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Australia



Conveyor belting of elastomeric and steel cord construction



AS 1333:2024

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Preface

This Standard was prepared by the Standards Australia Committee RU-002, Conveyor and Elevator Belting, to supersede AS 1333:1994.

This document states the minimum technical specification of conveyor belting of elastomeric materials and steel cord construction in which the carcass is composed of a plane of steel cords with or without supplementary reinforcements.

The major changes in this edition are as follows:

- (a) AS 1334.12, AS 3569 and ISO 4589 removed from [Clause 2](#)
- (b) ISO 7622-2, AS 1334.13, ISO 7622-2 and DIN EN 16974 added to [Clause 2](#).
- (c) AS 1199, AS 1399, AS 3900.1, AS 3904.1, SAA HB 18.44, ISO 433 and ISO 7623 moved from [Clause 2](#) to the Bibliography.
- (d) [Table 1](#) added to [Clause 4.1](#) which provides more economic outcomes than the existing cord construction table.
- (e) [Table 2](#) moved to [Clause 4.1](#) where it is first referenced.
- (f) [Table 3](#) ([Clause 4.2](#)) and [Table 4](#) ([Clause 4.3](#)) have been named.
- (g) Note 2 added in [Clause 5.1](#) in reference to the historical version of the suggested belt construction parameters.
- (h) [Clause 5.2](#) updated to include the tolerance on cord diameters. Tolerance on cord diameter table removed.
- (i) [Clause 5.4](#) updated to provide more clarity about minimum distances between cords and breaker layers.
- (j) Conveyor belt thickness tolerance modified in [Clause 6.3](#) and [6.4](#) to reflect the tolerance used in international Standards.
- (k) [Clause 7.1](#) updated, [Appendix H](#) removed and reference to Table H.1 in [Clause B.2](#) removed. Cord breaking strength is to be tested in accordance with ISO 7622-2.
- (l) [Figure 1](#) moved to [Clause 7.2](#) where it is first referenced.
- (m) [Clause 7.12](#) and [Appendix L](#) added to provide recommendations for test parameters and a ranking of indentation rolling resistance results that will allow conveyor belts to be graded according to their performance.
- (n) Appendix [Clause B.2](#) (i), (k), (l) and (m) updated in correlation to the changes and additions to the associated clauses.
- (o) Appendix [Clauses C.5](#), [E.6](#), [F.6](#), [G.7](#), [H.7](#), [I.6](#), [J.6](#) and [K.6](#) updated to conform to Clause 18.5.8 of SG-006.

The terms “normative” and “informative” are used in Standards (and other publications) to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Australian Standard®

Conveyor belting of elastomeric and steel cord construction

1 Scope

This document specifies requirements for conveyor belting of elastomeric materials and steel cord construction in which the carcass is composed of a plane of steel cords with or without supplementary reinforcements.

NOTE 1 Alternative methods for determining conformance to this document, are given in [Appendix A](#).

NOTE 2 Guidelines and advice on information to be supplied at the time of placing an enquiry or an order are set out in [Appendix B](#).

WARNING — Belting conforming to this document may not necessarily be electrically insulating at any stage of its life and therefore is not to be used as an insulator for electrical work.

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.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1334.1, *Methods of testing conveyor and elevator belting, Method 1: Determination of length of endless belting*

AS 1334.4, *Methods of testing conveyor and elevator belting, Method 4: Determination of troughability of conveyor belting*

AS 1334.9, *Methods of testing conveyor and elevator belting, Method 9: Determination of electrical resistance of conveyor belting*

AS 1334.10, *Methods of testing conveyor and elevator belting, Method 10: Determination of ignitability and flame propagation characteristics of conveyor belting*

AS 1334.11, *Methods of testing conveyor and elevator belting, Method 11: Determination of ignitability and maximum surface temperature of belting subjected to friction*

AS 1334.13, *Methods of testing conveyor and elevator belting, Method 13: Determination of indentation rolling resistance of conveyor belting*

AS 1683.11, *Methods of test for elastomers, Method 11: Tension testing of vulcanized rubber*

AS 1683.21, *Methods of test for elastomers, Method 21: Rubber — Vulcanized — Determination of abrasion resistance using a rotating cylindrical device*

AS 1683.26, *Methods of test for elastomers, Method 26: Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

AS 2103, *Dial gauges and dial test indicators (metric series)*

AS 4606, *Grade S fire resistant and antistatic requirements for conveyor belting and conveyor accessories*

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

DIN EN 16974, *Conveyor belts — Indentation rolling resistance related to belt width — Requirements, testing*

3 Terms and definitions

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

3.1

may

indicates the existence of an option

3.2

shall

indicates that a statement is mandatory

3.3

should

indicates a recommendation

4 Designation and classification

4.1 Belting

Belting shall be designated by the number of this document and by the calculated minimum strength of the belting in kilonewtons per metre (kN/m) width, prefixed by the letters “ST” in accordance with [Table 1](#) or [Table 2](#).

EXAMPLE Belting designated AS 1333 ST1600 will have a calculated minimum strength of not less than 1 600 kN/m width of belt.

NOTE Application, conveyor design and environmental conditions should be considered for the final belt construction.

Table 1 — Designation and suggested parameters of conveyor belting of elastomeric and steel cord construction

Belting design- nation	Nominal cord pitch (see Clause 6.6) mm	Number of cords																		
		Belt width, mm																		
		600	650	750	800	900	1000	1050	1200	1400	1500	1600	1800	2000	2200	2400	2500	2600	3000	3200
ST500	14	40	43	51	54	61	68	71	82	96	103	111	125	139	153	167	175	182	210	224
ST630	14	40	43	51	54	61	68	71	82	96	103	111	125	139	153	167	175	182	210	224
ST800	14	40	43	51	54	61	68	71	82	96	103	111	125	139	153	167	175	182	210	224
ST1000	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST1250	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST1400	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST1600	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST1800	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST2000	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST2250	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST2500	12	45	49	57	62	71	78	81	94	111	119	127	143	159	177	156*	161*	169*	196*	209*
ST2800	15	35	39	45	49	56	63	66	76	89	96	102	117	129	142	156	161	169	196	209
ST3000	15	35a	39	45	49	56	63	66	76	89	96	102	117	129	142	156	161	169	196	209
ST3150	15	35a	39a	45	49	56	63	66	76	89	96	102	117	129	142	156	161	169	196	209
ST3500	17	32a	35a	41a	43	49	55	58	67	79	85	90	102	114	126	137	143	149	173	183
ST4000	17	32a	35a	41a	43a	49	55	58	67	79	85	90	102	114	126	137	143	149	173	183
ST4500	17	32a	35a	41	43a	49a	55	58	67	79	85	90	102	114	126	137	143	149	173	183
ST5000	19	-	-	-	-	45a	50a	52	60	71	76	81	91	102	113	123	128	134	155	165
ST5600	19	-	-	-	-	45a	50a	52	60	71	76	81	91	102	113	123	128	134	155	165
ST6000	19	-	-	-	-	-	50a	52a	60	71	76	81	91	102	113	123	128	134	155	165
ST6300	21	-	-	-	-	-	45a	47a	54a	64	69	73	83	93	101	111	116	121	140	149
ST6500b	Documents ST7000b ST7500b ST8000b ST8500b ST9000b																			
ST7000b																				
ST7500b																				
ST8000b																				
ST8500b																				
ST9000b																				

Table 1 (continued)

Belting design- nation	Nominal cord pitch (see Clause 6.6) mm	Number of cords																			
		Belt width, mm																			
		600	650	750	800	900	1000	1050	1200	1400	1500	1600	1800	2000	2200	2400	2500	2600	3000	3200	
ST10000 ^b																					
* Nominal cord pitch is 15 mm for highlighted belt configurations.																					
a Check for suitable troughability (see Clause 7.6).																					
b Number of cords, cord diameter, cord strength and cord pitch to be determined in consultation with the manufacturer [see Clause B.2 (k)].																					
The minimum cord breaking force shall be calculated in accordance with Clause 5.1 .																					

Table 2 — Designation and suggested parameters of conveyor belting of elastomeric and steel cord construction (Historical)

Belting design- nation	Steel cord belting reinforcement		Number																
	Cord breaking force, (min.) kN	Cord pitch (see Clause 6.6) mm	Belt width, mm																
			600	650 ^a	750	800 ^a	900	1000 ^a	1050	1200 ^a	1400 ^a	1500	1600 ^a	1800	2000	2200	2500	3000	3200
ST500	7.3	13.8	42	45	52	56	63	70	74	84	99	106	113	128	142	156	178	215	229
ST560	8.2	13.8	42	45	52	56	63	70	74	84	99	106	113	128	142	156	178	215	215
ST630	9.3	13.8	42	45	52	56	63	70	74	84	99	106	113	128	142	156	178	215	215
ST710	10.3	13.8	42	45	52	56	63	70	74	84	99	106	113	128	142	156	178	215	215
ST800	11.6	13.8	42	45	52	56	63	70	74	84	99	106	113	128	142	156	178	215	215
ST900	14.7	15.3	37	40	47	50	56	63	66	76	89	96	102	115	128	141	161	193	207
ST1000	16.5	15.3	37	40	47	50	56	63	66	76	89	96	102	115	128	141	161	193	207
ST1120	18.5	15.3	37	40	47	50	56	63	66	76	89	96	102	115	128	141	161	193	207
ST1250	20.6	15.3	37	40	47	50	56	63	66	76	89	96	102	115	128	141	161	193	207
ST1400	23.1	15.3	37	40	47	50	56	63	66	76	89	96	102	115	128	141	161	193	207
ST1600	29.1	17.3	33	36	42	45	50	56	59	67	79	85	90	102	113	124	142	171	183
ST1800	32.7	17.3	33	36	42	45	50	56	59	67	79	85	90	102	113	124	142	171	183
ST2000	36.4	17.3	33	36	42	45	50	56	59	67	79	85	90	102	113	124	142	171	183
ST2240	41.0	17.3	33	36	42	45	50	56	59	67	79	85	90	102	113	124	142	171	183
ST2500	51.1	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST2800	57.4	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST3150	64.6	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST3550	72.8	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST4000	82.0	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST4500	92.3	19.4	30	32	37	40	45	50	52	60	70	75	81	91	101	111	127	152	163
ST5000	102.0	19.4	—	—	—	—	45	50	52	60	70	75	81	91	101	111	127	152	163
ST5600	113.5	19.4	—	—	—	—	45	50	52	60	70	75	81	91	101	111	127	152	163
ST6300	133.0	20.0	—	—	—	—	43	48	50	58	68	73	78	88	98	108	123	148	158
ST7500 ^b						—	—	—											

Table 2 (continued)

Belting design-nation	Steel cord belting reinforcement		Number																	
			Belt width, mm																	
	Cord breaking force, (min.) kN	Cord pitch (see Clause 6.6) mm	600	650 ^a	750	800 ^a	900	1000 ^a	1050	1200 ^a	1400 ^a	1500	1600 ^a	1800	2000	2200	2500	3000	3200	
^a	Preferred width.																			
^b	Number of cords, cord diameter, cord strength and cord pitch to be determined in consultation with the manufacturer [see Clause B.2 (k)].																			

4.2 Covers

The cover of belting is classified according to grade letters in [Table 3](#) or to property letters as defined in ISO 433, except that where the letters coincide, the requirements of this document shall apply:

Table 3 — Classification grade letters

Grade	Property/function
A	Abrasion resistant.
E	Static electricity conducting.
F	Fire resistant.
M	General purpose.
N	
S	Static electricity conducting and fire resistant.
Z	Special properties (see Note 2).

NOTE 1 ISO 433 property letters include Grades H, D, J, K and L.

NOTE 2 Grade Z includes covers with specific properties if required by the purchaser.

NOTE 3 More than one grade may be used to classify the cover, e.g. E, F.

NOTE 4 In the case of grades E, F and S, the properties/functions apply to the belt as a whole.

4.3 Splicing materials

Splicing materials for the various grades of covers shall be identified using coloured interleaves as per [Table 4](#).

Table 4 — Colours of interleaves

Grade	Colour
A, E, M, N	Blue
F, S	White
Z	Other than blue or white

Refer to the relevant regulatory bodies for regulations that may apply.

5 Construction

5.1 General

The belting shall consist of a single plane of longitudinal steel cords laid parallel to the belting surface surrounded by, and moulded into, an elastomeric matrix. Right-hand and left-hand lay cords shall be placed alternately in the belting. Suggested parameters of conveyor belting are given in [Table 1](#).

NOTE 1 Wherever possible, the suggested parameters shown in [Table 1](#) should be used for belting supplied for new installations. However, intermediate strengths are available. Cord diameters should be selected from the cord manufacturers' specifications in order to meet the minimum breaking force.

NOTE 2 [Table 2](#) is the historical version of the suggested parameters and can still be used.

NOTE 3 In order to rationalize cord diameters or utilize stocked diameters, it will often be necessary to use other parameters. In such cases, the minimum belt strength may be calculated using the following equation:

$$\text{Minimum belt strength (kN/m)} = \frac{1000 \times n \times F}{W}$$

where

- n = the number of cords in the full width of belt.
- F = the minimum guaranteed cord breaking force, in kilonewtons
- W = the nominal belt width, in mm.

Due consideration should be given to the intended splice configuration so that the calculated cord pitch ensures at least 1.5 mm (preferably 2 mm or more) calculated clearance between the cord diameters in the splice.

5.2 Steel cords

The cords shall consist of steel wire ropes, constructed to withstand the effects of flexing during the life of the belting. The tolerance on the specified cord diameter shall be $\pm 3\%$.

The method of determining cord diameter shall be in accordance with [Appendix C](#).

The wires in the raw cords shall be protected against corrosion during transport and storage, and coated if necessary, to provide the required adhesion.

5.3 Cord joints

Within a manufactured length of belting, cord joints shall be avoided as far as practicable, particularly at the edges of belting.

If cords are joined, then —

- (a) not more than one cord in every 50 cords or part of 50 cords shall be joined;
- (b) no cord shall have more than one joint; and
- (c) the longitudinal distance along the belting between joints in different cords shall be not less than 15 m.

NOTE 1 A suggested method of joining cords is described in [Appendix D](#).

NOTE 2 The purchaser should specify whether any cord joints are permitted (see [Clause B.2\(d\)](#)).

5.4 Secondary belting reinforcement

Where required by the purchaser for purposes of increased impact resistance, control of transverse stiffness, or other desirable property, secondary belting reinforcement may be incorporated in the matrix. Such reinforcement shall be included in the cover thickness. For belts with secondary reinforcement, the distance from the cord to the reinforcement shall be no closer than 1.0 mm.

NOTE The purchaser should specify whether secondary belting reinforcement is required (see [Clause B.2\(f\)](#)).

6 Dimensions and tolerances

6.1 Length

The length of belting and the tolerances thereon shall be in accordance with the following requirements:

- (a) The length of belting shall be free from factory-made splices. See [Clause B.2 \(g\)](#).

- (b) When measured in accordance with AS 1334.1, the length of belting required in the endless form (net endless length) and made so by vulcanized splices, shall not vary by more than 0.5 % from the nominated length.
- (c) There shall be no negative tolerance on belting manufactured to a length nominated.

NOTE Where multiple rolls are supplied for use on a given conveyor, the “no negative” tolerance applies only to the overall length.

6.2 Width

6.2.1 Recommended widths

Recommended widths are as set out in [Table 5](#).

Table 5 — Recommended widths

mm				
600	900	1 400	2 000	3 200
650	1 000	1 500	2 200	
750	1 050	1 600	2 500	
800	1 200	1 800	3 000	

6.2.2 Width tolerance

The width tolerance of belting shall be ± 1 %. The permitted maximum variation in width in any one manufactured length of belting shall be 1 %.

6.3 Thickness of belting

Thickness of belting shall be determined in accordance with [Appendix E](#). Variation in thickness in any one belt shall be not more than 5 % of the mean thickness, across the width of the belt.

NOTE Nominal thickness of belting is determined by adding the top and bottom cover thickness to the cord diameter (see [Clause 6.4](#)).

The maximum belt thickness shall be 1.1 times the nominal belt thickness.

6.4 Thickness of covers

The cover thickness shall include any secondary reinforcement.

The cover thickness shall be measured in accordance with [Appendix E](#).

The minimum cover thickness shall be:

- (a) for cover thickness ≤ 20 mm, not be less than the specified cover thickness;
- (b) for cover thickness > 20 mm, equals the greater of $a_{\min} = 0.95 \cdot a_1$, or $a_{\min} = a_1 - 1.5$ mm;
 a_1 = nominal top cover thickness.

Thickness of the cover quality compound, including any secondary reinforcement, shall be not less than the nominated minimum cover thickness less one-quarter of the cord diameter (see [Figure E.2](#)).

NOTE 1 The thickness of covers as nominated (see [Clause B.2\(e\)](#)).

NOTE 2 The nominal cover thickness should not be less than 70 % of the cord diameter, and in any event, should not be less than 4 mm.

6.5 Vertical cord location

When belting is tested in accordance with [Appendix E](#), no cord shall deviate from the centre-line by more than 1.5 mm, and not more than 5 % of the cords shall deviate by more than 1 mm.

6.6 Cord pitch

Cords should be evenly spaced across the width of the belting. When belting is tested in accordance with [Appendix G](#), the tolerance on any individual cord pitch compared to the average cord pitch shall be ± 1.5 mm, except that 5 % of the cords may exceed this tolerance by not more than 10 % of the mean spacing. In addition, no part of the outer cords shall be less than 15 mm or greater than 50 mm from the edge of the belting, and the variation in the edge rubber width shall be not more than 10 mm on any one edge.

7 Physical properties

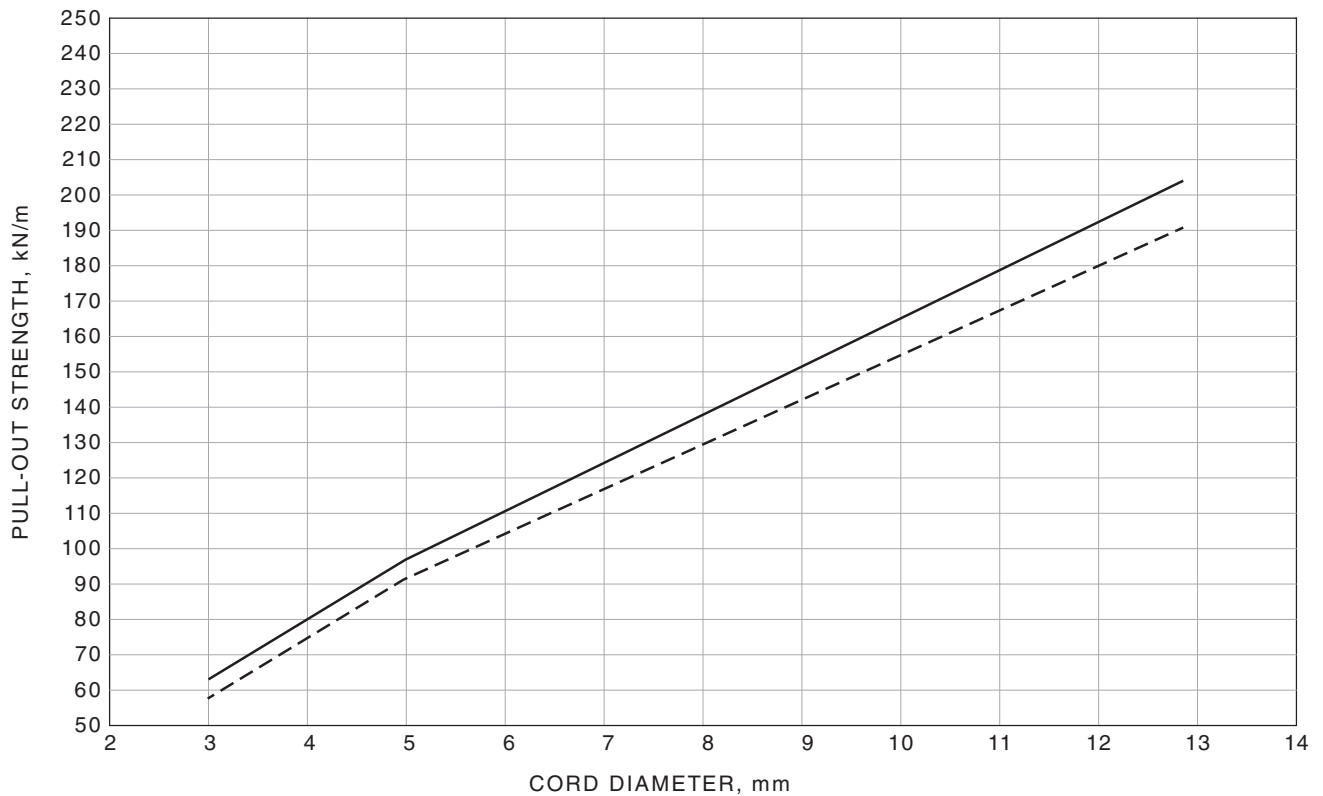
7.1 Cord breaking force

The method for the determination of the cord breaking force shall be in accordance with ISO 7622-2. The breaking force of the cords shall be not less than the minimum value used for the determination of belt designation.

7.2 Static pull-out strength

When determined in accordance with [Appendix H](#), the average force required to pull the cords from the matrix shall be not less than the value derived from [Figure 1](#) for the particular cord diameter used in the manufacture of the belting.

NOTE If required, ISO 7623 may be used for high strength belts.



Key

- Static pull out strength
- Static pull out strength after reheating

Figure 1 — Static pull-out strength of steel cord

7.3 Pull-out strength after reheating

When determined in accordance with [Appendix H](#), except that the test pieces shall have been preconditioned immediately prior to mounting in the machine, the average pull-out strength shall be not less than 75 % of the average pull-out strength obtained in [Clause 7.2](#) and, in any event, shall be not less than the value derived from the “----” line in [Figure 1](#).

NOTE The applicability of values obtained from [Figure 1](#) for cord diameters outside the range 3.0 mm to 13.0 mm is yet to be established. In such cases, the required pull-out strengths should be specified by the purchaser (see [Clause B.2\(i\)](#)).

7.4 Properties of covers

7.4.1 Tensile strength, elongation and abrasion of covers

When covers are tested in accordance with AS 1683.11, the tensile strength and elongation at break shall conform to the requirements of [Table 6](#), for the grade of covers, as appropriate.

When tested in accordance with AS 1683.21, with the test piece rotating, the maximum abrasion loss of the covers shall conform to the values given in [Table 6](#), appropriate to the grade of cover.

NOTE Tensile strength, elongation and abrasion are not always sufficient in themselves to determine the suitability of the belt cover for a particular service.