SLOVENSKI STANDARD
SIST EN 1009-4:2020

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Stroji za mehansko obdelavo mineralov in podobnih trdnih snovi - Varnost - 4. del: Posebne zahteve za presejalne stroje

Machines for mechanical processing of minerals and similar solid materials - Safety - Part 4: Specific requirements for screening machinery

Maschinen für die mechanische Aufbereitung von Mineralien und ähnlichen festen Stoffen - Sicherheit - Teil 4: Spezifische Anforderungen für Klassiermaschinen (Siebmaschinen)

Machines pour le traitement mécanique des minéraux et des matériaux solides similaires - Sécurité - Partie 4 : Prescriptions spécifiques pour machines de criblage

Ta slovenski standard je istoveten z: **EN 1009-4:2020**

ICS:

13.110	Varnost strojev	Safety of machinery
73.120	Oprema za predelavo rudnin	Equipment for processing of minerals
91.220	Gradbena oprema	Construction equipment

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EUROPEAN STANDARD

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English Version

Machines for mechanical processing of minerals and similar solid materials - Safety - Part 4: Specific requirements for screening machinery

Machines pour le traitement mécanique des minéraux et des matériaux solides similaires - Sécurité - Partie 4 : Prescriptions spécifiques pour machines de criblage

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 1009-4:2020) 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 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of an identical text or by endorsement, at the latest by November 2020, and conflicting national standards shall be withdrawn at the latest by May 2022.

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 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 part of EN 1009 is intended to be used in conjunction with EN 1009-1:2020.

EN 1009 “Machines for mechanical processing of minerals and similar solid materials — Safety” comprises the following parts:

— *Part 1: Common requirements for machinery and processing plants*

— *Part 2: Specific requirements for feeding machinery and continuous handling equipment*

— *Part 3: Specific requirements for crushing and milling machinery*

— *Part 4: Specific requirements for screening machinery*

— *Part 5: Specific requirements for cleaning, recycling and mud treatment machinery*

— *Part 6: Specific requirements for mobile machinery* (in preparation)

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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 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, to be used together with EN 1009-1:2020, specifies the safety requirements and their verification for the design and construction of screening machinery for the mechanical processing in quarrying, recycling and processing mineral and by-products as defined in 3.1.

In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

When requirements of this document are different from those which are stated in EN 1009-1:2020, the requirements of this document take precedence over the requirements of EN 1009-1:2020 for machines that have been designed and built according to the provisions of this document.

This document, together with EN 1009-1:2020, deals with all the significant hazards, hazardous situations and events relevant to screening machinery when they are used as intended and under the conditions foreseen by the manufacturer (see Annex C).

This document does not cover:

— design relating to road traffic regulations;

— hazards arising from the use of the machines in potentially explosive atmospheres as well as from processing of explosive materials and risks related to electromagnetic compatibility;

— specific hazards related to mobile machinery.

NOTE 1 EN ISO 13766-1 and EN ISO 13766-2 specify test methods and acceptance criteria for evaluating the electromagnetic compatibility of all kinds of mobile construction machinery.

NOTE 2 prEN 1009-6 "Specific requirements for mobile and semi mobile equipment" is under preparation to cover specific requirements (e.g. mobility, braking, access, frequent transportation), including exceptions and additional requirements for mobile and semi mobile equipment. This means that mobile machines are not covered as long as EN 1009-6 is not published by CEN.

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

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 547-1:1996+A1:2008, *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+A1:2008, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings*

EN 1009-1:2020, *Machines for mechanical processing of minerals and similar solid materials — Safety — Part 1: Common requirements for machinery and processing plants*

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

EN ISO 13854:2019, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 14122-1:2016, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access (ISO 14122-1:2016)*

EN ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2016)*

EN ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2016)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 1009-1:2020 and the following apply.

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

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

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

NOTE Annex A shows examples of screening machinery.

3.1
screening machinery
stationary or mobile machinery that separates industrial mineral by-products into two or more fractions by dry or wet process through use of a *screen* (3.2)

Note 1 to entry: Screening machinery can be installed in a plant, a modular machinery or a mobile machine, as defined in EN 1009 1:2020, 3.1 to 3.3 and illustrated in Annex B.

3.2
screen
one of the following machines: *vibrating screen* (3.3), *roller screen* (3.4) or *tumbler screening machine* (3.5)

3.3
vibrating screen
screen (3.2) oscillated either by hydraulical, mechanical or electrical means for scalping and separation

[SOURCE: ISO 9045:1990, 3.2.38, modified by adding "hydraulical means"]

3.4
roller screen
roll screen
screen (3.2) consisting of a number of horizontal rotating shafts, fitted with elements arranged to provide screening apertures for scalping and separation

Note 1 to entry: This may be a wobbler screen, a star screen, disk screen or other type of screen with rollers rotating in the same direction.

[SOURCE: ISO 1213-1:1993, 4.5.8]

3.5
tumbler screening machine
tumbler screen
screening machine with a three-dimensional eccentric motion with a radial and tangential inclination

Note 1 to entry: Basically, this type of machine is used to screen for fine and ultra-fine products.

3.6
screening media
device fitted on each screening deck to separate products into two fractions

Note 1 to entry: This device can be, e.g. metallic, polyurethane or rubber.

Note 2 to entry: The dimension of this device may cover the full size of the screening deck or be composed with an assembly of several modules.

4 Safety requirements and/or protective/risk reduction measures

4.1 General

Screening machinery shall comply with the requirements of EN 1009-1:2020, as far as not modified or replaced by the requirements of this part.

For dry operation, when screens are dust-encapsulated, the dust-encapsulation shall allow the replacement of the screen meshes, inspection and maintenance.

The following functions shall be stopped when opening screen oversize chute, and they shall not be able to be started when the chutes are open and shall not be automatically re-started when the chutes are closed:

— drive of the screen;

— relevant upstream and downstream machinery (e.g. bypass).

For maintenance, fall protection shall be provided:

— when the oversize chute is open (e.g. by a folding platform system);

— from the top deck outwards sides of the screen (e.g. by a handrail);

— through the decks of the screen (e.g. by a removable shield).

These access and fall protection shall allow the periodical interventions including the removal of meshes.

In deviation to EN ISO 14122, for maintenance above the screen, instead of fixed guardrails, removable guardrails or permanent wire ropes providing the same protection as handrail and knee-rail (with no direct anchorage to the machine) may be provided.

Warning signs (e.g. crushing, shearing, dust, PPE) shall be placed close to the relevant areas.

For inspection and maintenance (checking mesh conditions, greasing, sealing, lining conditions, cleaning, changing meshes, changing lining, etc.), access and working spaces are specific according to screens machinery design and shall comply with 4.2.1.

All relevant residual risks shall be part in the information for use in 6.3.1.

4.2 Ergonomics requirements for screening machines maintenance

4.2.1 General

According to EN 1009-1:2020, the EN ISO 14122 series, EN 547-1:1996+A1:2008 and EN 547-2:1996+A1:2008 apply.

The design of screening machines shall be such that the frequency and duration of maintenance operations in the screen, in which an operator is required to enter, are minimized.

The design of screening machines should be such that inspection, cleaning and maintenance operations can be performed from a position outside of the screen box. This can be achieved for example by providing means to adjust the screen tension from outside the screen box, providing access hatches in the body of the screen in order to allow upper limb access to the tensioning bolts, reducing the size of the screening media in order to facilitate the ease of removal of screening medias.

In complement to EN 1009-1:2020, 4.2.1, the minimum dimensions given in 4.2.2 and 4.2.3 shall be considered taking into account any maintenance hatches and moveable parts that are incorporated into screening machines. For example:

— moveable conveyors (for example, raising, lowering, sliding conveyors);

— moveable feeding hoppers;

— moveable chute;

— splitting of screens.

Where inspection, cleaning or maintenance is performed when moveable parts are in the raised position, these moveable parts shall be mechanically secured with a device, for example locking pin. These devices shall be permanently affixed to the machine or stored on a safe place on the machine.

Inspection, cleaning and maintenance procedures shall be described in the instruction handbook (folding, dismantling meshes and lining, mechanical parts, etc.), see Clause 6.

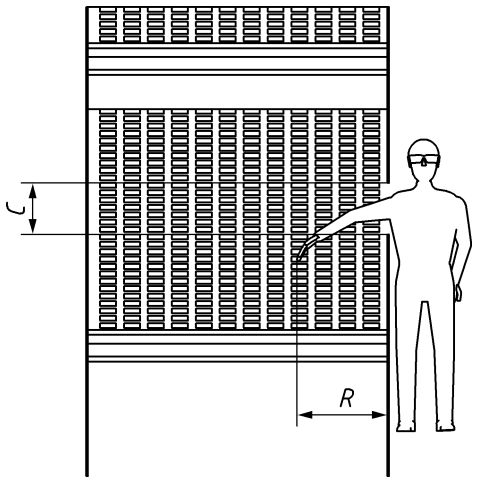
In all cases described in 4.2.2 and 4.2.3, the reach distances may be increased depending on the length of a tool, if such tool is intended to be used according to the instruction handbook of the manufacturer.

The mesh material can be metallic, rubber (RU) or polyurethane (PU) with tensioning or modular system. Whatever is the mesh material the inspection, cleaning and maintenance procedures shall be described in the instruction handbook (folding, dismantling meshes and lining, mechanical parts, etc.), see Clause 6.

4.2.2 Minimum dimensions for inspection

4.2.2.1 Inspection laterally from outside through an opening for one upper limb

As one arm is sufficient for access through an access opening with a minimum diameter, *C*, of 141 mm for inspection from outside, maximum dimension for one upper limb to reach the inspection area (*R*) shall be 495 mm (see Figure 1). It may be increased if the access openings, *C*, are larger than the minimum dimensions.



Key

C minimum opening diameter

R maximum reaching distance (radius from opening)

Figure 1 — Access for inspection from outside and laterally through an opening

4.2.2.2 Inspection from outside through access opening(s) with two arms

Horizontal access openings for two arms shall be, as illustrated in Figure 2, the following minimum distances:

A = 645 mm

B = 221 mm

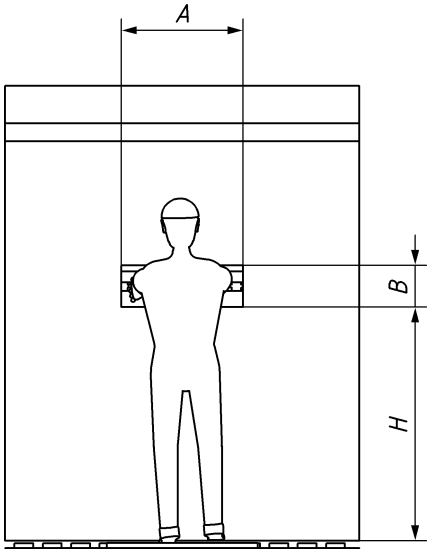
H = 1 520 mm

Maximum reach distance = 462 mm

The maximum reach distance may be increased if the access openings are larger than the minimum dimensions.

This requirement does not apply to screens the width of which is less than 645 mm.

Dimensions in millimetres



Key

A	minimum width of opening
B	minimum height of opening
H	maximum height of the bottom point of the opening from ground level

Figure 2 — Inspection from outside through access opening(s) with two arms

The maximum dimension for upper limbs to reach the inspection area given value of 495 mm is a minimum value linked to the minimum dimensions of the access opening. It may be increased with a bending position.

4.2.2.3 Inspection from outside from the top

Horizontal access openings for two arms shall be the following minimum distances:

A = 645 mm

B = 221 mm

H = 903 mm to 1 152 mm

R = 462 mm

The maximum reach distance may be increased if the access opening are larger than the minimum dimensions.

4.2.3 Minimum dimensions for maintenance

4.2.3.1 Maintenance from outside from front and rear

The opening for one or both arms shall be the followings minimum distances, as illustrated in Figure 3:

A = 645 mm

B = 300 mm

R = 506 mm

H ≤ 1 230 mm.

NOTE If the opening is greater than the minimum required dimensions, the grip reach value can increase.