



SLOVENSKI STANDARD
SIST EN 14973:2016

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Naprave za kontinuirni transport - Trakovi tračnih transporterjev za podzemno vgradnjo - Električne in požarnovarnostne zahteve

Conveyor belts for use in underground installations - Electrical and flammability safety requirements

Fördergurte für die Verwendung unter Tage - Elektrische und brandtechnische Sicherheitsanforderungen

Courroies transporteuses pour usage dans les installations souterraines - Prescriptions de sécurité électrique et protection contre l'inflammation

Ta slovenski standard je istoveten z: EN 14973:2015

ICS:

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
53.040.20	Deli za transporterje	Components for conveyors

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EUROPEAN STANDARD

EN 14973

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Conveyor belts for use in underground installations - Electrical and flammability safety requirements

Courroies transporteuses pour usage dans les
installations souterraines - Prescriptions de sécurité
électrique et protection contre l'inflammation

Fördergurte für die Verwendung unter Tage -
Elektrische und brandtechnische
Sicherheitsanforderungen

This European Standard was approved by CEN on 26 September 2015.

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.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 14973:2015

European foreword

This document (EN 14973:2015) has been prepared by Technical Committee CEN/TC 188 "Conveyor belts", the secretariat of which is held by SNV.

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 May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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 supersedes EN 14973:2006+A1:2008.

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 an integral part of this document.

Significant technical changes between this document and the previous edition of this European Standard:

Requirements for alternative Fire Propagation test, method D, added. For a defined range of belts this laboratory scale test can be substituted for the full scale test specified in EN 12881-2 and 8.4 of this document.

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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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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

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.

The approach taken in this European Standard is to identify the main hazards encountered in underground conveying applications and to specify requirements for conveyor belts that will provide the necessary operational safety. Three Classes are specified, A, B and C, as defined in 3.9 to 3.11.

NOTE According to national authorities Class C (C1/C2) conveyor belts are requested for use in EU coal mining.

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EN 14973:2015**1 Scope**

This European Standard specifies electrical and flammability safety requirements for conveyor belts intended for use in underground installations, in the presence of flammable or non-flammable atmospheres.

Conveyor belts covered by this European Standard and intended for use in flammable atmospheres are intended for use on conveyor belt installations (machinery in mines). The belt is a component or part of equipment, which can be incorporated into the conveyor, which is an equipment of Group I, Category M2, as defined in 3.2.2 of EN 13463-1:2009.

This European Standard is not applicable to light conveyor belts as described in EN ISO 21183-1:2006 nor is it applicable to conveyor belts which are manufactured before the date of publication of this document by CEN.

This European Standard deals with those significant hazards detailed in A.1.

Attention is drawn to Annexes ZA and ZB.

NOTE A summary of the requirements of this European Standard is given in Table 2. This is intended for quick reference only.

2 Normative references

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 1554:2012, *Conveyor belts — Drum friction testing*

EN 1710:2005+A1:2008, *Equipment and components intended for use in potentially explosive atmospheres in underground mines*

EN 12881-1:2014, *Conveyor belts — Fire simulation flammability testing — Part 1: Propane burner tests*

EN 12881-2, *Conveyor belts — Fire simulation flammability testing — Part 2: Large-scale fire test*

EN 13463-1:2009, *Non-electrical equipment for use in potentially explosive atmospheres — Part 1: Basic method and requirements*

EN 31010, *Risk management — Risk assessment techniques*

EN ISO 284, *Conveyor belts — Electrical conductivity — Specification and test method (ISO 284)*

EN ISO 340, *Conveyor belts — Laboratory scale flammability characteristics — Requirements and test method (ISO 340)*

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

EN ISO 15236-3:2007, *Steel cord conveyor belts — Part 3: Special safety requirements for belts for use in underground installations (ISO 15236-3:2007)*

EN ISO 22721:2007, *Conveyor belts — Specification for rubber- or plastics-covered conveyor belts of textile construction for underground mining (ISO 22721:2007)*

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

afterflame

flame which persists after the ignition source has been removed

3.2

afterglow

persistence of glowing, after cessation of flaming or, if no flaming occurs, after the ignition source has been removed

3.3

flame (noun)

zone of combustion in the gaseous phase usually with emission of light

3.4

to flame (verb)

to undergo combustion in the gaseous phase with emission of light

3.5

glowing

made luminous by heat (without flame)

3.6

undamaged

that part of a conveyor belt remaining after the termination of the fire tests described in EN 12881 and which shows no evidence of embrittlement, cracking, blistering or other blemishes not originally present

3.7

secondary safety device

equipment or apparatus provided for the purpose of assisting in the provision of a safe working environment, e.g. slip detectors, heat detectors, water fire extinguishing systems

3.8

incomplete ignition

situation in which the part of the conveyor belt above the burner burns only on the bottom side and not on the top side when the burner is removed

3.9

class A belt

conveyor belt intended for general use where the only hazard is limited access and means of escape

3.10

class B belt

conveyor belt intended for use where there is limited access and means of escape, where a potentially explosive atmosphere is present and where secondary safety devices are either not present (Class B1) or present (Class B2)

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3.11**class C belt**

conveyor belt intended for use where there is limited access and means of escape, where a potentially explosive atmosphere is present, where other combustible material or dust is either being conveyed or is a potential source of additional fuel (fire load) and where secondary safety devices are either not present (Class C1) or present (Class C2)

3.12**additional fuel source (fire load)**

material, eg wooden linings or plastic pipes, significantly additional to the conveyor belt and conveyed material which it is considered likely would contribute to the ignition source of the conveyor belt in a fire situation

3.13**potentially explosive atmosphere**

atmosphere which could become explosive due to local and operational conditions

4 Ignition hazard assessment

In order to determine which class of conveyor belt has to be used in an underground installation. The operating company shall carry out an ignition hazard assessment. The result of such an assessment shall lead to a class of conveyor belt according to this standard. Annex A of this standard and Annex A of EN 1710:2005+A1:2008 serve as aids for preparing such an ignition hazard assessment.

NOTE An example of an ignition hazard assessment for a conveyor belt intended for use in a potentially explosive atmosphere is given in Annex B. (standards.iteh.ai)

5 Electrical resistance

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When tested in accordance with EN ISO 284, conveyor belts intended for use in underground installations shall have an electrical surface resistance not greater than 300 MΩ.

6 Frictional heating**6.1 Conveyor belts intended for general use in underground installations (Class A), and for use in hazardous installations where secondary safety devices are present (Classes B2 and C2)**

When tested in accordance with EN 1554:2012, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord conveyor belts, conveyor belts intended for use in these applications shall exhibit no flame whatsoever, although glowing is permissible. No requirements are included for the maximum temperature of the drum.

6.2 Conveyor belts intended for use in installations where there is a potentially flammable atmosphere and where secondary safety devices are not present (Class B1)

When tested in accordance with EN 1554:2012, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord conveyor belts, conveyor belts intended for use in flammable atmospheres shall exhibit no flame or glow whatsoever and at no time shall the temperature of the drum exceed 450 °C.

NOTE If the intrinsic properties of the conveyor belt alone are to be used to give a safe situation in the presence of flammable atmospheres, it is important to limit the temperature of the drum and not to allow glow. The temperature of 450 °C was chosen as being adequately below the ignition temperature of methane-air mixtures when in the presence of a hot drum surface.

6.3 Conveyor belts intended for use in installations where there is a potentially flammable atmosphere plus combustible dust or material conveyed, and where secondary safety devices are not present (Class C1)

When tested in accordance with EN 1554:2012, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord conveyor belts, conveyor belts intended for use in the presence of coal dust shall exhibit no flame or glow whatsoever and at no time shall the temperature of the drum exceed 325 °C.

NOTE If the intrinsic properties of the conveyor belt alone are to be used to give a safe situation in the presence of combustible dusts or material conveyed, it is important to limit the temperature of the drum and not to allow glow to avoid the possibility of combustion of dust on the belt. The drum temperature of 325 °C was chosen as being adequately below the ignition temperature of coal dust on the belt when in the presence of a hot drum surface. However, if the conveyor belt is to be used in the presence of other dusts, the purchaser/user and manufacturer may agree alternative requirements on the basis of experience, e.g. a different maximum drum temperature that will give an adequate margin of safety over the ignition temperature of the dust in question.

7 Resistance to ignition

7.1 Conveyor belts intended for general use in underground installations (Class A), for use where there is a potentially flammable atmosphere (Classes B1 and B2), and for use in hazardous installations where secondary safety devices are present (Class C2)

When tested in accordance with EN ISO 340, the sum of the afterflame times for each group of six tests (i.e. six tests with covers intact and six tests with covers removed) shall be less than 45 s and no individual result shall be greater than 15 s.

7.2 Conveyor belts intended for use in installations where there is a potentially flammable atmosphere plus combustible dust or material conveyed, and where secondary safety devices are not present (Class C1)

When tested in accordance with EN ISO 340, the sum of the afterflame and afterglow times for six test pieces with covers intact shall be no more than 18 s and no individual result shall be greater than 10 s. When tested with covers removed, the sum of the afterflame and afterglow times for the six test pieces shall be no more than 30 s and no individual result shall be more than 15 s.

8 Fire propagation

8.1 Introduction

8.1.1 The requirements in 8.2 to 8.4 are based on resistance to the propagation of fire from a localized heat source. However, experience has shown that the two metre propane burner test given in EN 12881-1:2014, Method A (8.2.2) might not measure propagation if the conveyor belt is not fully ignited in the 10 min period of flame application. In these circumstances, the mid-scale high energy test given in EN 12881-1:2014, Method C (see 8.2.3 and 8.3) has been found to ignite all but the heaviest steel cord conveyor belts and to provide an adequate level of safety. The inability to ignite fully a belt in the 50 min period of the mid-scale high energy test implies a high level of resistance to fire propagation.

8.1.2 If, in the mid-scale high energy test, the conveyor belt is not fully ignited in the 50 min period of flame application, the double burner test given in EN 12881-1:2014, Method B (see 8.2.4 and 8.3) may be used to achieve full ignition. Although the double burner test ignites a wider range of conveyor belts, experience with conveyor belts other than those containing steel cord or aramid yarns is limited.

8.1.3 If there is the possibility of a major roadway fire due to the presence of fuel sources (fire load) additional to and greater than the conveyor belt and conveyed material alone, the full scale gallery test