



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 23224:2025**  
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**Oprema za vrtanje in temeljenje - Oprema za vodoravno usmerjeno vrtanje (HDD) - Varnostne zahteve in preverjanje (ISO/DIS 23224:2025)**

Drilling and foundation equipment - Horizontal directional drilling (HDD) machines - Safety requirements and verification (ISO/DIS 23224:2025)

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 3: Geräte für das gerichtete Horizontalbohrverfahren (HDD) (ISO/DIS 23224:2025)

Machines de forage et de fondation - Machines de forage horizontal dirigé (HDD) - Exigences de sécurité et vérification (ISO/DIS 23224:2025)

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### Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 195, *Building and construction machinery and equipment*, Subcommittee SC 3, *Drilling and foundation machinery and equipment*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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**ISO/DIS 23224:2025(en)****Introduction**

This document is a type-C standard as stated in ISO 12100:2010.

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 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.

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# Drilling and foundation equipment — Horizontal directional drilling (HDD) machines — Safety requirements and verification

## 1 Scope

This document specifies the safety requirements for horizontal directional drilling (HDD) machines (hereafter referred to as HDD machines) as defined in ISO 21467:2023 which are designed primarily for drilling through the earth in a mostly horizontal direction.

This document is applicable to the following HDD machine types:

- portable HDD machines;
- pedestrian-controlled HDD machines;
- towed HDD machines;
- self-propelled HDD machines;
- ride-on HDD machines;
- remote-controlled tramming HDD machines;
- skid-mounted HDD machines;
- pit-launched HDD machines;
- surface-launched HDD machines.

NOTE Some HDD machines can include a combination of types or characteristics noted above.

This document deals with all significant hazards, hazardous situations, and events relevant to the HDD machines within its scope when used as intended or under conditions of misuse reasonably foreseeable by the manufacturer, excluded hazards related to high-voltage batteries integrated in the power source system. It specifies the appropriate technical measures for eliminating or reducing risks arising from relevant hazards, hazardous situations or events during commissioning, operation, and maintenance.

This document is not applicable to machines manufactured before the date of its publication.

## 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.

ISO 2631-1:1997, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*

ISO 2860:1992, *Earth-moving machinery — Minimum access dimensions*

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

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

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ISO 3449:2005, *Earth-moving machinery — Falling object protective structure — Laboratory tests and performance requirements*

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

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

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

ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 4309:2017, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

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

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 5006:2017, *Earth-moving machinery — Operator's field of view — Test method and performance criteria*

ISO 5010:2019, *Earth-moving machinery — Wheeled machines — Steering requirements*

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

ISO 6011:2023, *Earth-moving machinery — Visual display of machine operation*

ISO 7731, *Ergonomics — Danger signals for public and work areas — Auditory danger signals*

ISO 6682:1986, *Earth-moving machinery — Zones of comfort and reach for controls*

ISO 6683:2005, *Earth-moving machinery — Seat belts and seat belt anchorages — Performance requirements and tests*

ISO 6750-1:2019, *Earth-moving machinery — Operator's manual — Part 1: Contents and format*

ISO 7000:2019, *Graphical symbols for use of equipment — Registered symbols*

ISO 7010:2019<sup>1)</sup>, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 7096:2020, *Earth-moving machinery — Laboratory evaluation of operator seat vibration*

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 10263-2:2009, *Earth-moving machinery — Operator enclosure environment — Part 2: Air filter element test method*

ISO 10263-4:2009, *Earth-moving machinery — Operator enclosure environment — Part 4: Heating, ventilating and air conditioning (HVAC) test method and performance*

ISO 10264:1990, *Earth-moving machinery — Key-locked starting systems*

1) As impacted by amendments Amd1:2020, Amd2:2020, Amd3:2021, Amd4:2021, Amd5:2022, Amd6:2022, Amd7:2023

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ISO 10265:2008, *Earth-moving machinery — Crawler machines — Performance requirements and test procedures for braking systems*

ISO 10532:1995, *Earth-moving machinery — Machine-mounted retrieval device — Performance requirements*

ISO 10567:2007, *Earth-moving machinery – Hydraulic excavators – Lift capacity*

ISO 10968:2020, *Earth-moving machinery — Operator's controls*

ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

ISO 11203:1995, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*

ISO 11112:1995<sup>2)</sup>, *Earth-moving machinery — Operator's seat — Dimensions and requirements*

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

ISO 13732-1:2006, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part1: Hot surfaces*

ISO 13766-1:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 1: General EMC requirements under typical electromagnetic environmental conditions*

ISO 13766-2:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 2: Additional EMC requirements for functional safety*

ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems*

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

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reach by upper and lower limbs*

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119:2024, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 15442:2012, *Cranes — Safety requirements for loader cranes*

ISO 15817:2012, *Earth-moving machinery — Safety requirements for remote operator control systems*

ISO 15818:2017, *Earth-moving machinery — Lifting and tying-down attachment points — Performance requirements*

ISO 16001:2017, *Earth-moving machinery — Object detection systems and visibility aids — Performance requirements and tests*

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*

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2) As amended by ISO 11112:1995/Amd 1:2001

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ISO 21467:2023, *Drilling and foundation machinery — Horizontal directional drilling (HDD) machines – Commercial specifications*

ISO/TR 22100-3:2016, *Safety of machinery — Relationship with ISO 12100 — Part 3: Implementation of ergonomic principles in safety standards*

IEC 60204-1:2016+A1:2021, *Safety of machinery — Electrical equipment of machines — Part1: General requirements*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity standard for industrial environments*

IEC 61000-6-4:2018, *RLV, Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 and ISO 21467:2023, and the following apply.

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

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

#### 3.1

##### **horizontal directional drilling machine**

HDD machine

machine that uses a steerable drill head attached to the end of a drill string to drill through the earth in a mostly horizontal direction

Note 1 to entry: HDD 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.

[SOURCE: ISO 21467:2023, 3.1.1 modified to remove Note 2 to entry.]

#### 3.2

##### **ground fixation device**

device by which the HDD machine is secured to the ground

#### 3.3

##### **exit side**

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

#### 3.4

##### **hose track**

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 HDD machine

#### 3.5

##### **drill rod/pipe receiver**

structure or a component that supports the drill rod/pipe on HDD machines that are not equipped with mechanical drill rod/pipe loaders