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FOR INFORMATION ONLY
This is a translated manuscript on
And much under no ** DIN 22102
Regard as an ** part 1
****

Conveyor belts with textile plies for bulk goods ; Dimensions , specifications, marking

With DIN 22102 Part 2/04.91
Replaces DIN 22102/09.70

See Explanations for correlation with International Standard ISO 251:1987, published by the International Organisation for Standardisation (ISO)

Dimensions in mm

1. Scope

This standard applies to conveyor belts with one or more plies of woven textile fabric for transporting bulk goods.

For conveyor belts for use in coal mining see DIN 22109 Part 1, Part 2 and Part 4 to Part 6

Rubber Technology Standards Committee (FAKAU) in the Deutsches Institute for Normung e.V. (DIN) (German Standards Institute)
Mining Standards Committee (FABERG) in DIN

2. Construction of belts

Conveyor belts with textile plies for bulk goods have
-one ply
-or two plies with an interlayer 1 to 2 mm thick
-two or more plies bonded together with bonding layers of elastomeric material
-edges as required

3. Types of belt

Table 1 Types of belt for bulk goods, with one, two or more plies

	Types of belt												
Conveyor belts with one ply	200/1	250/1	315/1	400/1	500/1	630/1	800/1	1000/1	1250/1	1600/1	2000/1	2500/1	3150/1
Conveyor belts with two plies	200/2	250/2	315/2	400/2	500/2	630/2	800/2	1000/2	1250/2	1600/2	2000/2	2500/2	3150/2

Conveyor belts with more than two plies			315/3	400/3	500/3	630/4	800/4	1000/5	1250/5	1600/5	2000/5	2500/5	3150/5
The symbol for the type of belt includes the minimum breaking load * of the belt (N /mm width of belt) and the number of plies													

When selecting the type of belt, the lose of breaking strength * in the joint shall be taken into account, as in DIN 22101,using the values given in Table 2

Table 2 Loss of breaking strength

Number of plies	Loss of breaking strength in the joint *
1	0.20
2	0.20[1)] 0.50[1)]
3	0.33
4	0.25
5	0.20
1) Combination with reinforcement interlayer and 2-step joint 2) Without reinforcement interlayer	

4. Symbols and units

Symbol	Meaning, comments	Unit
A	Abrasive wear of covers	mm^3
B	With of belt	mm
F	Tensile force	N
F_B	Breaking load (corresponds to Fn in DIN 53815)	N/mm
F_{Bmin}	Minimum breaking load	N/mm
F_V	Pre-tension load	N/mm
F_{10}	Standard load	N/mm
L_0	Initial measured length	mm
T	Resistance to separation	N/mm
b_1	Finger width	mm
f	Sag	mm
l_a	Skive	mm
l_d	Length of covering fabric	mm
?l_c	Finger length	mm
?l_{st}	Minimum step length	mm
?l_u	Length of overlap	mm
l_v	Length of joint	mm
?n_{st}	Number of steps	–
*	Loss of breaking strength in the joint	–

S_1	Thickness of belt	mm
S_2 S_3	Auxiliary parameters for determining the thickness of covers (TS ,LS)	mm
S_4	Thickness of interlayer	mm
S_5	Thickness of one ply	mm
C_{BCZ}	Elongation with static loading under standard load (%) (measured at a definite percentage of minimum breaking load)	–
?C_R	Elongation at break of covers (%)	–
?O_R	Ultimate tensile strength of covers	N/mm^2

5. Dimensions, definitions

Width of belt

Table4 Width of belt

Width of belt	Tolerance
300 400 500	±5
650 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200	±1%

5.2 Thickness of belt

The thickness of the belt depends on its construction, and shall be agreed between the manufacturer and user. The actual dimension shall not differ from the agreed nominal thickness by more than ±1 mm in belts up to10mm thick, or by more than ±10% of the thickness in belts more than 10mm thick..

5.3 Thickness of covers

Thickness of covers in mm for carrying face (TS) and backing face (LS):

2/1; 3/1; 4/2; 6/3

Other thicknesses can be agreed, depending on the loading and taking into account the requirements of DIN 22101. In such cases the ratio TS/LS should not be greater

than 3:1 so as to prevent excessive bulging of the belt.
The actual thickness of the covers may be less than the nominal value
-- by 0.2 mm for thicknesses of up to 4 mm
-- by 5% for thicknesses above 4 mm
There are no specified values for thicknesses above the nominal values

5.4 Length of belt
The length of the belt shall be fixed by agreement.

The tolerances for length, measured on the slack belt, are given in Table 5 and 6.

Table 5 Tolerance for endless belts

Inside length	Tolerance
Up to 15000	±50
From 15000 to 20000	±75
Above 20000	±0.5%

Table 6 Tolerance for open belts

How delivered	Tolerance %
As one length	+2.5 0
In several lengths, Each single length For the sum of all Single lengths	±5 +2.5 0
Stock lengths	±5

5.5 Edge of belt
The edges of the belt are the zones at the edge of the conveyor belt without reinforcement. These edges shall be up 15 mm wide.

5.6 Description for ordering
400m conveyor belt, 1000 mm wide, ply material polyester (E) in the longitudinal direction and polyamide (P) in the transverse direction, minimum breaking load 1000 N/mm belt width, with 5 plies with carrying face/backing face thickness ratio4/2, covers of type ?2 and special feature K:

400m Conveyor belt DIN22102-1000-EP-1000/5 4/2 ?ZX
The symbol for the type of cover is omitted for belts with special features T, G, A and C

6 Specifications

6.1 Minimum breaking load

Table 7 Minimum breaking load

Minimum breaking load $?F_{Bmin}$ (N/mm belt width)												
200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150

6.2 Elongation under standard load

Table 8 Elongation under standard load

Minimum breaking load (N/mm belt width)	Elongation under standard load(static loading) % mix
200 250 315 400 500	1.5
630 800 1000 1250	2.5
1600 2000 2500 3150	3
The standard load is 10% of min, breaking load	

The elongation values apply to conveyor belts with polyester (E) as the longitudinal ply material. Elongation values may be different for other longitudinal ply materials.

6.3 Ultimate tensile strength, elongation at break and abrasive wear of covers

Table 9 Ultimate tensile strength, elongation at break and abrasive wear

Type of cover	Tensile strength N/ mm^2 min	Elongation at break % min	Abrasive wear mm^3 max
W	18	400	90
X	25	450	120
Y	20	400	150
Z	15	350	250

The above Table gives a selection of test criteria, Other criteria, e.g. tear resistance, may be used for the evaluation of covers

Reliable conclusions on the behaviour of covers in practical operation e.g. wear properties or resistance to damage by cutting, cannot be reached solely on the basis of these values.

These values do not apply to conveyor belts with special feature T, G, A or C

6.4Resistance to separation

Table 10 Resistance to separation

Resistance to separation N/mm min		
Between plies	?Between covers and plies	
	?For Covers 0.8-1.5mm thick	?For Covers Above 1.5 mm thick
5	3.5	4.5

No single value shall be more than 1 N/mm below these values

The maximum permissible single value shall be 16 N/mm for conveyor belts with a minimum breaking strength of up to 1250 N/mm and 20 N/mm for belts with a minimum breaking strength above that value.

Different values are permissible in conveyor belts with special features T, G, A or C

6.5 Troughability

Troughability is given by the ratio

$$\frac{\text{Deflection } f}{\text{Belt width } B}$$

The minimum values of f/B with 3 idler rollers of the same dimensions as specified in DIN 22107 are given in Table11

Table 11 Minimum values of f/B

Inclination of side idler rollers	F/B min

20°	0.08
25°	0.10
30°	0.12
35°	0.14
40°	0.16
45°	0.18
50°	0.20
55°	0.23
60°	0.26

6.6 straight running

with bearings perfectly adjusted under no-load condition and when loaded in the middle of the belt, conveyor belts shall not drift laterally off center by more than the amounts given in table 12

table 12 permissible lateral travel

Belt width from table 4	Permissible lateral travel
up to 800	±40
1000	±50
1200	±60
1400	±70
?1600 to 3200	±75

6.7Fabric joints

6.7.1 Fabric joints along the belt

Table 13 number of fabric joints

Belt width from Table 4	No.of lengthwise fabric joints for belts with			
	One ply	Two plies	More than 2 plies	
			Each outer ply	Each inner ply
Up to 800	_	_	–	1
1000 1200			1	2
1400 1600		By agreement		
1800 2000			2	2
2200 to3200			3	3

Fabric joints shall be at least 100mm from the outer edge of the fabric core
In wide conveyor belts with two or more joints in the same ply, the spacing shall be at least 200mm. The spacing between joints in two fabric plies on top of one another shall be at least 100mm

6.7.2 fabric joints across the belt
In conveyor belts with two plies, any required fabric joints shall be constructed in such a way as to ensure, that the tensile load transmitted is appropriate to the minimum breaking load of the belt.
In conveyor belts with several plies, the inner plies shall not have more than two joints in each ply in a 100-m length of belt.
Joints in adjacent plies shall be at least 2 m apart.
Joints in the same ply shall be at least 5 m apart, joints shall be angles at 45 to 70 to the longitudinal axis of the belt and shall not overlap.

6.8 Materials
6.8.1 plies (traction carriers)
Traction carriers shall be made of suitable materials.

Table 14 Code letters for ply materials

Code letter	Ply material
B	Cotton
Z	Viscose staple fibre
R	Rayon
P	Polyamide
E	Polyester
D	*
G	Glass

If different materials are used for the warp (longitudinal) and weft (transverse), the code letters for both materials shall be stated when ordering. The first letter indicates the material for the warp, the second the material for the weft.
If the warp or weft consists of various materials, the material which is primarily responsible for its strength, is placed first and separated by a "/" from the code letters for the other materials.
Non-load bearing covering and/or binding warps shall also be given, and separated from the warp section by"-".

6.8.2 Covers, interlayers and bonding layers
Elastomers (e.g. natural rubber, synthetic rubber or mixtures there of shall be used for covers, interlays and bonding layers)

6.9 Ageing

After accelerated ageing, the mean values for ultimate tensile strength and elongation at break of the covers and for resistance to separation shall be not more than 25% below the values in the condition as delivered.
Different values are permissible in conveyor belts with special properties T, G, A or C.

6.10 Fire resistance
As specified in DIN 22103,only for conveyor belts with special properties S and K, which are not used in coal mining

6.11 antistatic properties
As specified in DIN22104, only for conveyor belts special properties E, S and K

7 Testing
Conveyor belts shall be tested as specified in DIN 22102 part 2

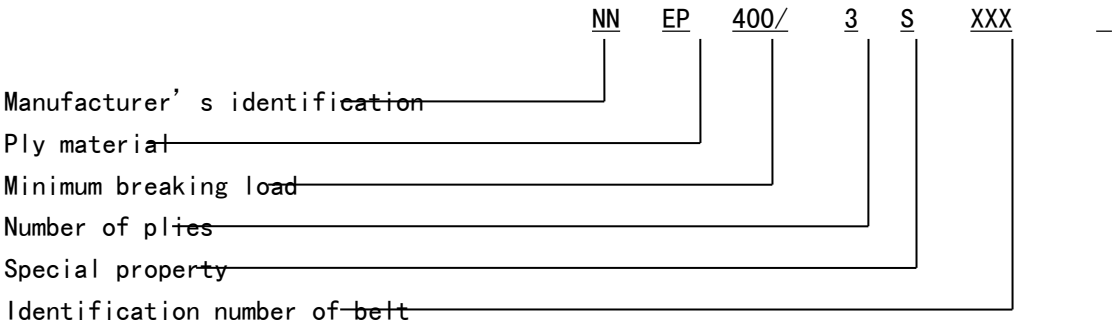
8 Marking
If a marking has been agreed between manufacturer and user, it shall be effected by marking one of the covers with the following sequence of symbols:
-Manufacturer’s identification
-Ply material
-Minimum breaking load (N/mm width of belt)
-Number of plies
-Special property (if necessary)
-Identification number of belt

Table 15 code letters for special properties

Code letter	Special properties
E	With antistatic covers
K	With antistatic covers, and fire resistant with covers
S	Fire resistant with and without covers and with antistatic covers
T	Heat resistant
R	Cold resistant
G	Oil-and grease-resistant
A	For foodstuffs
C	For chemical products

Characters of type 1 E 28 as specified in DIN 1451 part 3 shall be used for the marking letters and numbers, according to the width of the belt.
The code groups shall be separated by spaces.
Belts shall be marked at intervals of 10 m.
The type and size of marking shall be agreed

Example of marking:



9 Joints in belts

As specified in DIN22102 part 3

Quoted standards

DIN 1451 Part 3 character types, sanserif, printing types for marking DIN

DIN 22101 conveyor belts for bulk goods, principles for calculation and design

DIN 22102 part 2 conveyor belts with textile plies for bulk goods, testing

DIN 22102 part3 conveyor belts with textile plies for bulk good, permanent joints

DIN22103 fire resistant conveyor belts, specifications, testing

DIN22104 antistatic conveyor belts, specifications, testing

DIN22107 continuous conveyors, arrangement of idler rollers for conveyor belts for bulk goods, principal dimensions

DIN22109 part1 conveyor belts with textile plies for coal mining, PVG or PVC conveyor belts with one ply for below ground, dimensions, specifications

DIN22109 part 2 conveyor belts with textile plies for coal mining, rubber or PVC conveyor belts with two plies for below ground, dimensions, specifications

DIN 22109 part 4 conveyor belts with textile plies for coal mining; rubber conveyor belts with two plies for above ground, dimension, specifications

DIN 22109 part 5 conveyor belts with textile plies for coal mining, marking

DIN 22109 part 6 conveyor belts with textile plies for coal mining, testing

DIN 53815 testing of textiles; definitions for the simple tensile test

Previous versions

DIN BERG 2102 Part 1 and part 2: 10.34

DIN 22102 part 1:09.43, 01.52

DIN 22102 part 2:09.43, 10.51

DIN 22102: 03.68,09.70

Amendments

The following amendments have been made to DIN 22102/09.70

a) The title of the standard has been changed
b) The stand has been divided into two. Parts and joints in belts have been included
c) The stand has been adapted to the current state of technology

Explanations
As regards widths and tolerances on length, this standard correspond to ISO 251:1987
en: conveyor belts-widths and lengths
ge: * and *

International patent classification
B 65 G 15/34
G 01 B 21/60
G 01 L 5/00

小注：看不明白的单词已用*代替。
不确定的单词前已用?标明