Naprave za kontinuirni transport - Trakovi tračnih transporterjev z jeklenimi vrvmi - 1. del: Zgradba traku, mere in mehanske zahteve trakov za splošne namene (ISO/FDIS 15236-1:2016)

Steel cord conveyor belts - Part 1: Design, dimensions and mechanical requirements for conveyor belts for general use

Stahlseilfördergurte - Teil 1: Aufbau, Maße und mechanische Anforderungen an Fördergurte für allgemeine Einsatzbedingungen

Courroies transporteuses à câbles d'acier - Partie 1: Exigences de conception, de dimensions et mécaniques des courroies transporteuses à usage général

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FINAL
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INTERNATIONAL STANDARD

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Steel cord conveyor belts —

Part 1:
Design, dimensions and mechanical requirements for conveyor belts for general use

Courroies transporteuses à câbles d'acier —

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Please see the administrative notes on page ii

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ISO/CEN PARALLEL PROCESSING

This final draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement. The final draft was established on the basis of comments received during a parallel enquiry on the draft.

This final draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel two-month approval vote in ISO and formal vote in CEN.

Positive votes shall not be accompanied by comments.

Negative votes shall be accompanied by the relevant technical reasons.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*.

This second edition cancels and replaces the first edition (ISO 15236-1:2005), of which it constitutes a minor revision.

ISO 15236 consists of the following parts, under the general title *Steel cord conveyor belts*:

— *Part 1: Design, dimensions and mechanical requirements for conveyor belts for general use*

— *Part 2: Preferred belt types*

— *Part 3: Special safety requirements for belts for use in underground installations*

— *Part 4: Vulcanized belt joints*

FINAL DRAFT INTERNATIONAL STANDARD   ISO/FDIS 15236-1:2016(E)

Steel cord conveyor belts —

Part 1:
Design, dimensions and mechanical requirements for conveyor belts for general use

1 Scope

This part of ISO 15236 specifies the performance and constructional requirements applicable to conveyor belts having steel cords in the longitudinal direction as reinforcement. The requirements for construction given in Clause 6 apply to the design of single belts, as well as the design of complete type series such as those covered in ISO 15236-2.

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.

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

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

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

ISO 703, *Conveyor belts — Transverse flexibility (troughability) — Test method*

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 7590, *Steel cord conveyor belts — Methods for the determination of total thickness and cover thickness*

ISO 7622-2, *Steel cord conveyor belts — Longitudinal traction test — Part 2: Measurement of tensile strength*

ISO 7623, *Steel cord conveyor belts — Cord-to-coating bond test — Initial test and after thermal treatment*

ISO 8094, *Steel cord conveyor belts — Adhesion strength test of the cover to the core layer*

ISO 10247, *Conveyor belts — Characteristics of covers — Classification*

ISO 15236-2, *Steel cord conveyor belts — Part 2: Preferred belt types*

EN 12882, *Conveyor belts for general purpose use — Electrical and flammability safety requirements*

EN 13827, *Steel cord conveyor belts — Determination of the lateral and vertical displacement of steel cords*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1

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3.1
edge width
b_k
thickness of rubber between the outer cord and the belt edge

Note 1 to entry: See Figure 1.

3.2
breaker
transverse reinforcement in the conveyor belt, normally of a textile material, attached both above and below, or either above or below, the layer of longitudinal cords at a distance of at least 1 mm and considered to be part of the cover

[SOURCE: ISO 7590:2009, 2.1, modified.]

Note 1 to entry: See Figure 2.

3.3
weft
transverse reinforcement in the conveyor belt, normally of steel wires, attached both above and below, or either above or below, the layer of longitudinal cords at a distance of less than 1 mm and considered to be part of the belt core

[SOURCE: ISO 7590:2009, 2.2, modified.]

Note 1 to entry: See Figure 3.

4 Symbols and units

Table 1 — Symbols and units

Symbol	Explanation	Unit
B	Belt width	mm
F_a	Pull-out force of cord per cord length	N/mm
F_{bs}	Breaking strength of cord taken from cured belt	kN
F_v	Pull-out force of cord per cord length — after thermal treatment	N/mm
K_N	Minimum (nominal) breaking strength per width of belt	N/mm
b_k	Calculated edge width	mm
b_t	Supporting belt width	mm
d	Cord diameter	mm
F	Deflection (troughability)	mm
h_m	Median cord height according to EN 13827	mm
n	Number of cords	—
s_1	Belt thickness	mm
s_2	Cover thickness carrying side	mm
s_3	Cover thickness pulley side	mm
s_4	Thickness of layer between breaker and layer of longitudinal cords	mm
s_5	Thickness of layer between weft and layer of longitudinal cords	mm
s_6	Thickness of belt core	mm
t	Cord pitch	mm

Table 1 *(continued)*

Symbol	Explanation	Unit
Δh_1	Number of cords positioned within a range of $h_m \leqq 1$ mm as a percentage of the total number of cords	%
Δh_2	Number of cords positioned within a range of h_m of from >1,0 mm to 1,5 mm and expressed as a percentage of the total number of cords	%
Δh_3	Percentage of cords with $h_m > 1,5$ mm	%

5 Belt design

5.1 Standard type

Conveyor belts conforming to this part of ISO 15236 contain steel cords surrounded by a layer of core rubber. This belt core is protected on top and bottom by cover layers (see Figure 1).
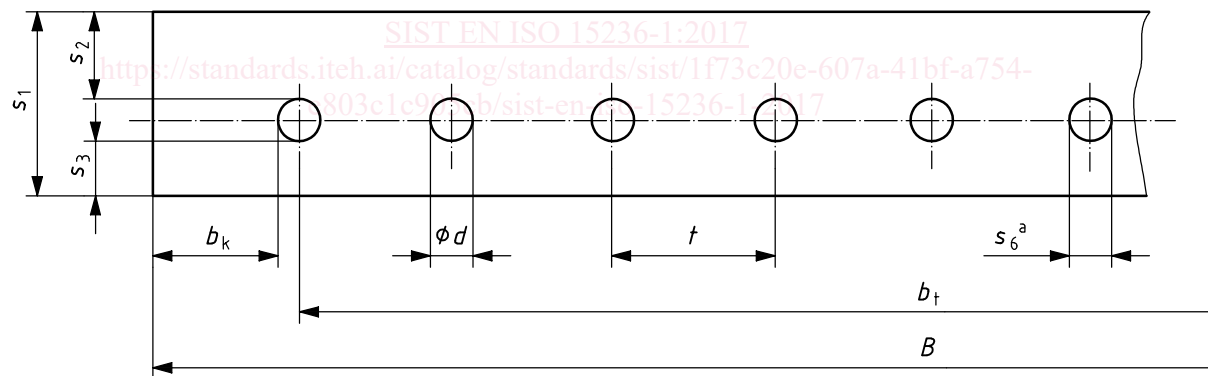
5.2 Conveyor belting having transverse reinforcements

Requirements for steel cord conveyor belts having breakers are illustrated in Figure 2 and requirements relating to weft are illustrated in Figure 3.

5.3 Belt core

The thickness of the belt core (carcass), s_6, for all belt types is defined as follows:
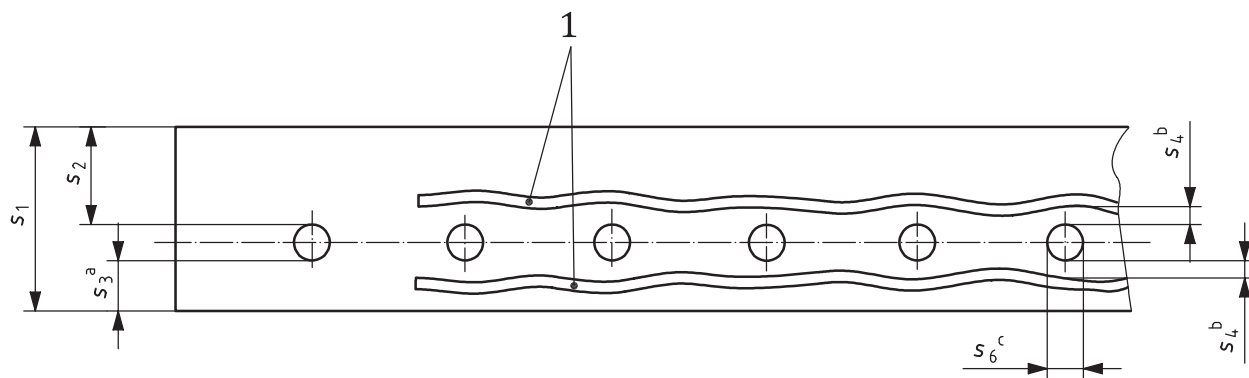
$$s_6 = s_1 - s_2 - s_3$$

a $s_6 = d$.

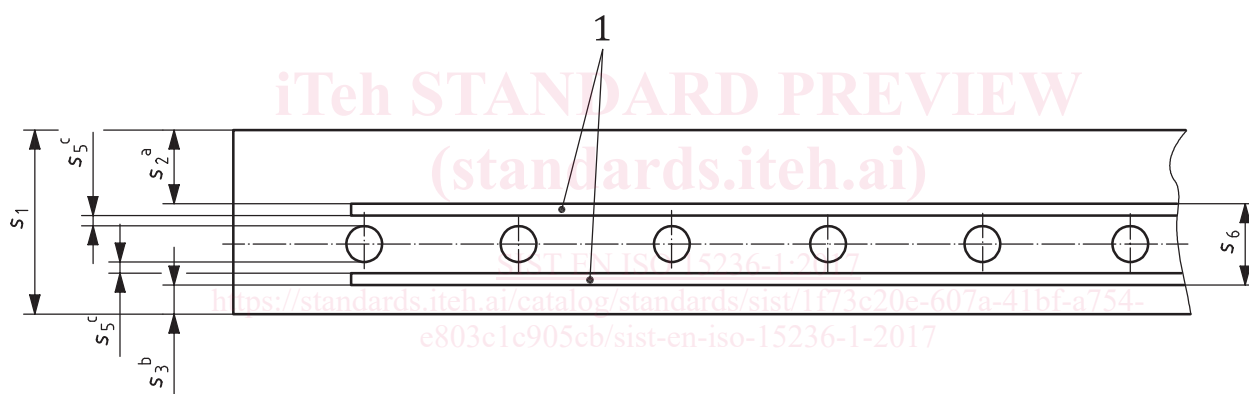**Figure 1 — Cross section of standard belt**

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Key

1 breaker

a Including the breaker.

b $\geqq 1$ mm.

c $s_6 = d$ (see Table 1).

Figure 2 — Belt cross section with breaker

Key

1 weft

a Above the weft.

b Below the weft.

c <1 mm.

Figure 3 — Belt cross section with weft

6 Design and construction

6.1 Belt strengths

Steel cord belts shall be manufactured in strengths of between 500 N/mm and 8 000 N/mm belt width.

The selection of preferred belt types shown in Table 2 should be used. Three groups are indicated, for low-, medium- and high-strength belts.

Table 2 — Belt types

Low	ST 500	ST 630	ST 800	ST 1000	ST 1250	ST 1600
Medium	ST 2000	ST 2250	ST 2500	ST 2800	ST 3150	
High	ST 3500	ST 4000	ST 4500	ST 5000	ST 5400	

6.2 Belt widths

The belt widths and tolerances according to Table 3 shall apply only to belts when manufactured and not to belts when tensioned on-site.

Table 3 — Belt widths, B

Dimensions in millimetres

B															
500	650	800	1 000	1 200	1 400	1 600	1 800	2 000	2 200	2 400	2 600	2 800	3 000	3 200
$+10$ -5	$+10$ -7	$+10$ -8	±10	±10	±12	±12	±14	±14	±15	±15	±15	±15	±15	±15

6.3 Belt edge and supporting belt width

6.3.1 Edge width

The edge width shall not be less than 15 mm and not more than 40 mm. Within these limits, the calculated edge width, b_k, is approximated from Formula (1):

$$b_k \approx 5 \times s_6 \tag{1}$$

6.3.2 Supporting belt width

The supporting belt width, b_t, is derived as follows:

$$b_t = B - 2b_k - d \tag{2}$$

(see also 7.2.2).

6.4 Number of cords

Based on the minimum breaking strength of the cord, F_{bs} (see 7.1), in kilonewtons (kN), the minimum breaking strength of the belt, K_N, in newtons per millimetre (N/mm) of belt width, and on the width of the belt, B, in millimetres (mm), the minimum number of cords, n_{min}, is given by Formula (3):

$$n_{min} = \frac{K_N \times B}{F_{bs} \times 1\,000} \tag{3}$$

The actual number of cords, n, shall be greater than or equal to n_{min}.

6.5 Cord pitch

The cord pitch, t, is calculated using Formula (4):

$$t = \frac{b_t}{n-1} \tag{4}$$

The cord pitch shall be selected to the nearest 0,1 mm.