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Drilling and foundation equipment - Safety - Part 1: Common requirements (ISO/DIS 20770-1:2025)

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 1: Gemeinsame Anforderungen (ISO/DIS 20770-1:2025)

Machines de forage et de fondation - Sécurité - Partie 1: Prescriptions commun (ISO/DIS 20770-1:2025)

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Part 1:

Common requirements

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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).

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

A list of all parts in the ISO 20770 series can be found on the ISO website.

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.

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Introduction

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

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 organisations, 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 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 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 drilling and foundation machines that have been designed and built according to the requirements of this type C standard.

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Drilling and foundation equipment — Safety —

Part 1: Common requirements

1 Scope

This document specifies the common safety requirements for drilling and foundation equipment.

This document deals with the significant hazards (see [Annex F](#)) common to drilling and foundation equipment (see ISO 11886:____)¹⁾, , 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 (transport, assembly, dismantling, equipment in service and out of service, maintenance, moving on site, storage, disabling and scrapping).

NOTE 1 The requirements specified in this part of the standard are common to two or more families of drilling and foundation equipment.

This document gives common safety requirements for drilling and foundation equipment and is intended to be used in conjunction with relevant parts of this series (Part 2 thru Part 6). These machine specific parts do not repeat the requirements from part 1 but supplement or modify the requirements for the type of drilling and foundation equipment in question.

For multipurpose machinery, the parts of the standard that cover the specific functions and applications are used, e.g. a drilling machine also used as a piling machine will use the relevant requirements of ISO 20770-1 to -6.

The following machines are excluded from the scope of this standard:

- autonomous or semi-autonomous (as defined in ISO 17757:2019) drilling and foundation equipment;
- tunnelling machines, unshielded tunnel boring machines and rodless shaft boring machines for rock according to EN 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 ISO/TC 82);
- 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 ISO/TC 82);
- core drilling machines on stand (covered by EN 12348);
- hand-held machines (in particular machines covered by ISO 11148-5);
- horizontal directional drilling machines (HDD) as defined in ISO 21467).

NOTE 2 ISO 23224 (*in preparation*) deals with the significant hazards for horizontal directional drilling (HDD) machines.

NOTE 3 Specific requirements for offshore applications are not covered by this document.

1) Under preparation (stage DIS)

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Where a drilling and foundation machine of fixed configuration that is not intended to be separated is assembled using a carrier machine based on earth-moving equipment, agricultural equipment, or crane, then the completed assembly is covered by this document.

Drilling and foundation machinery within the scope of ISO 20770 parts 1 to 5 may include interchangeable auxiliary equipment within the scope of ISO 20770-6, either as an integral part of its construction or as interchangeably fitted equipment.

Hazards due to:

- self-learning systems;
- cybersecurity;
- corruption due to machines which are connected to the internet or an external network;
- potentially explosive atmosphere, or lightning;
- high-voltage batteries integrated in the power source system

are not covered by this document.

This document is not applicable to drilling and foundation equipment 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.

EN 474-1:2022, *Earth-moving machinery — Safety — Part 1: General requirements*

EN 474-5:2022, *Earth-moving machinery — Safety — Part 5: Requirements for hydraulic excavators*

NOTE Although the ISO 20474 series has the same scope as the EN 474 series, the European standards are more recent and therefore more representative of the state of the art.

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 614-2:2000+A1:2008, *Safety of machinery — Ergonomic design principles — Part 2 : interactions between the design of machinery and work tasks*

EN 795:2012, *Personal fall protection equipment — Anchor devices*

EN 12254:2010, *Screens for laser working places - Safety requirements and testing*

EN 60825-4:2006, *Safety of laser products - Part 4 : Laser guards*

EN ISO 14118:2018, *Safety of machinery — Prevention of unexpected start-up*

EN 13411-6:2004+A1:2008, *Terminations for steel wire ropes — Safety — Part 6: Asymmetric wedge socket*

EN 13411-7:2006+A1:2008, *Terminations for steel wire ropes — Safety — Part 7: Symmetric wedge socket*

ISO 12117:2008, *Earth-moving machinery — Tip-over protection structure (TOPS) for compact excavators — Laboratory tests and performance requirements*

IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

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

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

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

ISO 3449:2005, *Earth-moving machinery — Falling-object protective structures — 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 3747:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering/survey methods for use in situ in a reverberant environment*

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 6682:2008²⁾, *Earth-moving machinery — Zones of comfort and reach for controls*

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

ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*

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

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

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

2) As impacted by ISO 6682:2008/Amd 1:1989, *Earth-moving machinery — Zones of comfort and reach for controls*

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ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

ISO 13856-3:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices*

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

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

ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders³⁾*

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

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

IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

ISO 2631-1:1997, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements⁴⁾*

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

ISO 4302:2016, *Cranes — Wind load assessment*

ISO 4309:2010, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

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

ISO 6405-1:2017, *Earth-moving machinery — Symbols for operator controls and other displays — Part 1: Common symbols*

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

ISO 7000:2012, *Graphical symbols for use on equipment — Registered symbols*

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

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 10570:2004, *Earth-moving machinery — Articulated frame lock — Performance requirements*

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

3) This document is impacted by stand-alone Amendment 1 published in 2010.

4) This document is impacted by stand-alone Amendment 1 published in 2010.