

**Vaiapaigaldus- ja vundamendirajamisseadmed. Ohutus.
Osa 3: Suundpuurimisseadmed**

**Drilling and foundation equipment - Safety - Part 3:
Horizontal directional drilling equipment (HDD)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16228-3:2014 sisaldab Euroopa standardi EN 16228-3:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 16228-3:2014 consists of the English text of the European standard EN 16228-3:2014.
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English Version

Drilling and foundation equipment - Safety - Part 3: Horizontal directional drilling equipment (HDD)

Machines de forage et de fondation - Sécurité - Partie 3:
Appareils de forage horizontal dirigé (HDD)

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil
3: Geräte für das gerichtete Horizontalbohrverfahren

This European Standard was approved by CEN on 6 March 2014.

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Foreword

This document (EN 16228-3:2014) 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of an identical text or by endorsement, at the latest by November 2014 and conflicting national standards shall be withdrawn at the latest by November 2014.

This document supersedes EN 791:1995+A1:2009 and EN 996:1995+A3:2009.

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 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, *Drilling and foundation equipment – Safety*, consists of the following parts:

- *Part 1: Common requirements*
- *Part 2: Mobile drill rigs for civil and geotechnical engineering, quarrying and mining*
- *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*

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, 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 situations and events are covered are indicated in the scope of this document.

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

1 Scope

This European Standard, together with part 1, deals with all significant hazards for horizontal directional drilling equipment (HDD) 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 EN 16228-1:2014.

This document does not repeat the requirements from EN 16228-1, but adds or replaces the requirements for application for horizontal directional drills.

A machine is considered a horizontal directional drill if it is designed to drill in a shallow arc for the installation of pipes, conduits, and cables and typically has a drill string entry angle of less than 45° relative to the operating surface of the earth.

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.

EN 474-1:2006+A4:2013, *Earth-moving machinery — Safety — Part 1: General requirements*

EN 12999:2011+A1:2012, *Cranes — Loader cranes*

EN 16228-1:2014, *Drilling and foundation equipment — Safety — Part 1: Common requirements*

EN ISO 2867:2011, *Earth-moving machinery — Access systems (ISO 2867:2011)*

EN ISO 3411:2007, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

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

EN ISO 3471:2008, *Earth-moving machinery — Roll-over protective structures — Laboratory tests and performance requirements (ISO 3471:2008)*

EN ISO 5353:1998, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point (ISO 5353:1995)*

EN ISO 6682:2008, *Earth-moving machinery — Zones of comfort and reach for controls (ISO 6682:1986, including Amd 1:1989)*

EN ISO 7731:2008, *Ergonomics — Danger signals for public and work areas — Auditory danger signals (ISO 7731:2003)*

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

ISO 9244:2008, *Earth-moving machinery — Machine safety labels — General principles*

ISO 9533:2010, *Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria*

ISO 11112:1995¹, *Earth-moving machinery — Operator's seat — Dimensions and requirements*)

ISO/DIS 15818:2013, *Earth-moving machinery — Lifting and tying-down attachment points — Performance requirements*

ISO 16754:2008, *Earth-moving machinery — Determination of average ground contact pressure for crawler machines*

ISO 17063:2003, *Earth-moving machinery — Braking systems of pedestrian-controlled machines — Performance requirements and test procedures*

3 Terms and definitions

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

NOTE Terminology for horizontal directional drills is specified in ISO 21467.

3.1

horizontal directional drill

machine that uses a steerable cutting head attached to the end of a drill string for creating a bore through the earth in a horizontal direction

Note 1 to entry: Drilling can include fluid injection through the drill string to the cutting head, tracking of the bore by use of sensors or a transponder near the cutting head and subsequent enlargement of the bore by back-reaming.

3.2

drill string for HDD

length of rods joined together which transmit forces from the drill frame to the cutting head or back-reamer that cuts the earth and which is also used to rotate the cutting head to position it for steering

Note 1 to entry: This term is hereafter referred to as "drill string".

3.3

drill frame

structure on the horizontal directional drill that transmits rotational and linear forces to the drill string

3.4

ground fixation device

device by which the horizontal directional drill is secured to the ground

3.5

exit side

location remote from the base machine where the drill string exits the ground

3.6

back-reaming

process of enlarging the bore by pulling back a tool of larger diameter than that previously used to form the bore

3.7

back-reamer

tool of larger diameter than that previously used to form the bore

¹) This document is impacted by Amendment 1 published in 2001.