

# Machines and plants for mining and tooling of natural stone — Safety — Requirements for chain- and belt-slotting machines

ICS 73.120

## National foreword

This British Standard is the UK implementation of EN 15164:2008.

The UK participation in its preparation was entrusted by Technical Committee MCE/3, Safeguarding of machinery, to Subcommittee MCE/3/15, Machines for natural stone.

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

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## Machines and plants for mining and tooling of natural stone - Safety - Requirements for chain- and belt-slotting machines

Machines et installations d'extraction et d'usinage des  
pierres naturelles - Sécurité - Prescriptions relatives aux  
coupeuses à chaîne et à sangle

Maschinen und Anlagen zur Gewinnung und Bearbeitung  
von Naturstein - Sicherheit - Anforderungen für Ketten- und  
Gurt-Steinschrämmmaschinen

This European Standard was approved by CEN on 18 April 2008.

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## **Foreword**

This document (EN 15164:2008) 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 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of an identical text or by endorsement, at the latest by November 2008, and conflicting national standards shall be withdrawn at the latest by November 2008.

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 relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## **Introduction**

This document is a type C standard as stated in EN ISO 12100-1.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of this type C standard.

## **1 Scope**

This standard applies to chain- or belt-slotting machines to be used in open or underground quarries. Chain- or belt-slotting machines are used for cutting marble, granite and other stones loose or at the face. They can be stationary or can be moved on rails during work.

This standard deals with slotting machines with electric main motor and equipped with one main sawing head. This European Standard covers only machines for plain cutting (with one axis) and does not cover the difficulties arising from the geomorphology of the stone to be cut.

This standard does not deal with noise as a significant hazard.

This standard deals with all significant hazards, hazardous situations and events relevant to chain- and belt-slotting machines, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4). This European Standard deals with the hazards during transport, commissioning, use and maintenance.

This European Standard does not deal with:

- operation under extreme ambient conditions (outside the limits defined in EN 60204-1);
- operation in a potentially explosive atmosphere.

This document is not applicable to machines which are manufactured before the date of its publication as EN.

## **2 Normative references**

The following referenced documents are indispensable for the application 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 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

EN 547-1:1996, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 547-2:1996, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings*

EN 547-3:1996, *Safety of machinery — Human body measurements — Part 3: Anthropometric data*

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

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

EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*



EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1760-2:2001, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

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

EN 61310-1:1995, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995)*

EN 61496-1:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850:2006, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

EN ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

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

### 3 Terms and definitions

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

#### 3.1

##### **chain- and belt-slotting machines**

range of machines designed, made and fitted to cut solid stone masses, stone boulders and square blocks by means of abrasive tools which are stationary or moveable on rails.

Chain- and belt-slotting machines are characterised as follows:

- the cuts can be vertical and horizontal;
- the chain-slotting machine has a moveable arm for carrying a chain with cutting tools;

- the belt-slotting machine has a moveable arm for carrying a belt with abrasive tools (e.g. diamond grid);
- the arms of those machines can be of different dimensions.

The machines in the scope can be of one of the following types:

### 3.1.1

#### **transportable chain- and belt-slotting machine for open cast quarries**

machine which consists of a trolley carrying the arm holder and the drive and moving on rails. The translation movement of the trolley on the rails is the feeding movement for cutting. The complete machine is intended to be moved frequently from one cutting position to another

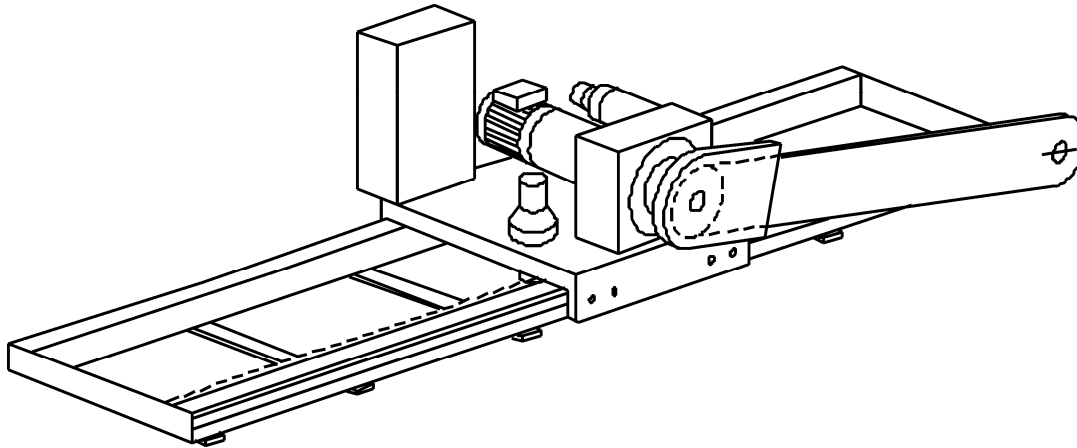


Figure 1 — Transportable chain- or belt-slotting machine for open-cast quarries

### 3.1.2

#### **chain-slotting machine for underground quarries**

machine which is intended to cut and extract blocks of stone of regular form in underground quarries (see Figure 2). Those machines can be stationary or self-propelled

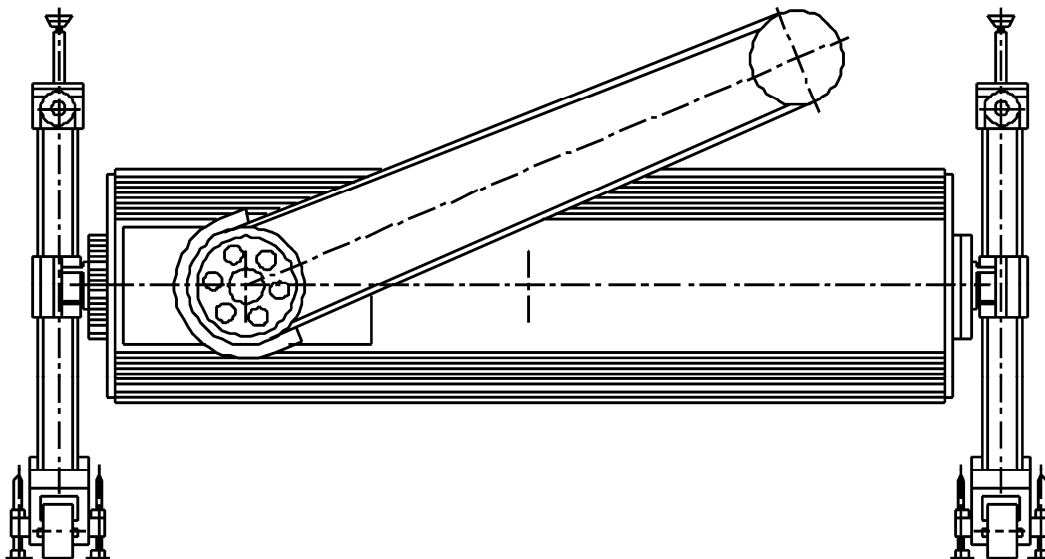


Figure 2 — Chain-slotting machine for underground quarries

**3.1.3 stationary gantry chain- and belt-slotting machine**

machine which is intended to cut stone blocks and smaller squared blocks using a chain or diamond belt (see Figure 3)

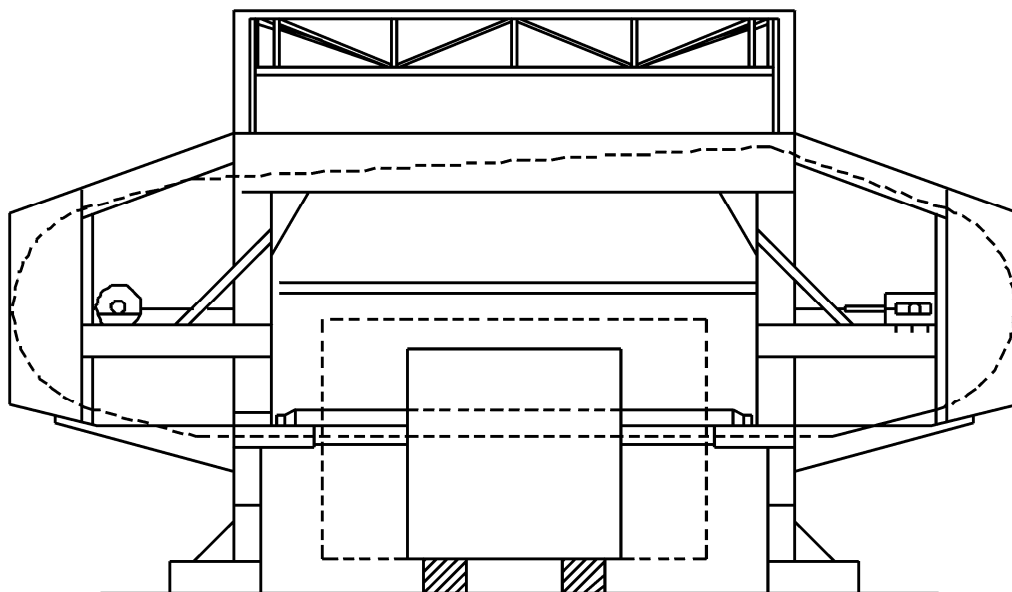


Figure 3 — Stationary chain- or belt-slotting machine

**3.1.4 moveable gantry chain- or belt-slotting machine**

machine which is intended to make vertical cuts for dividing and squaring hard or abrasive stone blocks using a chain or diamond belt (see Figure 4). The machine can be positioned relative to the blocks by a trolley or by a mobile gantry guided by rails on the ground

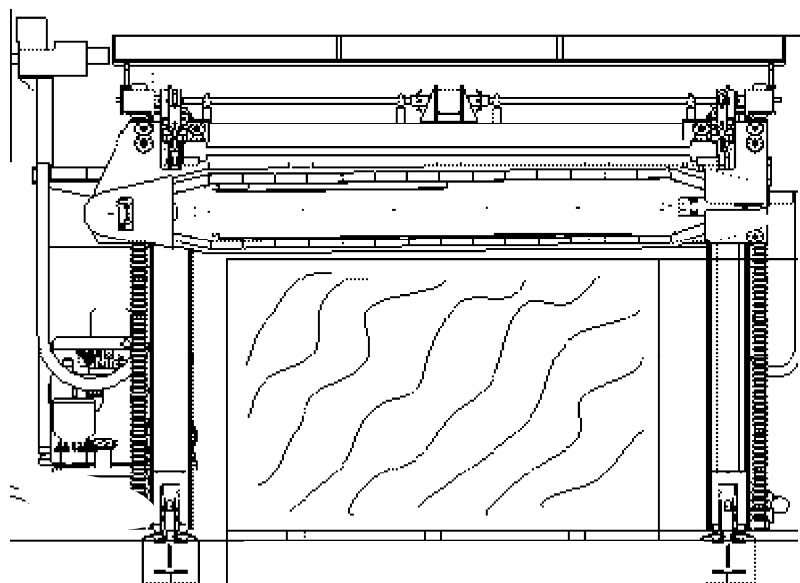


Figure 4 — Gantry chain- or belt-slotting machine

**3.2 cutting arm**  
 abrasive or cutting tools mounted on the belt or on the chain are guided by the arm of the slotting machines. The chain and the belt are driven by a belt sprocket or by a sprocket pulley respectively which is positioned on the drive unit.

The arm is fitted with appropriate guide bars, with an idle wheel and a tension system which allows the tool to be seated in the cutting arm and to be regulated

**3.3 trolley of transportable slotting machines for open-cast quarries**  
 trolley is the base of the machine (shown in Figure 1) where the arm-holder head is placed. The translation movement of the trolley on the rails allows the cutting operation

**4 List of significant hazards**

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

**Table 1 — List of significant hazards**

<b>Hazards</b>	<b>Relevant subclauses</b>
4.1 Mechanical hazards	
4.1.1 Crushing	5.2.1; 5.3.1
4.1.2 Shearing	5.2.1; 5.3.1
4.1.3 Cutting or severing	5.2.1; 5.3.1
4.1.4 Entanglement	5.2.1
4.1.5 Ejection of parts	5.2.1
4.2 Hazard caused by loss of stability	5.2.2; 5.3; 5.4; 5.5
4.3 Slip, trip and fall hazard in relationship with machinery	5.6
4.4 Fluid ejection hazard	5.11
4.5 Hazards caused by dust	7.3
4.6 Hazard caused by failure of power supply	5.10
4.7 Hazard caused by failure/disorder of control system	5.6; 5.8; 5.9
4.8 Hazards caused by electrical contact direct or indirect	5.6; 5.9
4.9 Hazard caused by human errors	7
4.10 Lack or inadequacy of visual or acoustic warning means	7.3
4.11 Insufficient instruction for the operator	7
4.12 Hazards due to neglecting ergonomic principles in the design	5.6; 5.7

**5 Safety requirements and/or protective measures**

**5.1 General**

Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to EN ISO 12100-2 for hazards relevant but not significant which are not dealt with by this document (e.g. sharp edges).

For application of type B standards (such as EN 294, EN 953, EN 982, EN 983, EN 1037, EN 1088, EN 60204-1, EN ISO 13849-1, EN ISO 13850), the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary (as far as the choice is not made in the requirements of this clause).

## 5.2 Mechanical hazards

### 5.2.1 Protection against moving parts

#### 5.2.1.1 Transmission parts

Moving transmission parts shall be protected by fixed guards according to EN 953:1997, 3.2, or interlocking moveable guards according to EN 953:1997, 3.5. The guards shall comply with EN 294:1992, Table 4, and for distance guards with EN 294:1992, Table 1.

Interlocking guards shall comply with EN 1088:1995, 6.2, or alternative solutions in accordance with EN 1088:1995, 6.3. The related parts of the control system shall have a Performance Level not less than c in accordance with EN ISO 13849-1:2006.

#### 5.2.1.2 Guards for the moveable parts in the cutting area

The tool has to be protected as much as possible (except the usable cutting length of the arm) with a combination of fixed and adjustable guards.

Adjustable guards shall comply with EN 953:1997, 3.4 and 5.4.7.

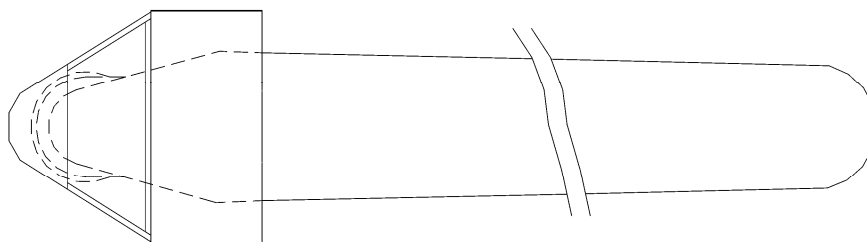
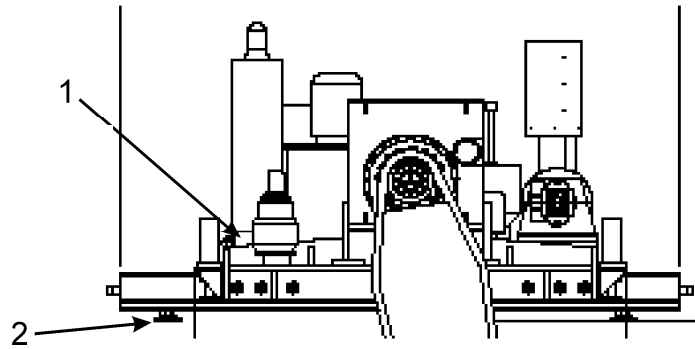


Figure 5 — Fixed and adjustable guards

#### 5.2.2 Positioning and stabilizing devices for transportable machines

Transportable machines shall be equipped with stabilizing devices to be used after positioning to avoid any unexpected movement of the machine while working.

Transportable machines shall be equipped with positioning devices ensuring the correct levelling of the machine in relation to the ground.



**Key**

- 1 positioning device
- 2 stabilizing feet

**Figure 6 — Stabilizing and positioning devices**

### 5.3 Movement of machines on the rails

#### 5.3.1 General requirements

In case of rails with defined length, provisions shall be made to prevent the machine from overrunning the end of the rails. These provisions shall consist of a limit switch with positive opening of the contacts in accordance with EN 1088:1995, 6.2, and a mechanical restraint device.

To avoid crushing of hands or feet between the machine and the rail or fixed carrying structure, devices capable of detecting the presence of parts of the body and stopping the trolley movement shall be provided.

Acceptable protective devices are:

- pressure-sensitive edge or bar in accordance with the requirements of EN 1760-2:2001 for category 1;
- light barrier in accordance with EN 61496-1:2004, type 2.

The related parts of the control system shall have a Performance Level not less than c according to EN ISO 13849-1:2006.

In case of the activation of the device, the stopping distance for any dangerous part shall be maximum 30 mm.

#### 5.3.2 Requirements for transportable machines

Transportable machines on rails (see Figure 1) shall be provided with devices which prevent any further movement on the rails when the power supply is interrupted or switched off (e.g. automatic brakes or self-braking mechanism). The related parts of the control system shall have a Performance Level not less than c according to EN ISO 13849-1:2006.

For transportable machines on rails (see Figure 1), suitable anchorage devices shall be provided to prevent a movement of the rails. The manufacturer shall give adequate instructions for anchorage of the rails in the different foreseeable conditions of use (see 7.3.4).

For transportable machines on rails (see Figure 1) having different rail sections to be placed one after another, centring devices shall be provided to keep the track section aligned. In addition, suitable clamps shall be provided to keep the rails together.

### 5.3.3 Requirements for machines with powered trolley movement

The fast translation movement (other than cutting movement) of the trolley shall be controlled by a hold-to-run control device.

The related parts of the control system shall have a Performance Level not less than c according to EN ISO 13849-1:2006.

### 5.4 Loss of stability

Transportable machines shall be stable to avoid overturning when operating or provisions shall be made to keep them on the rails. In this case, the anchorage of the rails shall be sufficient to prevent overturning.

Stationary machines shall be fixed to the ground. The manufacturer shall give adequate instructions on the fixing of the machine to the ground (see 7.3.4).

### 5.5 Transport and positioning of machines and sub-assemblies

#### 5.5.1 Transport of the machines

Machines shall be fitted with lifting points for their transport and positioning, designed taking into consideration the centre of gravity of the machines. In addition, when required, a suitable rocker arm or other provisions for lifting shall be provided. If those devices are specific for transportable machines, they shall be supplied with the machine.

#### 5.5.2 Positioning of the machines

Fixing devices or mechanical locks shall be provided to avoid any movement of the trolley and of the head of the machine (including cutting arm) during transport of the machine. The use of those devices shall be described in the operation manual.

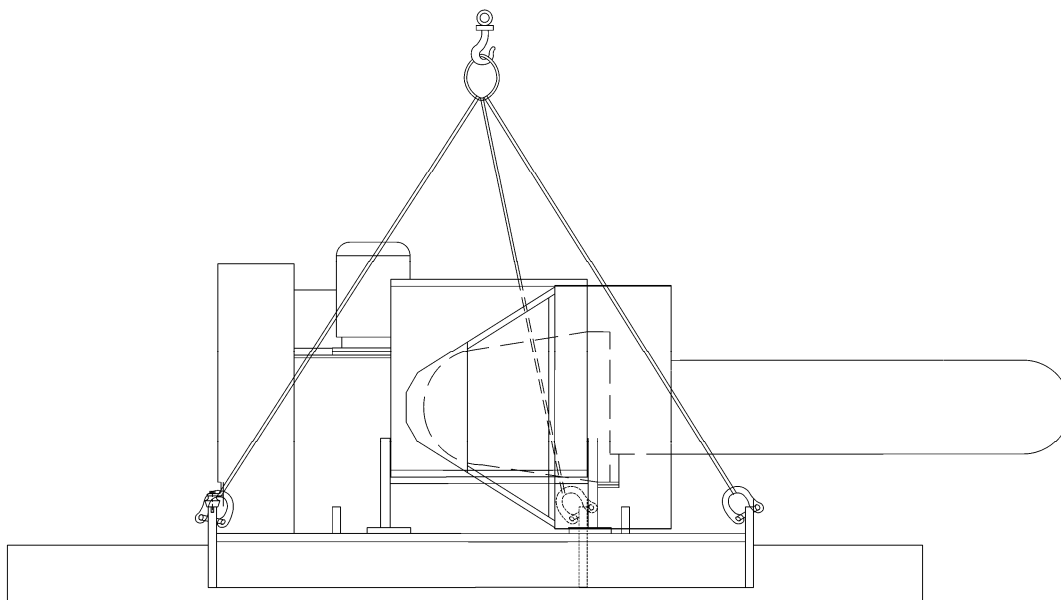


Figure 7 — Machine-lifting by ropes

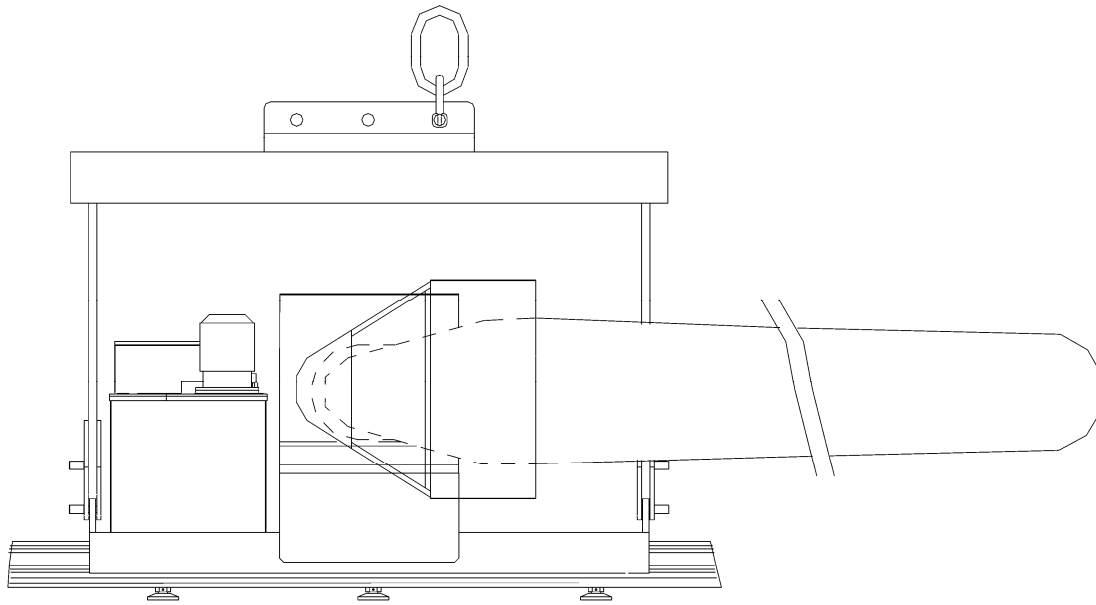


Figure 8 — Machine-lifting by a rocker arm

#### 5.4.3 Transport of rails sections

Rails sections shall be provided with proper lifting devices and/or lifting points.

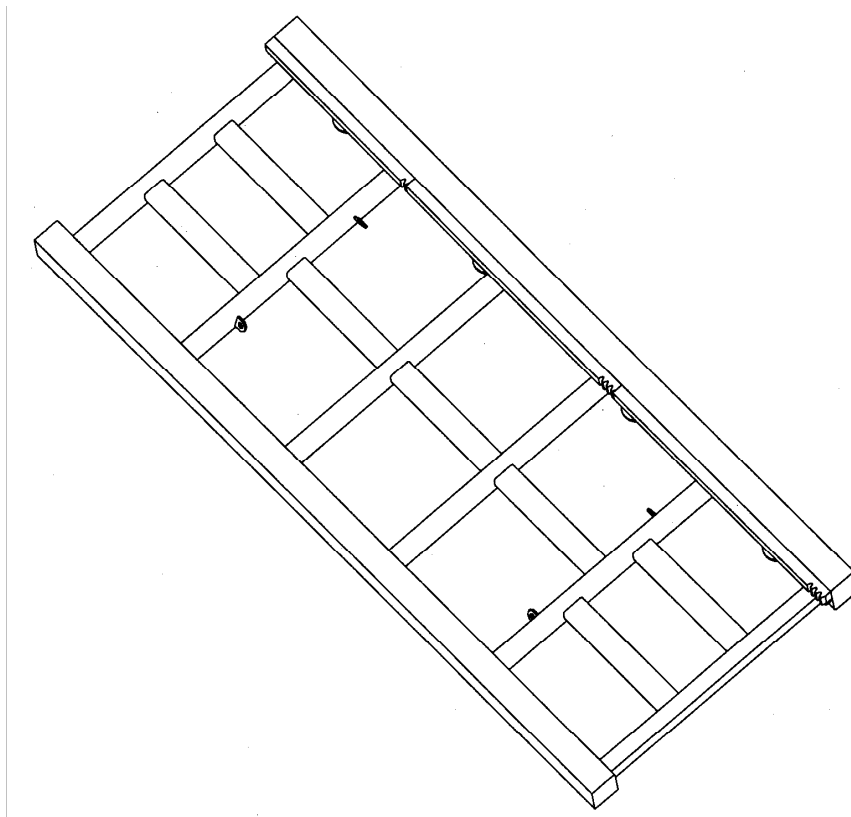


Figure 9 — Example of rails-lifting points



#### 5.4.4 Handling of the cutting arm

The mass shall be marked permanently and legibly on the cutting arm.

#### 5.6 Maintenance

Access openings for maintenance and service shall comply with EN 547-1:1996, EN 547-2:1996 and EN 547-3:1996.

Appropriate means for access and fall protection in accordance with EN ISO 14122-1 to 4 shall be provided.

Machines shall have lockable devices for isolating them from all their energy sources. Electrical devices shall comply with EN 60204-1:2006, 5.3. Pneumatic devices shall comply with EN 983 and hydraulic devices with EN 982.

Measures to be taken for avoiding unexpected start-up of a drive shall be in accordance with EN 1037.

#### 5.7 Ergonomic aspects

The ergonomic design of the machine shall comply with EN 614-1, EN 614-2 and with EN ISO 12100-2:2003, 4.8.

#### 5.8 Electrical equipment and energy supply

##### 5.8.1 Connectors and cables

The electrical connector housings shall be protected according to EN 60529:1991, which shall be not less than IP 54.

##### 5.8.2 Cable-less remote control

Cable-less remote control systems shall comply with EN 60204-1:2006, 9.2.7.

##### 5.8.3 Electric plug and socket

If the electrical supply is by plug and socket, it shall not be possible to connect or disconnect the plug and socket under load conditions, or the plug and socket combination shall have an appropriate breaking capacity (see EN 60204-1:2006, 5.3.2).

The protection level of the plug and socket shall be at least IP 54 according to EN 60529:1991 if the connection is mounted on the machine or on the control panel, and IP 55 if it is cable-mounted and can touch the ground.

##### 5.8.4 Emergency stop

The machine shall have an emergency-stop equipment of stop category 0 or 1 as specified in EN ISO 13850:2006, 4.1.4. Emergency-stop devices shall be located at each control position. They shall be easily accessible and permanently operational.

The parts of control systems regarding emergency-stop controls shall be not less than Performance Level d of EN ISO 13849-1:2006.

##### 5.8.5 Safety-related parts of the control systems

Safety related parts of the control system shall have a Performance Level not less than Performance Level c of EN ISO 13849-1:2006, unless otherwise stated.

The use of programmable electronic and pneumatic systems shall not reduce the safety levels specified in this standard.

#### **5.8.6 Mode selector switch**

The machine shall be equipped with a mode selector for choosing between manual mode and automatic mode and between cable-less control and normal control.

In the manual mode, movements shall be initiated with hold-to-run control devices. A hold-to-run control device shall be provided for the rotation of the head whilst being positioned at the beginning of the work cycle.

The selection of those modes shall require a key or analogous measures for restricting the use of those modes to certain categories of persons.

The safety measures of EN ISO 12100-2:2003, 4.11.8 and 4.11.9, shall be observed.

#### **5.8.7 Supply disconnecting device**

Machines shall have lockable devices for isolating them from all their energy sources. Electrical devices shall comply with EN 60204-1:2006, 5.3. Pneumatic devices shall comply with EN 983 and hydraulic devices with EN 982.

Measures to be taken for avoiding unexpected start-up of a drive shall be in accordance with EN 1037.

#### **5.8.8 Protection degree of the enclosures**

All motors of the machines shall have a minimum degree of protection of IP 54 according to EN 60529:1991.

The electrical control panel of the machine shall be protected not less than IP 54 according to EN 60529:1991.

### **5.9 Electrical hazards**

#### **5.9.1 General**

The whole electrical equipment associated with the machine shall comply with the requirements of EN 60204-1:2006.

#### **5.9.2 Safety requirements related to electromagnetic phenomena**

The machines shall have sufficient immunity to electromagnetic disturbances to enable them to operate safely as intended and not fail to danger when exposed to the levels and types of disturbances intended by the manufacturer.

The manufacturer of the machines shall design, install and wire the equipment and sub-assemblies taking into account the recommendations of the suppliers of these sub-assemblies.

#### **5.10 Power failure**

If a machine stops in any working position as result of a power-supply failure, no further dangerous movements shall be made. The manufacturer shall make a note in the operation manual what measures shall be taken before a restart of the machine.

The main drive of the machine shall be automatically de-energised if the chain or belt breaks.

NOTE One means for detecting the breakage of the chain or belt is the abrupt reduction of the drive torque.

### 5.11 Hydraulic and pneumatic components

The hydraulic and pneumatic systems shall comply with the requirements of EN 982 and EN 983.

## 6 Verification of safety requirements and/or protective measures

The conformity with the requirements of Clauses 5 and 7 shall be verified with one or more of the following methods as relevant:

- visual check;
- measurement;
- functional test;
- design check.

The criteria for acceptance are included in the requirements.

## 7 Information for use

### 7.1 General

Information for use shall be provided in accordance with EN ISO 12100-2:2003, Clause 6. The following specific information shall be given:

### 7.2 Signals and warning devices

The residual risks of the machine shall be marked clearly without ambiguity preferably with use of pictograms. Pictograms shall comply with the principles of EN 61310-1.

### 7.3 Instruction handbook

#### 7.3.1 General

The operator's manual shall be drawn up according to EN ISO 12100-2:2003, 6.5, and shall contain the following items:

#### 7.3.2 Description of the machine

The description of the machine shall contain at least the following items:

- a general description of the machine with drawings;
- an explanation of pictograms and symbols used on the machine and in the documentation;
- a list of specific tools to be used, with their nominal characteristics and the advice that the use of all other types of tools which are not indicated in the list is not allowed;
- a description of tool guard;
- a list of materials which can be cut off by the machine;

- a warning that modification of the machine or important interventions require specify knowledge and experience and that it is strongly recommended to contact the manufacturer in such cases.

### **7.3.3 Instructions for transport, handling and storage of the machine and its dismantable parts**

The instructions for transport, handling and storage of the machine and its dismantable parts shall contain at least the following items:

- the nominal mass of the machine;
- the sliding and lifting conditions (including lifting points);
- the parts to be dismantled, emptied or fixed during transport and the necessary information concerning their mounting and dismanting;
- reference concerning requirements of the tool manufacturer for storage and handling of the tools.

### 7.3.4 Instructions for the installation and the use of the machine

The instructions for the installation and the use of the machine shall contain at least the following items:

- instructions for setting up the machine;
- information about treatment of powders resulting from working;
- information on rails to be fixed on the ground in the different foreseeable conditions of use;
- information on the fixing of stationary machines;
- information about a safe organisation of the working place including the intended operator's position;
- mounting and assembly procedures;
- if relevant, conditions for connection to power supply and to water supply;
- information about the residual risks (see 7.2);
- information on control devices (in particular start and stop and emergency-stop devices);
- information about the hazards that can be created by the reasonably foreseeable misuse and the measures against these hazards (e.g. it is severely prohibited to assist start-up manually by pulling the chain or belt);
- instructions for the identification and localisation of defects, for debugging and for restarting work after an interruption;
- information about the need of wearing adequate clothing and personal protection equipment (e.g. eye and ear protection);
- advice that the area shall be cleared of everything which may hamper the working action;
- information on feed and service water flow rate;
- advice that apart from the operator, nobody shall be within the working area;
- for stationary machines, information on maximum mass and dimensions of the piece which can be cut off by the machine;
- for transportable machines, the maximum working inclinations allowed shall be indicated together with the situations when it is necessary to secure the rails to the ground;
- for transportable machines, information about the position of stabilization devices before moving the machine;
- the instruction handbook and the technical documentation describing the equipment shall provide the following information on noise emission:
  - the A-weighted emission sound pressure level at workstations where this exceeds 70 dB. Should this level not exceed 70 dB, this fact shall be indicated;
  - the peak C-weighted emission sound pressure level at workstations where this exceeds 63 Pa (130 dB in relation to 20  $\mu$ Pa);

- the A-weighted sound-power level emitted by the equipment where the A-weighted emission sound pressure level at any workstation exceeds 80 dB, the operating conditions of the equipment during noise-emission measurement, the workstation position(s) where the emission sound pressure level(s) have been determined.

NOTE 1 Information on noise emission should also be provided in the sales literature.

NOTE 2 A specific noise-test code is not yet available; it is in preparation.

### **7.3.5 Maintenance instructions**

The maintenance instructions shall contain at least the following items:

- instructions for the positioning of the machinery and arm for the maintenance;
- the list of operations (e.g. adjustment, maintenance, lubrication, repair, cleaning and servicing) which shall be carried out only while the machine is shut down and the prime mover stopped. When drawing up procedures for the safe intervention for maintenance, attention shall be paid to the following aspects: supply disconnection, measures against reconnection, neutralising residual energy and verification of zero-energy state;
- type and frequency of inspections and replacement intervals;
- instructions concerning the maintenance procedures which may be carried out by the user;
- list of the maintenance procedures which require particular technical knowledge and which shall be performed only by a competent person;
- diagrams and drawings to allow the correct repair of the machine;
- electrical diagrams (if relevant).

### **7.3.6 Spare parts list**

The spare parts list shall contain all relevant safety-related spare parts with an unambiguous identification and information of the location of the part to be replaced.

## **7.4 Marking**

The following minimum markings shall be displayed:

- business name and full address of the manufacturer and, where applicable, his authorised representative;
- mandatory marking<sup>1)</sup>;
- year of construction;
- designation of the machinery;
- designation of series or type, if any;
- serial or identification number, if any;

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<sup>1)</sup> For machines and their related products intended to be put on the market in the EEA, CE marking as defined in the applicable European directive(s), e.g. Machinery.

- rating information (mandatory for electrotechnical products: voltage, frequency, power, etc.);
- mass in kilogramme of the heavy parts of the machine to be handled separately during the lifetime of the machine;
- for transportable machines, the maximum allowed inclination;
- the maximum tool speed in meters per second (m/s).

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive Machinery 98/37/EC, amended by 98/79/EC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements, except essential requirements 1.5.8 and 1.7.4 f), of that Directive and associated EFTA regulations.

**WARNING** — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.



## Annex ZB (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements, except Essential Requirements 1.5.8 and 1.7.4.2 u), of that Directive and associated EFTA regulations.

**WARNING** — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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