
Steel cord conveyor belts —

Part 2: Preferred belt types

*Courroies transporteuses à câbles d'acier —
Partie 2: Types de courroies recommandés*



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Foreword

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ISO 15236-2 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

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 4: Vulcanized belt joints*

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Foreword

This document (EN ISO 15236-2:2004) has been prepared by Technical Committee CEN/TC 188 "Conveyor belts", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 41 "Pulleys and belts (including veebelts)".

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of an identical text or by endorsement, at the latest by November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

EN ISO 15236 will consist 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 applications*
- *Part 4: Vulcanized belt joints*
- *Part 5: Marking*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Steel cord conveyors belts are mainly long belts which have to be 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.

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1 Scope

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

2 General remarks

The belt types described in this part of EN ISO 15236 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 EN 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 the following Tables for different belt types, 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 the equation:

$$n_{\min} = \frac{K_N \times B}{F_{bs} \times 1000}$$

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 prEN ISO 15236-1 and EN ISO 15236-4 are met.

$$K_N = \frac{F_{bs} \times n \times 1000}{B}$$

For the purposes of this document, the symbols and 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
t	Cord spacing/pitch	mm
min	Minimum value	-
max	Maximum value	-

3 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	1000	1250	1400	1600	1800	2000	2250	2500	2800	3150	3500	4000	4500	5000	5400
Min. breaking strength $K_{Nmin.}$	N/mm	500	630	800	1000	1250	1400	1600	1800	2000	2250	2500	2800	3150	3500	4000	4500	5000	5400
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	Tolerance 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
1000	± 10	68	84	80	80	68	68	63	71	80	86	63	71	63	64	63	60	56	57
1200	± 10	86	110	97	97	82	82	76	85	96	104	76	85	76	76	76	72	67	68
1400	± 12	96	124	114	113	97	97	90	100	112	122	89	99	89	89	89	84	79	79
1600	± 12	111	142	130	130	111	111	103	114	129	140	102	114	102	102	102	96	90	90
1800	± 14	125	160	147	147	125	125	116	129	145	159	116	128	116	116	116	108	102	102
2000	± 14	139	177	164	163	140	139	130	144	162	177	129	143	129	129	129	121	114	114
2200	± 15	153	195	180	180	154	154	143	159	179	195	142	158	142	142	142	133	126	126
2400	± 15	167	213	197	197	168	168	156	174	195	213	156	173	156	156	156	146	137	137
2600	± 15	181	231	214	213	182	182	170	189	212	231	169	188	169	169	169	158	149	149
2800	± 15	196	249	230	230	197	197	183	203	229	249	182	202	182	182	182	171	161	161
3000	± 15	210	267	247	247	211	211	196	218	245	268	196	217	196	196	196	183	173	173
3200	± 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	1000	1250	1400	1600	1800	2000	2250	2500	2800	3150	3500
Min. breaking strength $K_{Nmin.}$	N/mm	1000	1250	1400	1600	1800	2000	2250	2500	2800	3150	3500
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	Tolerance 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
1000	± 10	96	96	96	95	95	95	94	94	78	78	78
1200	± 10	116	116	116	115	115	115	114	114	94	94	94
1400	± 12	136	136	136	135	135	135	134	134	111	111	111
1600	± 12	156	156	156	155	155	155	154	154	128	128	128
1800	± 14	176	176	176	175	175	175	174	174	144	144	144
2000	± 14	196	196	196	195	195	195	194	194	161	161	161
2200	± 15	216	216	216	215	215	215	214	214	178	178	178
2400	± 15	236	236	236	235	235	235	234	234	194	194	194
2600	± 15	256	256	256	255	255	255	254	254	211	211	211
2800	± 15	276	276	276	275	275	275	274	274	228	228	228
3000	± 15	296	296	296	295	295	295	294	294	244	244	244
3200	± 15	316	316	316	315	315	315	314	314	261	261	261

4 Belt types B

Compared with the belt types A, belt types B are built with transverse reinforcements as indicated in 4.2 of prEN ISO 15236-1:1996.

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	1000	1250	1400
Min. breaking strength K_{Nmin}	N/mm	500	630	800	1000	1250	1400
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