

**Pidevtoimelised teisaldusseadmed ja -süsteemid.
Ohutuse ja elektromagnetilise ühilduvuse nõuded
puistmaterjalide lintkonveieritele**

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 620:2002+A1:2010 sisaldab Euroopa standardi EN 620:2002+A1:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.12.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 08.12.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 620:2002+A1:2010 consists of the English text of the European standard EN 620:2002+A1:2010.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.12.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 08.12.2010.

The standard is available from Estonian standardisation organisation.

ICS 53.040.10

Standardite reprodutseerimis- ja levitamisoigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

English Version

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

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

Stetigförderer und Systeme - Sicherheits- und EMW-
Anforderungen für ortsfeste Gurtförderer für Schüttgutt

This European Standard was approved by CEN on 16 november 2001 and includes Amendment 1 approved by CEN on 9 November 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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





CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	page
Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	6
3 Terms and definitions	8
4 List of hazards.....	12
4.1 Mechanical hazards	12
4.2 Electrical hazards	14
4.3 Thermal hazards	14
4.4 Hazards due to electromagnetic radiation	14
4.5 Fire or explosion hazards	15
4.6 Hazards generated by neglected ergonomic principals in machine design	15
4.7 Hazards arising from failure of energy supply and other functional disorders	15
4.8 Hazards arising during inspection, maintenance and cleaning	15
5 Safety and EMC requirements and/or measures.....	16
5.1 Measures for protection against mechanical hazards.....	16
5.2 Measures for protection against electrical hazards.....	36
5.3 Measures for protection against thermal hazards	37
5.4 Electromagnetic compatibility (EMC)	38
5.5 Measures for protection against fire and explosion hazards due to the materials conveyed	39
5.6 Measures for protection against hazards generated by neglected ergonomic principles in machine design (mismatch of machinery with human characteristics and abilities)	39
5.7 Measures for protection against hazards caused by failure of energy supply, and other functional disorders	39
5.8 Measures for protection against hazards arising during inspection, maintenance and cleaning	42
6 Verification of safety and EMC requirements and/or measures	43
7 Information for use	46
7.1 Instruction handbook	46
7.2 Marking	49
Annex A (normative) Fire or explosion hazard	50
Annex ZA (informative)  Relationship between this European Standard and the Essential Requirements of the EU Directive 2006/42/EC 	52
Annex ZB (informative)  Coverage of Essential Requirements of EU Directives 	54
Bibliography	55

Foreword

This document (EN 620:2002+A1:2010) 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 June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

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

This document includes Amendment 1, approved by CEN on 2010-11-09.

This document supersedes EN 620:2002.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

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).

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. **A1**

This **A1** standard **A1** forms part of a series of five **A1** standards **A1** 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" ;
- **A1** EN 619 **A1** "Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads" ;
- EN 620 "Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors for bulk material" ;
- EN 741 "Continuous handling equipment and systems — Safety requirements for systems and their components for pneumatic handling of bulk materials".

A1 *deleted text* **A1**

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, 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 European Standard is a type C Standard as stated in EN 1070:1998.

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

While producing this standard it was assumed that:

- negotiations occur between the manufacturer and the purchaser concerning particular conditions for the use and places of use for the machinery related to health and safety;
- only suitably trained persons will 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 lit.
- the place of installation will allow safe use of the machinery;
- by design of the load bearing elements, the safe operation of the system and components is assured for loading ranging from zero to 100 % of the rated capacities and during testing;
- all parts of the machinery without specific requirements, will be:
 - a) made from materials of adequate strength and durability and of suitable quality for their intended purpose;
 - b) of sound mechanical construction;
 - c) designed in accordance with the usual engineering practice and engineering codes, taking account of all failure modes and incorporating appropriate safety factors.

EN 617, EN 618 and EN 741 need to be considered for a complete continuous handling system (machine).

1 Scope

1.1 This European standard deals with the technical requirements to minimise the risks due to the hazards listed in clause 4, which can arise during operation and maintenance of fixed belt conveyors and systems as defined in **3.1 to 3.2.4** and designed for continuously conveying loose bulk materials from the loading point(s) to the unloading point(s). Requirements for electromagnetic compatibility are also covered.

1.2 This standard applies to use in ambient air temperatures of -15°C to $+40^{\circ}\text{C}$.

1.3 This standard does not cover:

- a) use in open cast lignite mining or use underground, such as in mines or tunnels;
- b) use in public areas or for man-riding;
- c) floating, dredging and ship mounted equipment;
- d) conveyors requiring a high level of cleanliness for hygiene reasons, e.g. in direct contact with foodstuffs or pharmaceuticals;
- e) conveyors using a moving belt with other than a continuous rubber or polymeric surface for the conveying medium;
- f) transportation of the conveyor;
- g) the design of the supporting structure which is not part of a conveyor (see **3.2**);
- h) the effects of wind;
- i) hazards resulting from handling specific hazardous materials, (e.g. explosives, radiating material);
- j) hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes or dust;
- k) biological and micro-biological (viral or bacterial) hazards;
- l) hazards due to heat radiation from the materials handled;
- m) hazards caused by operation in electromagnetic fields outside the range of EN 61000-6-2:1999;
- n) hazards caused by operation subject to special regulations (e.g. explosive atmospheres);
- o) hazards caused by noise;
- p) hazards caused by the use of ionising radiation sources;
- q) hazards caused by hydraulic equipment.

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

NOTE Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres can be applicable to the type of machine or equipment covered by this European Standard. The present standard is not intended to provide means of complying with the essential health and safety requirements of Directive 94/9/EC.

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.

[A1] *deleted text* **[A1]**

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 418:1992, *Safety of machinery — Emergency stop equipment — Functional aspects — Principles for design*

EN 457:1992, *Safety of machinery — Auditory danger signals — General requirements — Design and testing (ISO 7731:1986, modified)*

EN 563:1994, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces*

EN 574:1996, *Safety of machinery — Two-hand control devices — Functional aspects — Principles for design*

EN 614-1:1995, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

[A1] EN 617 **[A1]**, *Continuous handling equipment and systems — Safety and EMC requirements for the equipment for the storage of bulk materials in silos, bunkers, bins and hoppers*

[A1] EN 618 **[A1]**, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of bulk material except fixed belt conveyors*

[A1] EN 619 **[A1]**, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

[A1] EN 741 **[A1]**, *Continuous handling equipment and systems — Safety requirements for systems and their components for pneumatic handling of bulk materials*

EN 811:1996, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

EN 842:1996, *Safety of machinery — Visual danger signals — General requirements — Design and testing*

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

EN 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

EN 1005-1:2001, *Safety of machinery — Human physical performance — Part 1: Terms and Definitions*

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

EN 1005-3:2002, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

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

EN 1050:1996, *Safety of Machinery — Principles for Risk Assessment*

EN 1070:1998, *Safety of machinery — Terminology*

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

EN 1127-1:1997, *Explosive Atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

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*

■^{A1} EN ISO 12100-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)* ^{A1}

■^{A1} EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)* ^{A1}

EN ISO 12150-1:2000, *Glass in building — Thermally toughened soda lime silicate safety glass — Part 1: Definition and description*

EN ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machines and industrial plants — Part 1: Choice of fixed means of access between two levels*

EN ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machines and industrial plants — Part 2: Working platforms and gangways*

EN ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machines and industrial plants — Part 3: Stairways, Stepladders and guard-rails*

■^{A1} EN ISO 14122-4, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)* ^{A1}

EN ISO 12543:1998, *Glass in building — Laminated glass and laminated safety glass*

EN 13202:2000, *Ergonomics of the thermal environment — Temperatures of touchable hot surfaces — Guidance for establishing surface temperature limit values in production standards with the aid of EN 563*

EN 50081-1:1992, *Electromagnetic compatibility — Generic emission standard — Part 1: Residential, commercial and light industry*

EN 61000-6-2:1999, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:1999)*

EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: Specification for general requirements (IEC 60204-1:1997)*

■^{A1} EN 60204-11:2000, *Safety of machinery — Electrical equipment of machines — Part 11: Requirements for HV equipment for voltages above 1000 V a.c. or 1500 V d.c. and not exceeding 36 kV (IEC 60204-11:2000)* ^{A1}

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

EN 60947-5-1:1997, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:1997)*

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 61496-1:1997, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:1997)*

ISO 2148:1974, *Continuous handling equipment — Nomenclature*

ISO 6184-1:1985, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dust in air*

IEC 61241-1-1:1999, *Electrical apparatus for use in the presence of combustible dust — Part 1: Electrical apparatus protected by enclosures and surface temperature limitation — Specification for apparatus*

CENELEC Report No. R044-001:1999, *Safety of machinery — Guidance and recommendations for the avoidance of hazards due to static electricity*

3 Terms and definitions

For the purposes of this European standard, the terms and definitions stated in EN 1070:1998 apply in addition to those below. Additional terminology for conveyors is given in ISO 2148:1974.

3.1 conveyor system

number of linked conveyors with their ancillary equipment

3.2 belt conveyor

conveyor including its structural components, using a moving belt with a continuous rubber or polymeric surface for the conveying medium. The belt is usually driven by a pulley at one end, passing over a free-running pulley at the other end. The upper portion of the belt may be supported by free-running idlers or suitable flat surfaces. The conveyor may be arranged for horizontal or inclined travel, the angle of slope depending on the character of the goods conveyed and the type of belt

3.2.1 troughed belt conveyor

belt conveyor where the belt is supported on horizontal centre rollers and inclined side rollers which impart a transverse curvature to the belt

3.2.2 walled belt conveyor

belt conveyor where the belt has its flat carrying face extended to form side walls of limited height

3.2.3 radial conveyor

belt conveyor which is pivoted at one end and may be mounted on wheels or skids at a point along its length, which permits movement in a horizontal arc

3.2.4 belt feeder

shortened form of belt conveyor, normally running at slow speed, designed to extract or control the rate of flow of bulk materials from hoppers