

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

Mining – Mobile machines working underground – Machine safety (ISO 19296:2018)

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN ISO 19296:2018. It supersedes BS EN 1889-1:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MRE/1, Mining mechanical equipment and machinery.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 539 04244 3

ICS 13.110; 53.100; 73.100.40; 73.100.99

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2019.

Amendments/corrigenda issued since publication

Date	Text affected
31 March 2019	Implementation of CEN correction notice 20 February 2019: Date of withdrawal corrected
31 March 2019	Annex ZA added

This is a preview of "BS EN ISO 19296:2018". Click here to purchase the full version from the ANSI store.

EUROPÄISCHE NORM

December 2018

ICS 73.100.40

Supersedes EN 1889-1:2011

English Version

Mining - Mobile machines working underground - Machine safety (ISO 19296:2018)

Exploitation minière - Engins mobiles
d'exploitation souterraine - Sécurité
des machines (ISO 19296:2018)

Bergbau- und Erdbbaumaschinen
- Mobile Untertagemaschinen -
Maschinensicherheit (ISO 19296:2018)

This European Standard was approved by CEN on 12 December 2018.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

European foreword

This document (EN ISO 19296:2018) has been prepared by Technical Committee ISO/TC 82 "Mining" in collaboration with Technical Committee CEN/TC 196 "Mining machinery and equipment - 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 June 2019, and conflicting national standards shall be withdrawn at the latest by December 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1889-1:2011.

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 the relationship with EU Directive(s) see informative [Annex ZA](#), which is an integral part of this document.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 19296:2018 has been approved by CEN as EN ISO 19296:2018 without any modification.

This is a preview of "BS EN ISO 19296:2018". Click here to purchase the full version from the ANSI store.

Annex ZA (informative)

Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/396 (Machinery) to provide one voluntary means of conforming to essential requirements of Directive 2006/42/EC (MD).

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in [Table ZA.1](#) confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2006/42/EC (MD)

Essential Requirements of Directive 2006/42/EC (MD)	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Within the limits of the scope all relevant essential requirements are covered	All normative clauses	For relation of normative clauses of this standard to significant hazards/relevant essential requirements of 2006/42/EC see informative Annex B „List of significant hazards“ of this standard in combination with Annex D “Examples of significant hazards, hazardous situations, hazardous events and their relation to the Essential Requirements of the Machinery Directive 2006/42/EC” of CEN Guide 414

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

Contents		Page
Foreword		vi
Introduction		vii
1 Scope		1
2 Normative references		1
3 Terms and definitions		4
4 Safety requirements and/or protective/risk reduction measures		9
4.1 General requirements.....		9
4.1.1 General.....		9
4.1.2 Moving parts.....		9
4.1.3 Equipment carrier restraints.....		10
4.1.4 Starting system.....		10
4.1.5 Unintended movement.....		10
4.2 Lifting and transportation.....		10
4.3 Towing and retrieval.....		10
4.4 Fluid power systems.....		11
4.4.1 Hydraulic systems.....		11
4.4.2 Pneumatic systems.....		12
4.5 Electrical equipment.....		13
4.5.1 General.....		13
4.5.2 Electromagnetic compatibility (EMC).....		13
4.5.3 Batteries.....		13
4.6 Machines powered by diesel engine.....		13
4.6.1 Fuel and exhaust.....		13
4.6.2 Exhaust pipes.....		13
4.6.3 Engine cooling system.....		14
4.7 Fuel systems.....		14
4.7.1 Fuel tanks.....		14
4.7.2 Fuel tank filler inlet.....		14
4.7.3 Fuel tank vent system.....		14
4.7.4 Fuel tank drainage device.....		14
4.7.5 Fuel shut-off system.....		14
4.7.6 Fuel lines.....		15
4.8 Light intensity and quantity.....		15
4.8.1 General.....		15
4.8.2 Head lights.....		15
4.8.3 Tail lights.....		15
4.8.4 Reversing lights.....		15
4.8.5 Stop lamps.....		15
4.8.6 Both direction lights.....		15
4.8.7 Protective systems.....		16
4.9 Warning devices and safety signs.....		16
4.10 Braking.....		16
4.10.1 General requirements.....		16
4.11 Control systems and devices.....		16
4.11.1 General.....		16
4.11.2 Control devices.....		16
4.11.3 Steering systems.....		17
4.11.4 Displays.....		17
4.12 Operator and passenger's position.....		18
4.12.1 Protection.....		18
4.12.2 Access systems.....		18
4.12.3 Visibility.....		18
4.12.4 Interior space, dimensions, and seats.....		19

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

4.13	Fire protection.....	19
4.14	Noise.....	20
	4.14.1 Noise reduction at source at the design stage.....	20
	4.14.2 Information on noise emission.....	20
4.15	Vibrations.....	21
4.16	Radiation health risks.....	21
4.17	Tyres and rims.....	21
4.18	Stability.....	21
4.19	Load haul dump capacity.....	22
4.20	Maintenance.....	22
	4.20.1 General.....	22
	4.20.2 Frequent maintenance.....	22
	4.20.3 Support devices.....	22
	4.20.4 Tilttable cab support device.....	23
4.21	Quick coupler systems.....	23
5	Verification of safety requirements and/or protective/risk reduction measures.....	23
6	Information for use.....	23
6.1	Operator's manual.....	23
	6.1.1 General.....	23
	6.1.2 Information on noise emission.....	24
	6.1.3 Information concerning hand-arm and whole-body vibration emission.....	24
6.2	Marking.....	25
	6.2.1 General.....	25
	6.2.2 Attachment points.....	25
	6.2.3 Section or sub-assemblies.....	25
6.3	Training manuals.....	26
	Annex A (normative) Brake requirements for rubber tyred underground mining machines.....	27
	Annex B (informative) List of significant hazards, hazardous situations and hazardous events.....	33
	Annex C (normative) Verification table.....	37
	Annex D (informative) Examples of performance levels for safety-related functions.....	42
	Bibliography.....	43

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 82, *Mining*.

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.

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

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 (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, 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.

The following assumptions were made in writing this standard:

- a) the operators of the machines are well trained professionals and aware of potential risks of the working environment;
- b) the machines are operated according to the instructions given by the manufacturer in the operating instructions;
- c) administrative controls are in place for preventing unauthorized entry of persons to the area where machines are working;
- d) components are:
 - 1) designed in accordance with the good engineering practice and calculation codes, taking account of shocks and vibration, including all failure modes;
 - 2) made of materials with adequate strength and of suitable quality; and
 - 3) free of defects;
- e) harmful materials, such as asbestos are not used;
- f) components are kept in good repair and working order, so that the required dimensions remain fulfilled despite wear.

This is a preview of "BS EN ISO 19296:2018". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS EN ISO 19296:2018". Click here to purchase the full version from the ANSI store.

Mining – Mobile machines working underground – Machine safety

1 Scope

This document specifies the safety requirements for self-propelled mobile machines used in underground mining, as defined in [3.1](#).

This document deals with hazards, hazardous situations and hazardous events (see [Annex B](#)) relevant to these machines when they are used as intended or under conditions of misuse reasonably foreseeable by the manufacturer.

For utility/service/support machines, this document only includes provisions to address the risks associated with the mobility (movement of the whole machine from one location to another). Risks for the additional functions (e.g. scaling, concrete spraying, bolting, charging, drilling, attachments) are not covered in this document.

This document specifies the appropriate technical measures for eliminating or sufficiently reducing risks arising from hazards, hazardous situations or hazardous events during commissioning, operation and maintenance.

This document does not address:

- the additional risks for machines operating in potentially explosive atmospheres;
- air quality and engine emissions.

This document is not applicable to:

- machines constrained to operate by rails;
- continuous miners, roadheaders, drill rigs, conveyors, long wall production equipment, tunnel boring machines (TBM), and mobile crushers.

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 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*

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*