

INTERNATIONAL STANDARD

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

*Courroies transporteuses à câbles d'acier — Adhérence des câbles dans
l'enrobage — Essais à l'état original et après traitement thermique*



Reference number
ISO 7623:1996(E)

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7623 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*.

This second edition cancels and replaces the first edition (ISO 7623:1984), which has been technically revised.

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

1 Scope

This International Standard specifies a method for determining the bond strength of metal cords to their surrounding coating, either in the initial state or after thermal treatment.

It applies exclusively to metal-carcass conveyor belts.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 471:1995, *Rubber — Temperatures, humidities and times for conditioning and testing*.

ISO 7622-2:1984, *Steel cord conveyor belts — Longitudinal traction test — Part 2: Measurement of tensile strength*.

3 Principle

Measurement of the force required to tear one of the steel warp cords out of the carcass by applying tensile stress along the axis of the cord.

4 Apparatus

4.1 Dynamometric tensile testing machine with jaws, in accordance with that described in ISO 7622-2.

4.2 Press, having two heated platens, temperature controlled to $145\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, and capable of applying a pressure on the specimen (see clause 6) of between 1 MPa and 5 MPa.

5 Test conditions

Unless otherwise specified and cited in the test report, the tests shall be carried out at a temperature of $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and at a relative humidity of $(50 \pm 5)\%$, in accordance with ISO 471.

5.1 Test in the initial state

Carry out the test described in clause 8 at least five days after manufacture of the belt.

5.2 Test after thermal treatment

Carry out the test described in clause 8 after thermal treatment of a sample of the belt by heating it between the two platens of the press (4.2) for $150\text{ min} \pm 1\text{ min}$, at a temperature of $145\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and at a surface pressure of about 1 MPa but not exceeding 5 MPa.

NOTES

1 An adequate surface pressure can be obtained using spacers of a thickness of the belt test piece minus $1\text{ mm} \pm 0,5\text{ mm}$ between the platens of the press.

2 If different temperatures or pressures or the duration of their application are used, details should be specified in the test report.

6 Specimens

Take from the sample of the belt piece undergoing thermal treatment, or not, three specimens of the following dimensions:

- a) length in the longitudinal direction of the belt, L_{min} : 350 mm for cords up to 5 mm in diameter, or 450 mm for cords over 5 mm in diameter;
- b) width: such that the specimen contains five warp cords;
- c) thickness: thickness of the belt including both covers.

In the centre of the specimen, trace the limits of the test length L , defined in table 1.

Table 1— Test length, L , corresponding to the diameter, D , of the warp cords

Dimensions in millimetres		
D		
$D \leq 2$	$2 < D \leq 5$	$5 < D$
L		
25 ± 1	50 ± 2	100 ± 2

Using a knife, remove the cover and weft, if any, along at least 10 mm on either side of the test length L , so that the five warp cords are laid bare on both sides.

On one side, cut the centre cord as close as possible to the test area (see figure 1).

On the other side, cut the four cords on either side of the centre cord, as close as possible to the test area (see figure 1).

With a knife, detach the coating at the ends of the cut cords.

Take care not to damage the cord to be bond-tested.

7 Conditioning

Condition the test specimens, selected in accordance with clause 6, for a period of not less than 3 h at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and 50 % relative humidity, immediately prior to testing in accordance with clause 8.

8 Procedure

Set the distance between the jaws of the testing machine (4.1) at $250\text{ mm} \pm 10\text{ mm}$.

Place the ends of the specimens between the jaws and, for jaws with self-tightening wedges, check that the various parts of these jaws move freely and smoothly.

Apply a continuous tensile stress to the specimen (with no pauses) at a speed of $(100 \pm 10)\text{ mm/min}$.

Maintain the tractive force until the steel cable is completely torn out.

Note the highest tractive force, which is defined as the tear-out force.

Repeat the test on the two other specimens.

9 Expression of results

Calculate the arithmetical mean value of the tear-out force, expressed in newtons, of the three specimens tested, i.e.

$$F = \frac{F_1 + F_2 + F_3}{3}$$

The cord-to-coating bond strength, A , is expressed in newtons per millimetre by the formula

$$A = \frac{F}{L}$$

where L is the test length in millimetres.

10 Test report

The test report shall contain the following information:

- a) reference to this International Standard;
- b) identification of the belt tested and whether it is in the initial state or thermally treated state, or another state [see e)];
- c) cord-to-coating bond strength, expressed as indicated in clause 9;
- d) the test temperature if other than $23\text{ }^{\circ}\text{C}$, and the test relative humidity if other than 50 %;
- e) details of any departure from the standard thermal treatment specified in 5.2.

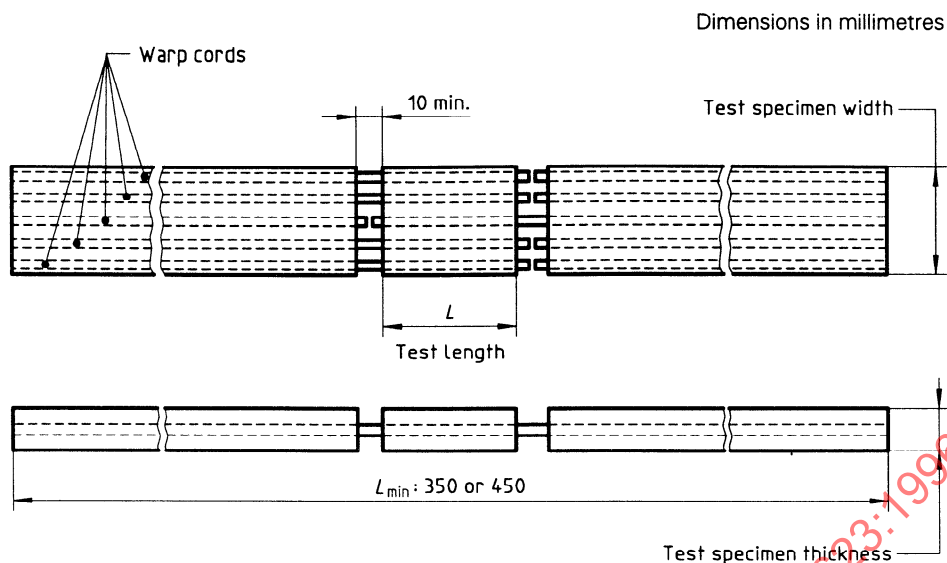


Figure 1 — Specimen for the bond test of the steel cord to its coating

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