
**Stroji in oprema za pridobivanje in obdelavo naravnega kamna - Varnost - 2. del:
Zahteve za premične enožične diamantne žage**

Machines and installations for the exploitation and processing of natural stone - Safety -
Part 2: Requirements for transportable diamond wire saws

Maschinen und Anlagen zur Gewinnung und Bearbeitung von Naturstein - Sicherheit -
Teil 2: Anforderungen für mobile Diamantseilsägen

Machines et installations pour l'exploitation et la transformation de la pierre naturelle -
Sécurité - Partie 2 : Prescriptions pour les scies à fil diamanté transportables

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ICS:

25.100.40	Žagni listi	Saws
73.120	Oprema za predelavo rudnin	Equipment for processing of minerals

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**Machines and installations for the exploitation and
processing of natural stone - Safety - Part 2: Requirements
for transportable diamond wire saws**

Machines et installations pour l'exploitation et la
transformation de la pierre naturelle - Sécurité - Partie
2 : Prescriptions pour les scies à fil diamanté
transportables

Maschinen und Anlagen zur Gewinnung und
Bearbeitung von Naturstein - Sicherheit - Teil 2:
Anforderungen für mobile Diamantseilsägen

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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Contents	Page
European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references.....	6
3 Terms and definitions	8
4 Safety requirements and/or protective measures	21
4.1 General.....	21
4.2 Controls.....	21
4.2.1 Safety and reliability of control systems	21
4.2.2 Position of controls.....	21
4.2.3 Starting.....	22
4.2.4 Normal stop	22
4.2.5 Emergency stop.....	23
4.2.6 Mode selection	23
4.2.7 Failure of power supply	24
4.2.8 Failure of the control circuits	24
4.3 Protection against mechanical hazards.....	24
4.3.1 Transport of the machine.....	24
4.3.2 Installation and stability of machine	25
4.3.3 Tool changing	25
4.3.4 Wire tension system.....	25
4.3.5 Safety requirements in case of whiplash	26
4.3.6 Guarding of transmission parts	29
4.3.7 Requirements for guard materials	30
4.4 Protections against no mechanical hazards.....	30
4.4.1 Fire.....	30
4.4.2 Noise	30
4.4.3 Electrical hazards.....	31
4.4.4 Ergonomics and handling.....	31
4.4.5 Hydraulic and pneumatic components	32
4.4.6 Electromagnetic compatibility	32
4.4.7 Isolation.....	32
4.4.8 Lightning	32
4.4.9 Maintenance.....	33
5 Information for use	33
5.1 General.....	33
5.2 Marking, signs and written warnings	33
5.3 Instruction handbook.....	34
5.3.1 General.....	34
5.3.2 Operator's manual	34
5.3.3 Maintenance instructions	36
Annex A (informative) List of significant hazards	38
Annex B (normative) Safety distances for transportable diamond wire saws	40
Annex C (normative) Noise-test code.....	43

C.1	Introduction.....	43
C.2	Measurement of the A-weighted emission sound pressure level at the operator's positions or other specified positions.....	43
C.2.1	Basic standards	43
C.2.2	Measurement procedure and positions	43
C.2.3	Measurement uncertainty	44
C.3	Determination of A-weighted sound-power level.....	44
C.3.1	Measurement procedure and positions	44
C.3.2	Measurement uncertainty	44
C.4	Installation, mounting and operating conditions for noise-emission measurement	45
C.5	Information to be recorded and reported	45
C.6	Declaration and verification of noise-emission values.....	47
C.6.1	General	47
C.6.2	Example of a declaration of noise-emission values in the instruction handbook for transportable diamond wire saws	48
Annex ZA (informative)	Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered.....	50
Bibliography		54

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 oSIST prEN 15163-2:2020

prEN 15163-2:2020 (E)**European foreword**

This document (prEN 15163-2:2020) 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 15163-2:2017.

This document has been prepared under a standardization request 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(s), see informative Annex ZA, which is an integral part of this document.

This document deals with safety requirements of transportable diamond wire saws previously treated in EN 15163:2017 with safety requirements of stationary diamond wire saws, now treated in prEN 15163-1:2020. As safety requirements related two types of machines have been separated, this standard edition is completely different from the previous one.

Safety requirements treated in Clause 4, information for use treated in Clause 5 and related annexes have been deeply modified, in addition, the following changes have been introduced:

- list of the significant hazards has been moved from Clause 4 to Annex A, according to Clause 6.10.3.1 of CEN Guide 414;
- normative references have been modified and updated to Clause 2;
- new terms and definitions have been introduced and improved to Clause 3 (e.g. transportable diamond wire saw; coated diamond wire, cutting operations);
- Annex ZA has been modified according to the last edition of CEN Guide 414.

Introduction

This document has been prepared to be a harmonized standard to provide one means of conforming to the essential health and safety requirements of the Machinery Directive and associated EFTA Regulations.

This document is a type-C standard as stated in EN 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 organizations, 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 type-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.

1 Scope

This document deals with all significant hazards, hazardous situations and events, as listed in Annex A, which are relevant to transportable diamond wire saws and cutting operations as defined in Clause 3.

This document deals only with transportable diamond wire saws used in quarries for cutting natural stones (e.g. marble, granite), when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A).

This document deals only with transportable diamond wire saws using coated diamond wire as tool.

This document specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

This document deals all significant hazards that may occur within the expected lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.

This document does not deal with the significant hazards arising by the use of other facilities/devices not described in this document, that may be fitted on the machines or that may be used during the work cycle.

This document does not deal with:

- a) operation under extreme ambient conditions (outside the limits defined in EN 60204-1:2018);
- b) upstream and downstream conveying elements, not integrated with transportable diamond wire saws, for transporting of the work-pieces.

This document is not applicable to machines which are manufactured before the date of publication of this document by CEN.

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2 Normative references

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The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 863:1995, *Protective clothing — Mechanical properties — Test method: Puncture resistance*

EN 1005-2:2003+A1:2008, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-4:2005+A1:2008, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*

EN 13087-3:2000, *Protective helmets — Test methods — Part 3: Resistance to penetration*

EN 50370-1:2005, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 1: Emission*

EN 50370-2:2003, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 2: Immunity*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016)*

EN 60529:1991,¹ *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61439-1:2011, *Low-voltage switchgear and controlgear assemblies — Part 1: General rules (IEC 61439-1:2011)*

EN 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 3744:2010)*

EN ISO 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

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

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

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN 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 11201:2010)*

EN ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

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

EN 13236:2019, *Safety requirements for superabrasive products*

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

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

EN ISO 14118:2018, *Safety of machinery — Prevention of unexpected start-up (ISO 14118:2017)*

¹ As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

prEN 15163-2:2020 (E)

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

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

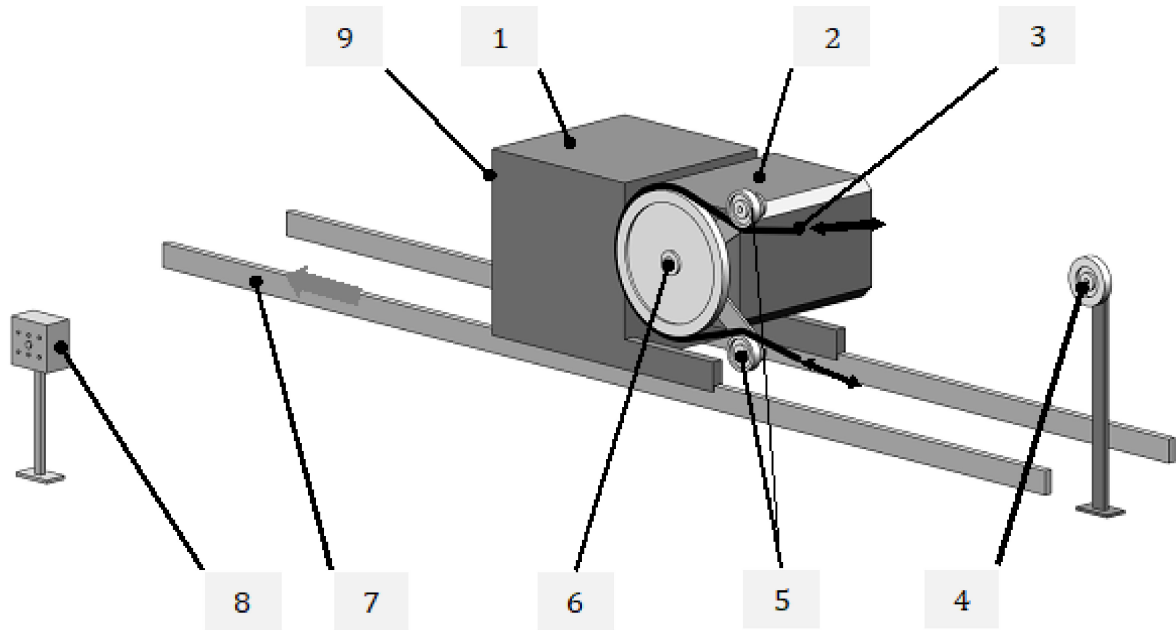
- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1
transportable diamond wire saw
 integrated fed machine, generally used in quarries or similar sites, designed for cutting natural stones (e.g. marble, granite) by the use of a coated diamond wire as tool; transportable diamond wire saw is powered by an electric motor as main drive, for cutting natural stones into benches, blocks using an only coated diamond wire as tool and where the cutting is performed by the movement of the wire joined to moving back of the machine on its rail

Note 1 to entry: Transportable diamond wire saws are generally intended for outdoor use, usually in quarries. The machinery, by the use of appropriate provisions and other machines, can be easily transported to several points of the quarry.

Note 2 to entry: During the cutting operation, the coated diamond wire can be cooled by water.

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Safeguarding devices are not illustrated

Key

- | | | | | | |
|---|---------------------|---|------------------|---|--------------------------|
| 1 | machine frame | 4 | idle wheels | 7 | rail |
| 2 | machine head | 5 | guide wheels | 8 | main control panel |
| 3 | coated diamond wire | 6 | main drive wheel | 9 | additional control panel |

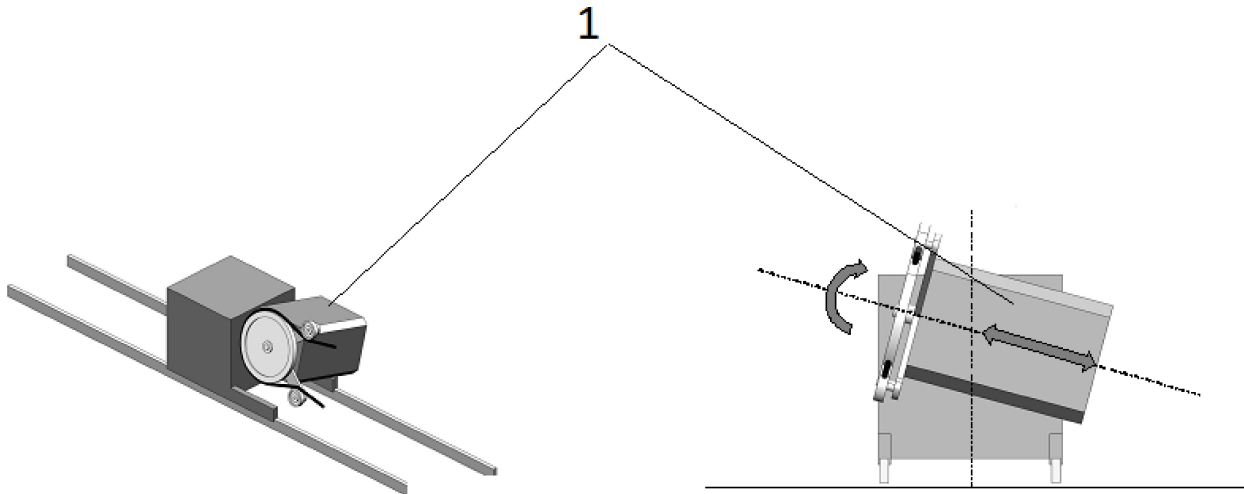
Figure 1 — Example of a transportable diamond wire saw

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3.2

drive unit

power transmission unit which allows the rotation and the transversal movement of machine head

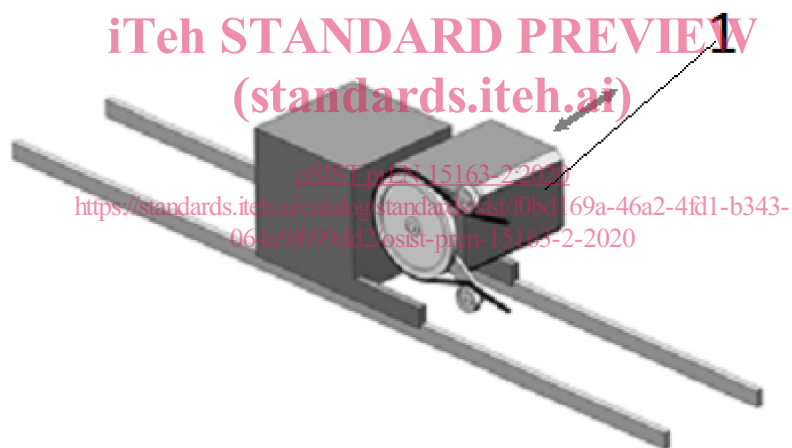


Safeguarding devices are not illustrated

Key

1 machine head

Figure 2 — Example of machine head rotation



Safeguarding devices are not illustrated

Key

1 machine head

Figure 3 — Example of transversal movement of machine head

3.3

drive wheel

power transmission wheel which allows the rotation of the tool

3.4

guide wheel

not driven wheel mounted on the machine frame which guides the tool entering and exiting the main drive wheel

3.5**idle wheel**

not driven wheel not mounted on the machine frame which guides the tool along its working path

3.6**main control panel**

control device located out of the dangerous zone including the principal controls of the machine

3.7**additional control panel**

control device located on the machine frame including control devices only machine setting operation

3.8**idle wheel**

not driven wheel not mounted on the machine frame which guides the tool along its working path

3.9**safety function**

function of the machine whose failure can result in an immediate increase of the risk(s)

[SOURCE: EN ISO 12100:2010, 3.30]

3.10**safety-related part of a control system
SRP/CS**

part of a control system that responds to safety-related input signals and generates safety-related output signals

[SOURCE: EN ISO 13849-1:2015, 3.1.1]

Note 1 to entry: The combined safety-related parts of a control system start at the point where the safety-related input signals are initiated (including for example the actuating cam and the roller of the position switch) and end at the output of the power control elements (including for example the main contacts of the contactor).

Note 2 to entry: If monitoring systems are used for diagnostics, they are also considered as SRP/CS.

3.11**performance level PL**

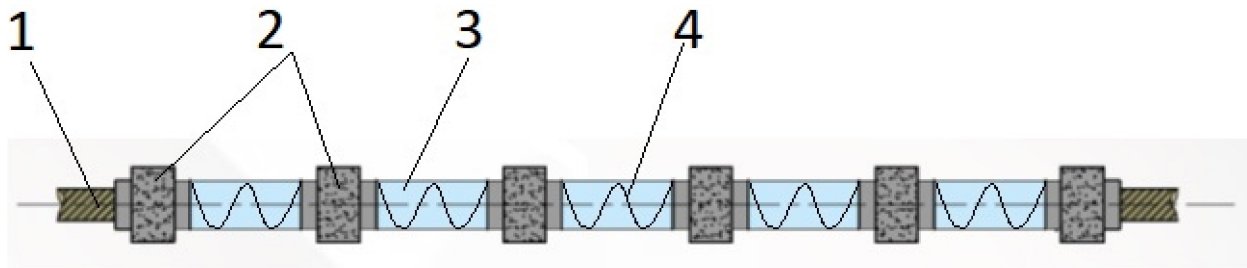
discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions

[SOURCE: EN ISO 13849-1:2015, 3.1.23, 4.5.1]

3.12**coated diamond wire**

plastic or rubber assembled diamond wire injected with polymer with no modification of the supporting steel cable section and used as a tool during the cutting

Note 1 to entry: The polymer, penetrating inside the strands under the threaded diamond beads creates a biting effect between the steel wire and the beads, reducing the probability of ejection of them in case of whiplash (3.18).

**Key**

- | | |
|-----------------|--|
| 1 steel wire | 3 thermoplastic polymer or vulcanized rubber |
| 2 diamond beads | 4 spring |

Figure 4 — Example of a coated diamond wire**3.13****damaged wire**

coated diamond wire or part of it that no longer meets its safety requirements

3.14**worn wire**

coated diamond wire which has lost its cutting power

3.15**remanufactured wire**

operation, made by coated diamond wire manufacturer, of remanufacturing of the wire which allows to obtain again the mechanical features such to satisfy its safety requirements

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3.16**wire coupling**

connection of two ends of the coated diamond wire forming a ring and allow the execution of the cut

3.17**cutting plane**

physical or virtual surface bounded by the coated diamond wire

3.18**whiplash**

dangerous movement of the diamond wire that can generate risk of impact and/or ejection of parts of the diamond wire in case of coated diamond wire breakage

3.19**hazardous area**

ground surface around the machine that can be reached by the whipping diamond wire ends in the most unfavourable conditions (e.g. wire breaking where it leaves the machine frame)

3.20**block**

mass of natural stone extracted from a quarry to be processed to a half-finished product

3.21

cutting operations

excavation of a block from a quarry or the squaring process of the blocks to obtain half-finished product. Transportable diamond wire saws are provided to work in different configurations depending on the morphology of the quarry and the type of cutting to be realized

3.21.1

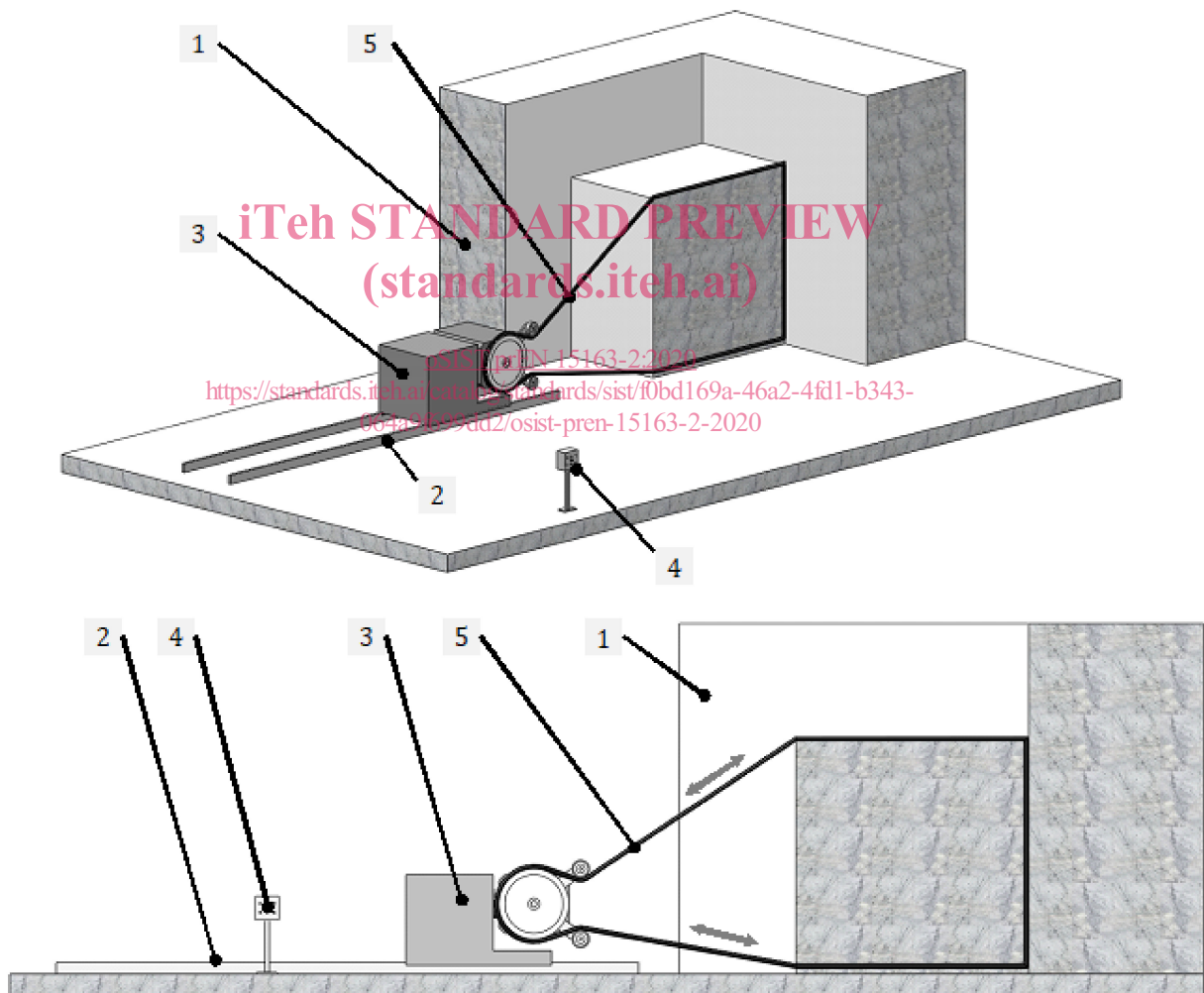
vertical cut

cutting operation where the cutting plane is orthogonal to the rail support surface and the coated diamond wire has no path variation; coated diamond wire rotation can be clockwise or counter clockwise; according to the position of the transportable diamond wire saw inside the quarry or workstation and the path of the coated diamond wire, different types of vertical cutting are defined:

3.21.1.1

mountain vertical cut

typical cutting operation of extraction of a bench of natural stone from the mountain



Safeguarding devices are not illustrated

Key

- | | | | |
|---|--------------------------------|---|---------------------|
| 1 | mountain | 4 | main control panel |
| 2 | rail | 5 | coated diamond wire |
| 3 | transportable diamond wire saw | | |