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Steel cord conveyor belts —

Part 2: Preferred belt types

Courroies transporteuses à câbles d'acier —

Partie 2: Types de courroies recommandées

Reference number
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Foreword

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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 15236-2:2004), which has been technically revised.

A list of all the parts in the ISO 15236 series can be found on the ISO website.

Introduction

Steel cord conveyor belts are mainly long belts which are manufactured by joining several delivery lengths on the site. To achieve joints with a high dynamic capability from belts supplied by various manufacturers, it is necessary to standardize some features, e.g. thickness of carcass or cord pitch and cord diameter.

Steel cord conveyor belts —

Part 2:
Preferred belt types

1 Scope

This document specifies preferred types of conveyor belts with steel cords in the longitudinal direction as reinforcement. The belt type series in this document are based on the general requirements for construction given in ISO 15236-1.

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 indicated applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15236-1:2016, *Steel cord conveyor belts — Part 1: Design, dimensions and mechanical requirements for conveyor belts for general use*

ISO 15236-4, *Steel cord conveyor belts — Part 4: Vulcanized belt joints*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

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

4 Symbols and units

For the purposes of this document, the symbols and the units given in Table 1 apply.

Table 1 — Symbols and units

Symbol	Explanation	Unit
B	Belt width	mm
F_{bs}	Breaking strength of the cord taken from the cured belt	kN
K_N	Nominal breaking strength per width of belt	N/mm
b_K	Calculated edge width	mm
d	Cord diameter	mm
n	Number of cords	—
s	Cover thickness	mm
s_6	Carcass thickness	mm

Table 1 *(continued)*

Symbol	Explanation	Unit
t	Cord spacing/pitch	mm
min	Minimum value	—
max	Maximum value	—

5 General remarks

The belt types described in this document are a selection out of the unlimited number of possible constructions; belts of the types A and B have been manufactured and installed in large quantities.

It is the general conception of these belt types that belts of a certain nominal breaking strength have equal cords and cord pitches or at least equal thickness of the carcass.

The requirements regarding belt design, i.e. cord diameter and cord pitch, depend on the mode of joint that will be applied. In accordance with ISO 15236-4, there are three types of vulcanized joints:

— interlaced stepped joints;

— plain stepped joints;

— finger joints.

For high performance stepped joints, it is essential that the belts to be joined have equal cord pitch and cord diameter. For belts to be joined by finger joints, the cord pitch and cord diameter are of less importance; what matters is a similar thickness of the carcass. In Tables 2, 3, 4 and 5, therefore, cord diameter, cord pitch and number of cords are specified only for those types which are usually joined by stepped joints, i.e. belt types A1, A2 and B2.

The cord numbers given in Tables 2, 3 and 5 are for guidance only. They result from Formula (1):

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

and from the requirement that the edge width shall be not larger than 40 mm and not smaller than 15 mm, i.e.

$$15 \leq b_k \leq 40$$

A higher number of cords as well as a smaller number of cords can be applied provided that the requirements for minimum breaking strength specified in ISO 15236-1 and ISO 15236-4 are met. The belt breaking strengths are calculated by Formula (2):

$$K_N = \frac{F_{bs} \times n \times 1\,000}{B} \tag{2}$$

For the purposes of this document, the symbols and units given in Table 1 apply.

6 Belt types A

Belt types A shall be manufactured with steel cords where the individual wires have been zinc coated by a hot dip process. Requirements for belt types A1 and A2 shall be as given in Tables 2 and 3, respectively.

NOTE Belt types A are designed for interlaced stepped belt joints with numbers of steps between 1 and 4. The t/d ratio of the A2 belt types is somewhat lower than that of the belt types A1 resulting in thinner cords for comparable tensile strengths and in most cases a higher number of steps within the joint.

Table 2 — Requirements for belt types A1

Type of belt	Unit	500	630	800	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500	4 000	4 500	5 000	5 400
Min. breaking strength $K_{N\,min.}$	N/ mm	500	630	800	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500	4 000	4 500	5 000	5 400
Max. cord diameter $d_{max.}$	mm	3,0	3,0	3,7	4,2	4,9	5,0	5,6	5,6	5,6	5,6	7,2	7,2	8,1	8,6	8,9	9,7	10,9	11,3
Min. breaking load of the cord $F_{bs\,min.}$	kN	7,6	7,6	10,3	12,9	18,4	20,6	26,2	25,5	25,5	26,2	39,7	39,7	50,0	55,5	63,5	75,0	90,3	96,0
Cord pitch, t	mm	14,0	11,0	12,0	12,0	14,0	14,0	15,0	13,5	12,0	11,0	15,0	13,5	15,0	15,0	15,0	16,0	17,0	17,0
Min. thickness of covers $s_{min.}$	mm	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	5,0	5,0	5,5	6,0	6,5	7,0	7,5	8,0
Belt width B in mm	Tole-rance in mm	Number of cords, n																	
500	+10/-5	33	42	39	39	34	34	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
650	+10/-7	44	54	51	51	45	45	41	46	52	56	41	46	41	41	41	39	36	N/A
800	+10/-8	54	68	64	63	55	55	50	57	64	69	51	57	51	51	51	48	45	45
1 000	±10	68	84	80	80	68	68	63	71	80	86	63	71	63	64	63	60	56	57
1 200	±10	84	107	97	97	82	82	76	85	96	104	76	85	76	76	76	72	67	68
1 400	±12	96	124	114	113	97	97	90	100	112	122	89	99	89	89	89	84	79	79
1 600	±12	111	142	130	130	111	111	103	114	129	140	102	114	102	102	102	96	90	90
1 800	±14	125	160	147	147	125	125	116	129	145	159	116	128	116	116	116	108	102	102
2 000	±14	139	177	164	163	140	139	130	144	162	177	129	143	129	129	129	121	114	114
2 200	±15	153	195	180	180	154	154	143	159	179	195	142	158	142	142	142	133	126	126
2 400	±15	167	213	197	197	168	168	156	174	195	213	156	173	156	156	156	146	137	137
2 600	±15	181	231	214	213	182	182	170	189	212	231	169	188	169	169	169	158	149	149
2 800	±15	196	249	230	230	197	197	183	203	229	249	182	202	182	182	182	171	161	161
3 000	±15	210	267	247	247	211	211	196	218	245	268	196	217	196	196	196	183	173	173
3 200	±15	224	286	264	263	225	225	210	233	262	286	209	232	209	209	209	196	184	184
N/A = Not applicable because of troughability.																			

Table 3 — Requirements for belt types A2

Type of belt	Unit	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500
Min. breaking strength $K_{N\,min.}$	N/mm	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500
Max. cord diameter $d_{max.}$	mm	3,7	4,2	4,4	4,7	4,9	5,2	5,6	5,8	6,7	7,2	7,4
Min. breaking load of the cord $F_{bs\,min.}$	kN	10,7	13,3	14,9	17,1	19,2	21,3	24,0	26,6	35,9	40,4	44,9
Cord pitch, t	mm	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	12,0	12,0	12,0
Min. thickness of covers $s_{min.}$	mm	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	5,0	5,0	6,0
Belt width B in mm	Toler-ance in mm	Number of cords, n										
500	+10/-5	47	47	47	47	47	47	47	47	39	39	39
650	+10/-7	61	62	62	61	61	62	61	62	51	51	51
800	+10/-8	76	76	76	75	76	76	76	76	63	63	63
1 000	±10	96	96	96	95	95	95	94	94	78	78	78
1 200	±10	116	116	116	115	115	115	114	114	94	94	94
1 400	±12	136	136	136	135	135	135	134	134	111	111	111
1 600	±12	156	156	156	155	155	155	154	154	128	128	128
1 800	±14	176	176	176	175	175	175	174	174	144	144	144
2 000	±14	196	196	196	195	195	195	194	194	161	161	161
2 200	±15	216	216	216	215	215	215	214	214	178	178	178
2 400	±15	236	236	236	235	235	235	234	234	194	194	194
2 600	±15	256	256	256	255	255	255	254	254	211	211	211
2 800	±15	276	276	276	275	275	275	274	274	228	228	228
3 000	±15	296	296	296	295	295	295	294	294	244	244	244
3 200	±15	316	316	316	315	315	315	314	314	261	261	261

7 Belt types B

Compared with the belt types A, belt types B are built with transverse reinforcements as indicated in ISO 15236-1:2016, 5.2.

Belt types B are divided into two categories:

— belt types B1 with relatively high elongation “warp” cords;

— belt types B2 with standard elongation “warp” cords.

Requirements for belt types B1 and B2 shall be as given in Tables 4 and 5, respectively.

A “weft” of steel cord with highly elastic elongation shall be arranged on top and below the longitudinal cords to form a carcass of the belt type ST S/S.

These belts may have only one weft of steel cords arranged above the longitudinal cords or with one weft of textile yarns arranged above and below the longitudinal cords. Each layer of cords shall be separated from each other by a rubber layer.

Belt types B shall be joined by

— “finger joints” or “plain stepped joints” for belt types B1, and

— “plain stepped joints” or “interlaced stepped joints” for belt types B2.

Table 4 — Requirements for belt types B1

Type of belt	Unit	500	630	800	1 000	1 250	1 400
Min. breaking strength $K_{Nmin.}$	N/mm	500	630	800	1 000	1 250	1 400
Max. cord diameter $d_{max.}$	mm	3,0	3,0	3,0	3,0	3,0	3,0
Thickness of the carcass with							
2 textile wefts type ST T/T	mm	5,6	5,6	5,6	5,6	5,6	5,6
1 metal weft type ST S/-	mm	4,0	4,0	4,0	4,0	4,0	4,0
2 metal wefts type ST S/S	mm	5,6	5,6	5,6	5,6	5,6	5,6
Min. thickness of covers $s_{min.}$	mm	3,0	3,0	3,0	3,0	3,0	3,0

Table 5 — Requirements for belt types B2

Type of belt	Unit	800	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500
Min. breaking strength $K_{Nmin.}$	N/mm	800	1 000	1 250	1 400	1 600	1 800	2 000	2 250	2 500	2 800	3 150	3 500
Max. cord diameter $d_{max.}$	mm	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	5,4	5,4	7,1	7,4
Min. breaking load of the cord $F_{bs\ min.}$	kN	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	27,0	27,0	40,7	44,9
Cord pitch, t	mm	12,1	9,7	7,7	6,9	6,1	5,4	4,8	4,4	9,9	9,3	11,0	12,0
2 textile wefts type ST T/T	mm	6,6	6,6	6,6	6,6	6,6	6,6	6,6	6,6	8,6	8,6	10,6	10,6
1 metal weft type ST S/-	mm	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	7,5	7,5	9,5	9,5
2 metal wefts type ST S/S	mm	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	9,0	9,0	11,0	11,0
Min. thickness of covers $s_{min.}$ in mm	mm	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	4,0	4,0	5,0	5,0
Belt width B in mm	Tolerance in mm	Number of cords, n											
650	+10/-7	50	62	78	87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
800	+10/-8	61	77	96	107	122	138	153	172	75	83	70	64
1 000	±10	77	96	123	134	153	172	193	215	94	104	88	80
1 200	±10	96	119	149	163	185	209	235	258	114	125	105	96
1 400	±12	110	137	175	192	218	246	276	301	134	146	123	112
1 600	±12	129	158	198	221	250	283	318	347	154	166	140	128
1 800	±14	143	178	224	250	283	320	360	392	175	187	158	144
N/A = Not applicable because of troughability.													

8 Belt types C

The tension members of the belt types C shall be fabric-like constructions. For both types C1 and C2 the warp shall consist of brass or zinc coated steel cords.

NOTE The longitudinal steel cords in the belting of the belt types C1 have a higher elastic elongation than belt types C2.

The weft of belt types C1 shall either be of textile yarns or steel cords and be arranged either above or below or above and below the longitudinal cords.

The weft of C2 belting shall be of steel cords which are arranged either above or below or above and below the longitudinal cord.