SLOVENSKI STANDARD
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Oprema za vrtanje in temeljenje - Varnost - 3. del: Oprema za vodoravno usmerjeno vrtanje (HDD)

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

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 3: Geräte für das Gerichtete Horizontalbohrverfahren (HDD)

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

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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 dirigé (HDD)

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 3: Geräte für das Gerichtete Horizontalbohrverfahren (HDD)

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 151.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 16228-3:2011) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 791:1995+A1:2009, 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, see informative Annex ZA, which is an integral part of this document.

Part 1: Drilling and foundation equipment – Safety – Common requirements

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

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

Part 4: Drilling and foundation equipment – Safety – Foundation equipment

Part 5: Drilling and foundation equipment – Safety – Diaphragm walling equipment

Part 6: Drilling and foundation equipment – Safety – Jetting, grouting and injection equipment

Part 7: Drilling and foundation equipment – Safety – Interchangeable auxiliary equipment

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 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 document specifies the specific safety requirements for horizontal directional drills when they are used as intended and under the conditions foreseen by the manufacturer.

The requirements of this part are complementary to the common requirements formulated in prEN 16228-1.

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

This document specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards, hazardous situations and events during commissioning, operation and maintenance of horizontal directional drills.

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 474-1:2006+A1:2009, *Earth-moving machinery — Safety — General requirements*

prEN 16228-1:2010, *Drilling and foundation equipment — Safety — Part 1: Common requirements*

FprEN 12999:2009, *Cranes — Loader cranes*

prEN ISO 2867:2009, *Earth-moving machinery — Access systems (ISO/DIS 2867:2009)*

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 3457:2008, *Earth-moving machinery — Guards — Definitions and requirements (ISO 3457:2003)*

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

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

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design – Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2; Technical principles (ISO 12100-2:2003)*

ISO 5006:2006, *Earth-moving machinery — Operator's field of view — Test method and performance criteria*

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 10968:2004, *Earth-moving machinery — Operator's controls*

ISO 11112:1995, *Earth-moving machinery — Operator's seat — Dimensions and requirements*

ISO 15817:2005, *Earth-moving machinery — Safety requirements for remote operator control*

ISO/FDIS 15818:2008, *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 prEN 16228-1 and the following apply.

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

3.1
horizontal directional drill
a 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 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.

NOTE 2 These machines typically apply force to the drill string using a drill frame parallel to, or inclined up to, 30° relative to the operating earth surface

3.2
drill string
one or more lengths of rods joined together which transmit forces from the drill frame to the cutting head or back-reamer that cuts the earth. The drill string is also used to rotate the cutting head to position it for steering

3.3
drill frame
structure on the horizontal directional drill that transmits rotational and linear forces to the drill string

3.4
ground fixation
method 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

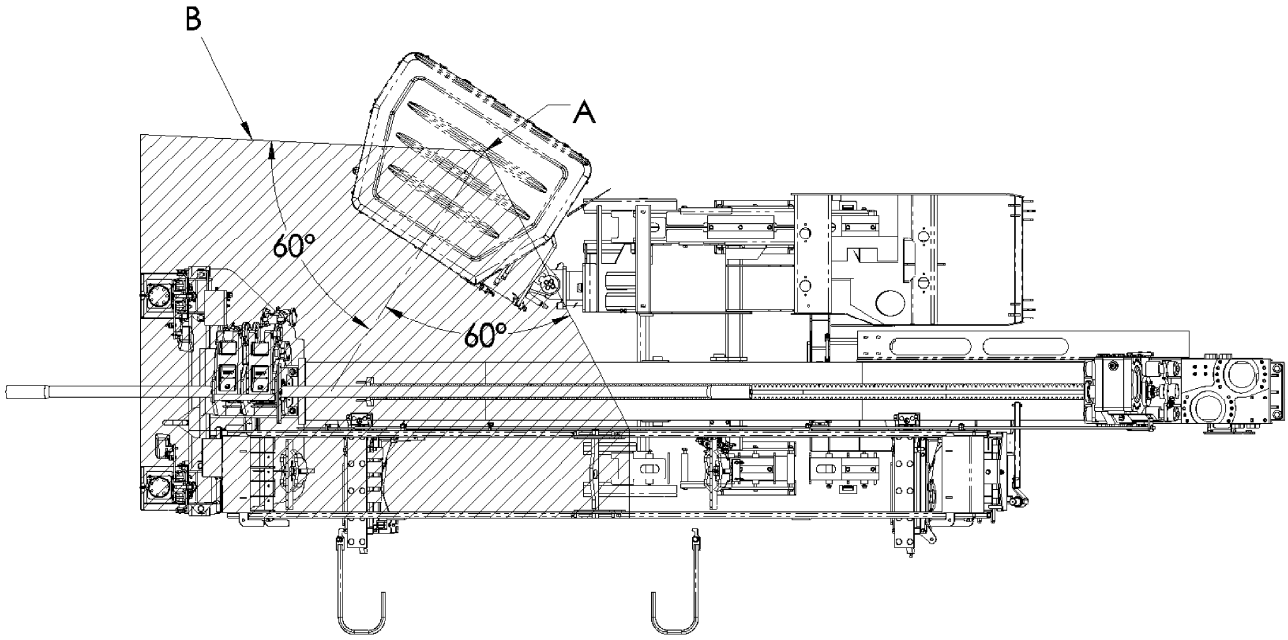
3.6
back-reaming
process of enlarging the bore by pulling back a tool of larger diameter than that previously used to form the bore

3.7
back-reamer
a tool of larger diameter than that previously used to form the bore

3.8
hose track
a carrier that protects, guides, and maintains proper bend radius of hydraulic hoses, electrical cables, and air hoses during movement between the stationary and moving portion of the horizontal directional drill

3.9
drill rod/pipe receivers
structure or a method that supports the drill rod/pipe on horizontal directional drills that are not equipped with mechanical drill rod/pipe loaders

3.10
operator zone of control
visible length of the drill pipe when seated in the operator's seat with the a profile of 60 ° each side based on the nasal binocular field of vision assuming a fixed head and fixed eyes measured from the central position with respect to the head but the length extends only to the inside edge of the drill rod/pipe storage magazine and not beyond (see Figure 1)



Key

A Seat index point
B Operator zone of control

Figure 1 — Operator zone of control

4 List of additional significant hazards

This clause contains all hazards, as far as they are dealt with in this European Standard, identified by risk assessments significant for this type of machinery and which require action to eliminate or reduce risk.

Hazards can occur under the following conditions:

a) in transportation to and from the work site;

b) in rigging and dismantling on the work site;

c) in service on the work site;

d) when tramming between working positions on the job site;

e) out of service on the work site;

f) maintenance;

g) in storage at the plant depot or on the work site.

Table 1 — List of significant hazards and associated requirements

No.	Hazard	EN ISO 12100-1	EN ISO 12100-2	Other EN-standards and ISO-standards	Relevant clause(s) in this standard
1	Mechanical Hazards	4.2	4.1		5.4.2, 5.9, 5.11
1.1	Drawing in or trapping				5.9, 5.11
1.2	Entanglement	4.2			5.9, 5.11
1.3	Crushing due to machine operation	4.2	4.2	EN ISO 3471 EN ISO 3449	5.3.9, 5.3.15, 5.8, 5.9
1.4	Crushing due to product movement				5.8
1.5	Crushing during cable connection operation	4.2	4.2		5.9
1.6	Crushing during manual drill rod handling	4.2	4.2	EN ISO 3449	5.8
1.7	Fluids under pressure			EN ISO 3457	5.3.2, 5.3.8
2	Hazardous events due to unexpected movement				5.3.11, 5.4
2.1	Movement of drill string/tooling at Exit side				5.8
2.2	Movement of product connected to drill string at exit side				5.8
2.3	Ejection of fluid at exit side				5.8
2.4	Movement of machine from anchored position				5.2
2.5	Movement of machine (tramming) while in drilling position				5.8, 5.10
3	Hazards due to electrical contact	4.3	4.9		5.5
4	Visibility of work area			ISO 5006	3.10, 5.10

5 Safety requirements and/or protective measures

5.1 General

Horizontal directional drills shall comply with the requirements of prEN 16228-1, as far as not modified or replaced by the requirements of this part.