations — Stability criteria — Construction — Safety — Examinations and tests*

〈A1〉 EN 16228-1:2014+A1:2021 〈A1〉, *Drilling and foundation equipment — Safety — Part 1: Common requirements*

EN ISO 3449:2008, *Earth-moving machinery — Falling-object protective structures — Laboratory tests and performance requirements (ISO 3449:2005)*

EN ISO 3450:2011, *Earth-moving machinery — Wheeled or high-speed rubber-tracked machines — Performance requirements and test procedures for brake systems (ISO 3450:2011)*

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

〈A1〉 EN ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)* 〈A1〉

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, 〈A1〉 EN 16228-1:2014+A1:2021 〈A1〉 and the following apply.

NOTE Examples of drilling and foundation equipment are given in Annex A of 〈A1〉 EN 16228–1:2014+A1:2021 〈A1〉.

3.1
drill rig
machine for drilling in soil or rock utilising either percussive, rotary or vibration principles (or a combination of principles) which may involve the addition of drill rods, tubes, casings or augers etc., normally threaded, as the hole extends

〈A1〉 *deleted text* 〈A1〉

3.1.1
pre-armouring machine
machine specifically designed for and solely intended to be used underground, for advanced roof and side wall ground reinforcement, e.g. pre-armouring, fore-poling, spiling etc., in a horizontal or almost horizontal orientation

Note 1 to entry: The machine can be fitted with one or more feed beams and a boom mounted working platform. Reinforcement bar loader may be present depending on the reinforcement technology.

[A1⟩ 3.1.2
suspended drill rig
non-self-propelled machine, not mounted on powered undercarriage and with external power system designed to work on steep slopes, near to vertical inclines or in very narrow spaces

Note 1 to entry: They are mounted in a fixture which can be:

— suspended in ropes;

— mounted in a stand;

— suspended by other means e.g. hydraulic jacks. ⟨A1]

3.2
mast
structure for supporting guiding the drilling tools

3.3
feed beam
structure on which drill head is mounted providing linear movement to the head

3.4
feed beam extension
structure for linear movement of mast or feed beam

3.5
boom
structure for positioning of the mast or feed beam

3.6
drill string
structure transforming the rotation and/or percussion energy from the drill/rotation unit in to the drill hole

3.7
boom mounted working platform
working platform used for raising or lowering personnel, consisting of a platform fitted onto a (articulated/telescopic) boom

3.8
drill mast attachment
interchangeable equipment comprising a feed beam which can be mounted on a carrier machine such as a 360° excavator in place of the bucket

3.9
rubber-tyred drill rig for underground use
machine for drilling blastholes, rockbolts or anchors in tunnels [A1⟩ *deleted text* ⟨A1] or similar underground structures

Note 1 to entry: It can be fitted with one or more feed beams and a boom mounted platform.

[A1⟩ *deleted text* ⟨A1]

[A1] 3.10
upper clamp
device to hold the drill string closest from the rotary head

3.11
specific initial speed
maximum rotation speed allowing a rotation head to stop in less than one revolution under the test conditions given in Annex G [A1]

4 List of additional significant hazards

Clause 4 of [A1] EN 16228-1:2014+A1:2021 [A1] applies with the following Table 1.

Table 1 of [A1] EN 16228-1:2014+A1:2021 [A1] and Table 1 of this document contain all hazards, hazardous situations and events, identified by risk assessments as significant for mobile drill rigs and which require action to eliminate or reduce risk.

Hazards generally occur under the following conditions:

— in transportation to and from the work site;

— in rigging and dismantling on the work site;

— in service on the work site;

— when moving on the work site;

— out of service on the work site;

— in storage at the plant depot or on the work site;

— maintenance.