

SLOVENSKI STANDARD
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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: prEN 14973

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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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ICS 53.040.10; 13.220.40

Will supersede EN 14973:2006+A1:2008

English Version

**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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 188.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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Foreword

This document (prEN 14973:2013) has been prepared by Technical Committee CEN/TC 188 “Conveyor belts”, the secretariat of which is held by SNV.

This document is currently submitted to the CEN Enquiry.

This document will supersede 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 EC Directive(s).

For relationship with EC Directive(s), see informative Annex ZA, and ZB, which is an integral part of this document.

The main changes with respect to the previous edition are listed below:

- Requirements for alternative Fire Propagation test added

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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.

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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, which will 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 873 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.

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 1050, *Safety of machinery – Principles for risk assessment*.

EN 15544, *Conveyor belts – Drum friction testing*.

EN 12881-1, *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 potentially explosive atmospheres – Part 1: Basic method and requirements*.

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 - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (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)*.

IEC 60300-3-9, *Dependability management – Part 3: Application guide – Section 9: Risk analysis of technological systems*.

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)

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

4 Ignition hazard assessment

An ignition hazard assessment shall be carried out and documented as described in Annex A.

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.

5 Electrical resistance

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 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, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord 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 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, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord 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 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 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, Method B2, or Method B1 if the use of Method B2 is impossible, e.g. when testing steel cord 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 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 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 Belts intended for general use in underground installations (Class A), for use where there is a potentially flammable atmosphere (Classes B1 & 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 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 average afterflame and afterglow times for six test pieces with covers intact shall be no more than 3 s and no individual result shall be greater than 10 s. When tested with covers removed, the average afterflame and afterglow times for the six test pieces shall be no more than 5 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, Method A (8.2.2) might not measure propagation if the belt is not fully ignited in the ten minute period of flame application. In these circumstances, the mid-scale high energy test given in EN 12881-1, Method C (see 8.2.3 and 8.3) has been found to ignite all but the heaviest steel cord belts and to provide an adequate level of safety. The inability to ignite fully a belt in the 50 minute 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 belt is not fully ignited in the 50 minute period of flame application, the double burner test given in EN 12881-1, 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 belts, experience with 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 belt and conveyed material alone, the full scale gallery test described in EN 12881-2 (see 8.4.1) is used to provide adequate operational safety levels. Alternatively the laboratory scale test described in EN 12881-1 Method D, may be used for a restricted range of belts (see 8.4.2)

8.1.4 The satisfactory performance of a conveyor belt in one of the propagation tests should not be taken to indicate that performance will necessarily be satisfactory in any of the other tests. Care is particularly needed in respect of the comparison of performance in the tests simulating resistance to propagation from a localized source and the test for propagation in a major roadway fire. Satisfactory performance in one test cannot be taken to indicate satisfactory performance in the other. The substitution of one of these tests for another may result in a reduction in previously accepted standards of safety.

8.2 Belts intended for general use in underground installations (Class A) and for use where there is a potentially flammable atmosphere (Classes B1 & B2)

8.2.1 General

The conveyor belt shall comply with the requirement given in 8.2.2, except that, if incomplete ignition is achieved, the conveyor belt shall comply with the requirement given in 8.2.3 or 8.2.4.