SLOVENSKI STANDARD
SIST EN 620:2021

01-december-2021

Nadomešča:
SIST EN 620:2003+A1:2011

Naprave in sistemi za kontinuirni transport - Varnostne zahteve za opremo za kontinuirni transport sipkih materialov na nepomičnih ogrodjih

Continuous handling equipment and systems - Safety requirements for fixed belt conveyors for bulk materials

Stetigförderer und Systeme - Sicherheits- Anforderungen an ortsfeste Gurtförderer für Schüttgut

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Équipements et systèmes de manutention continue - Prescriptions de sécurité pour les transporteurs à courroie fixes pour produits en vrac

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Ta slovenski standard je istoveten z: **EN 620:2021**

ICS:

53.040.10	Transporterji	Conveyors

SIST EN 620:2021 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 620

October 2021

ICS 53.040.10

Supersedes EN 620:2002+A1:2010

English Version

Continuous handling equipment and systems - Safety requirements for fixed belt conveyors for bulk materials

Équipements et systèmes de manutention continue - Prescriptions de sécurité pour les transporteurs à courroie fixes pour produits en vrac

Stetigförderer und Systeme - Sicherheits-Anforderungen an ortsfeste Gurtförderer für Schüttgut

This European Standard was approved by CEN on 18 July 2021.

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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.

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European foreword

This document (EN 620:2021) has been prepared by Technical Committee CEN/TC 148 “Continuous handling equipment and systems - Safety”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2022 and conflicting national standards shall be withdrawn at the latest by April 2022.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 will supersede EN 620:2002+A1:2010.

The main changes with respect to EN 620:2002+A1:2010 are as follows:

— Scope was clarified;

— Normative references were updated;

— Definitions were added;

— List of significant hazards updated and removed in an informative Annex;

— Overall safety requirements was updated;

— New normative annex relatin to specification of performance level;

— New requirements relating to noise reduction;

— New Annex ZA in line with template of Machinery harmonized standard;

— De-harmonization to EMC regulation.

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This document is part of a series of five standards the titles of which are given below:

— EN 617 “*Continuous handling equipment and systems — Safety and EMC requirements for the equipment for the storage of bulk materials in silos, bunkers, bins and hoppers*”;

— EN 618 “*Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of bulk materials except fixed belt conveyors*”;

— EN 619 *”Continuous handling equipment and systems — Safety requirements for equipment for mechanical handling of unit loads*”;

— EN 620 “*Continuous handling equipment and systems — Safety requirements for fixed belt conveyors for bulk materials*”;

— EN 741 “*Continuous handling equipment and systems — Safety requirements for systems and their components for pneumatic handling of bulk materials*”.

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) / Regulation(s).

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For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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.

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Introduction

This European Standard is a type C standard as stated in EN ISO 12100:2010.

The products concerned and the extent to which hazards are covered are indicated in the scope of this document.

While producing this document it was assumed that:

— For specific purpose machinery, clarifications occur between the manufacturer and the purchaser concerning particular conditions for the operation and location of the machinery (typically considering adjacent machinery, means of access, guarding concept, control systems, etc) related to health and safety. An agreement is needed between the manufacturer and purchaser about belt material, considering specific risk e.g. fire and the establishment of zones;

— only suitably trained persons operate this machinery;

— the machinery will be kept in good repair and working order, in accordance with the manufacturer's instructions, to retain specified health and safety characteristics throughout its working life;

— the place of installation is adequately illuminated;

— the place of installation will allow safe operation of the machinery;

— by design of the load bearing elements, the safe operation of the system and components is ensured for loading ranging from zero to 100 % of the rated capacities and during testing;

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— all parts of the machinery without specific requirements, will be:

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a) made from materials of adequate strength and durability and of suitable quality for their intended purpose;

b) designed in accordance with the usual engineering practice and engineering codes, taking account of all failure modes and incorporating appropriate safety factors;

— the establishment of the different zones is defined between the user and the manufacturer.

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1 Scope

1.1 This document deals with the technical requirements for stationary belt conveyors and systems as defined in 3.1 to 3.2.4, designed for continuously conveying loose bulk materials. The covered phases of life cycle are design, setting, operation, maintenance and cleaning.

1.2 This document does not cover:

a) use in coal mining and open cast lignite mining;

b) use for man-riding;

c) floating, dredging and ship mounted structures supporting the conveyor;

d) biological and chemical hazards resulting from handling foodstuffs or pharmaceuticals;

e) the design of the supporting structure which is not part of a conveyor;

f) the effects of wind;

g) hazards resulting from handling specific hazardous materials, (e.g. explosives, radiating material);

h) hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes or dust;

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i) biological and micro-biological (viral or bacterial) hazards;

j) hazards caused by the use of ionising radiation sources;

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k) conveyors fitted with a moving belt with other than a continuous rubber or polymeric surface for the conveying medium;

l) hazards associated with the integration of belt conveyors with other machinery;

The safety requirements of this document apply to equipment and systems placed on the market after the date of publication of this document.

NOTE Directive 2014/34/EC concerning equipment and protective systems intended for operation in potentially explosive atmospheres can be applicable to the type of machine or equipment covered by this European Standard. The present document is not intended to provide means of complying completely with the essential health and safety requirements of Directive 2014/34/EC.

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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 842:1996+A1:2008, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 1127-1:2019, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 12600:2002, *Glass in building — Pendulum test — Impact test method and classification for flat glass*

EN 14492-1:2006+A1:2009, *Cranes — Power driven winches and hoists — Part 1: Power driven winches*

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

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

EN IEC 60204-11:2019, *Safety of machinery — Electrical equipment of machines — Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2017)*

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EN 60947-5-5:1997[2], *Low-voltage switchgear and controlgear — Part 5-5: Control circuit devices and switching elements — Electrical emergency stop device with mechanical latching function (IEC 60947-5-5:1997)*

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EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2020)*

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 7731:2008, *Ergonomics — Danger signals for public and work areas — Auditory danger signals (ISO 7731:2003)*

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[1] As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

[2] As impacted by EN 60947-5-5:1997/A1:2005, EN 60947-5-5:1997/A11:2013 and EN 60947-5-5:1997/A2:2017.

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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 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 ISO 13732-1:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

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

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EN ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

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EN ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)*

EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

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

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 19353:2019, *Safety of machinery — Fire prevention and fire protection (ISO 19353:2019)*

ISO 16625:2013, *Cranes and hoists — Selection of wire ropes, drums and sheaves*

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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:

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

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

3.1
conveyor system
number of linked conveyors with their ancillary equipment

3.2
belt conveyor
conveyor with an endless belt acting as a carrying and traction element

Note 1 to entry: Some shortened form of belt conveyor, normally running at slow speed, designed to extract or control the rate of flow of bulk materials from a *feed hopper* (3.3.1), is called a belt feeder.

3.2.1
troughed belt conveyor
belt conveyor (3.2) where the support *idlers* (3.4.4) or suitable flat sliding surfaces which impart a transverse curvature to the belt less than 45°

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Note 1 to entry: If the angle between the support *idlers* (3.4.4) and the horizontal plane is more than 45°, a troughed belt conveyor can be called a deep troughed belt conveyor.

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3.2.2
pipe belt conveyor
pipe conveyor
belt conveyor (3.2) where the belt forms a pipe

3.2.3
walled belt conveyor
belt conveyor (3.2) where the belt has its flat carrying face extended to form side walls of limited height

3.2.4
radial conveyor
belt conveyor (3.2) which is pivoted around a fixed end and may be mounted on wheels or skids at a point along its length, which permits movement in a horizontal arc

3.3
ancillary equipment
3.3.1
feed hopper
hopper
device at the loading point of the *belt conveyor* (3.2) for receiving material

Note 1 to entry: See Figure 1, key 1.

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3.3.2
tripper
device usually comprising two or more *pulleys* (3.4.7), mounted either in a fixed position or on a travelling carriage, for discharging material at selected points or at any point along the length of a *belt conveyor* (3.2)

3.3.3
chute
pathway by which materials are guided and fall under gravity

3.4
other terms and definitions
3.4.1
skirt plate
extension to the *feed hopper* (3.3.1) or independent plate along the length of the conveyor for centralising and/or retaining material on the belt

Note 1 to entry: See Figure 4, key 3.

3.4.2
take-up device
device for removing slack and applying tension to the belt

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3.4.3
scraper
cleaning device fixed or flexibly mounted across the width of a belt or pulley of a conveyor, for removing adherent material

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Note 1 to entry: See Figure 1, key 14.

3.4.4
idler
mechanical element rotating on internal bearing(s) and fitted to support the belt

Note 1 to entry: On *belt conveyors* (3.2), several idlers can be used. These are called e.g. troughing idler (which supports the belt and maintains it in a troughed form), *carrying idler* (3.4.5), *return idler* (3.4.6).

Note 2 to entry: See Figure 1, keys 3, 4 and 5.

3.4.5
carrying idler
idler (3.4.4) which supports the load carrying side of the belt

3.4.6
return idler
idler (3.4.4) which supports the empty return side of the belt

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3.4.7
pulley
mechanical element typically rotating on external bearing and fitted to change the direction of the belt along its circumference

Note 1 to entry: On a *belt conveyor* (3.2) two or more of these elements can be used. Depending on the place where this element is used, it can be called a *drive pulley* (3.4.8), *snub pulley* (3.4.9), *bend pulley* (3.4.10), *head pulley* (3.4.11), *take-up pulley* (3.4.12), *tail pulley* (3.4.13).

3.4.8
drive pulley
pulley (3.4.7) that drives the belt

Note 1 to entry: A drive pulley is typically a *head pulley* (3.4.11).

Note 2 to entry: See Figure 1, key 8.

3.4.9
snub pulley
pulley (3.4.7) used to develop the necessary arc of contact (angle of wrap) of the belt on the drive pulley

Note 1 to entry: See Figure 1, key 7.

3.4.10
bend pulley
pulley (3.4.7) used to change the direction of the belt

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Note 1 to entry: See Figure 1, key 9.

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3.4.11
head pulley
terminal *pulley* (3.4.7) at the head of a conveyor

Note 1 to entry: See Figure 1, key 6.

3.4.12
take-up pulley
movable *pulley* (3.4.7) used in the *take-up device* (3.4.2)

Note 1 to entry: See Figure 1, key 12.

3.4.13
tail pulley
terminal *pulley* (3.4.7) at the tail of a conveyor

Note 1 to entry: A tail pulley can be a *take-up pulley* (3.4.12).

Note 2 to entry: See Figure 1, key 10.

3.4.14
fixed guard
guard affixed in such a manner (for example, by screw(s), nut(s), welding) that it can only be opened or removed by the use of tools or by destruction of the affixing means

[SOURCE: EN ISO 12100:2010, 3.27.1]

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3.4.15
interlocking guard
guard associated with an interlocking device so that, together with the control system of the machine, the following functions are performed:

— the hazardous machine functions “covered” by the guard cannot operate until the guard is closed;

— if the guard is opened while hazardous machine functions are operating, a stop command is given, and;

— when the guard is closed, the hazardous machine functions “covered” by the guard can operate (the closure of the guard does not by itself start the hazardous machine functions)

Note 1 to entry: EN ISO 14119:2013 gives detailed provisions.

[SOURCE: EN ISO 12100:2010, 3.27.4]

3.4.16
nip point
point which occurs on the in-running side at the line of contact between the conveyor belt and rotating pulley and in certain cases between belt and an idler

Note 1 to entry: See Figure 1-key 15, Figure 3-key 3, Figure 4-key 9, Figure 6-key 9, Figure 8-key 3, Figure 9-key 3 and Figure 10-key 9.

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3.4.17
nip guard
fixed guard (3.4.14) inserted at a *nip point* (3.4.16) to directly safeguard that point

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Note 1 to entry: See Figure 4-key 10, Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10 b)-key 17.