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Mining and earth-moving machinery — Rock drill rigs and rock reinforcement rigs —

Part 2: Safety requirements

Engins d'exploitation minière et de terrassement — Appareils de forage et de renfort de roches —

Partie 2: Exigences de sécurité

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

This document was prepared by Technical Committee ISO/TC 82, *Mining*, in cooperation with Technical Committee ISO/TC 127, *Earth-moving machinery*.

A list of all parts in the ISO 18758 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.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers;

— mining companies;

— health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.).

Others that can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups are:

— machine operators;

— service providers, e.g. for maintenance;

— third party system and technology providers.

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, 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 rock drill rigs and rock reinforcement rigs that have been designed and built according to the requirements of this type C standard.

The following assumptions were made in writing this document:

a) the operators of the machines are well trained professionals and aware of potential risks of the working environment (see ISO/IEC GUIDE 51:2014, 6.1 a);

b) the machines are operated according to the instructions given by the manufacturer, such as operator's instructions (see ISO/IEC GUIDE 51:2014, 7.4.2.2);

c) administrative controls are in place for preventing unauthorized entry of persons to the area where machines are working (see ISO/IEC GUIDE 51:2014, 6.2.2 and note).

For increased readability of this document, rock drill rigs and rock reinforcement rigs are called rigs.

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Mining and earth-moving machinery — Rock drill rigs and rock reinforcement rigs —

Part 2: Safety requirements

1 Scope

This document specifies the safety requirements for rock drill rigs and rock reinforcement rigs designed for the following underground or surface operations:

a) blast hole drilling;

b) rock reinforcement;

c) drilling for secondary breaking;

d) dimensional stone drilling;

e) mineral prospecting, e.g. utilizing core drilling or reverse circulation;

f) water and methane drainage drilling;

g) raise boring.

NOTE Rigs can be designed for more than one of the operations above. See ISO 18758-1 for vocabulary.

This document is also applicable to earth-moving machinery as defined in ISO 6165, modified to become a rock drill rig or rock reinforcement rig.

This document is not applicable to the following machines: drill rigs for soil and rock mixture; (geothermal drill rigs, water well drill rigs, water jet drill rigs, micro pile drill rigs; surface horizontal directional drill rigs (HDD) as defined in ISO 21467), kelly drill rigs (and casing drivers); cable tool drill rigs; pre-armouring machines; sonic drill rigs; shaft sinking drill rigs; crane attached drill rigs; drill rigs on derricks; scaling machines.

This document deals with the significant hazards, hazardous situations or hazardous events, as listed in Annex E, relevant to rock drill rigs and rock reinforcement rigs (see ISO 18758-1), when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer.

This document is not applicable to rigs 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, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*

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

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

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

ISO 3864-2, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*

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

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

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

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

ISO 4871, *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, *Earth-moving machinery — Rubber-tyred machines — Steering requirements*

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

ISO 6405-2, *Earth-moving machinery — Symbols for operator controls and other displays — Part 2: Symbols for specific machines, equipment and accessories*

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

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

ISO 6750:2005, *Earth-moving machinery — Operator's manual — Content and format*

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

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

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

ISO 10262, *Earth-moving machinery — Hydraulic excavators — Laboratory tests and performance requirements for operator protective guards*

ISO 10263-1, *Earth-moving machinery — Operator enclosure environment — Part 1: Terms and definitions*

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

ISO 10263-3, *Earth-moving machinery — Operator enclosure environment — Part 3: Pressurization test method*

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

ISO 10263-5, *Earth-moving machinery — Operator enclosure environment — Part 5: Windscreen defrosting system test method*

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ISO 10263-6, *Earth-moving machinery — Operator enclosure environment — Part 6: Determination of effect of solar heating*

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

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

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

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

ISO 10968, *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, *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 12508, *Earth-moving machinery — Operator station and maintenance areas — Bluntness of edges*

ISO 13333:1994, *Earth-moving machinery — Dumper body support and operator's cab tilt support devices*

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

ISO/TS 13732-2, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 2: Human contact with surfaces at moderate temperature*

ISO 13732-3, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces*

ISO 13766, *Earth-moving machinery — Electromagnetic compatibility*

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

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

ISO 13851, *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

ISO 13856-1, *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, *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, *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 14118, *Safety of machinery — Prevention of unexpected start–up*

ISO 14567, *Personal protective equipment for protection against falls from a height — Single-point anchor devices*

ISO 14990-1, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 1: General requirements*

ISO 14990-2, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 2: Particular requirements for externally-powered machines*

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ISO 14990-3, *Earth-moving machinery — Electrical safety of machines utilizing electric drives and related components and systems — Part 3: Particular requirements for self-powered machines*

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

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

ISO 16001, *Earth–moving machinery — Hazard detection systems and visual aids — Performance requirements and tests*

ISO 16368, *Mobile elevating work platforms — Design, calculations, safety requirements and test methods*

ISO 16528-1, *Boilers and pressure vessels — Part 1: Performance requirements*

ISO 16528-2, *Boilers and pressure vessels — Part 2: Procedures for fulfilling the requirements of ISO 16528-1*

ISO 20381, *Mobile elevating work platforms — Symbols for operator controls and other displays*

IEC 60073, *Basic and Safety Principles for Man–Machine Interface, Maring and Identification — Coding Principles for Indication Devices and Actuators*

IEC 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

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

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

IEC 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*

IEC 61310-3, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators*

EN 14492-1, *Cranes — Power driven winches and hoists — Part 1: Power driven winches*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 4309, ISO 6682, ISO 6750, ISO 10968, ISO 12100 and ISO 18758-1 apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Safety requirements

4.1 General requirements

4.1.1 General

Machinery shall comply with the safety requirements of this document. In addition, the machine shall be designed according to the principles of ISO 12100 for hazards which are not dealt with by this document.

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