INTERNATIONAL STANDARD

ISO 703-1

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Conveyor belts — Transverse flexibility and troughability —

Part 1:
Test method

Courroies transporteuses — Flexibilité transversale et aptitude à la mise en auge —

Partie 1: Méthode d'essai

Reference number
ISO 703-1:1999(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO 703 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 703-1 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts),* Subcommittee SC 3, *Conveyor belts*.

This first edition of ISO 703-1, together with ISO 703-2, cancel and replace ISO 703:1988, of which they constitute a technical revision.

ISO 703 consists of the following parts, under the general title *Conveyor belts — Transverse flexibility and troughability*:

— *Part 1: Test method*

— *Part 2: Performance requirements*

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Introduction

A large number of conveyor belts work in the shape of a trough. If a conveyor belt is too stiff transversely it does not rest on the central idler roller when unloaded. Its balance is then unstable and it is subject to lateral travel, which may cause its destruction.

It is possible to make a section of the conveyor belt take on the shape of a trough under its own mass, by suspending the section by its edges. However, this does not necessarily indicate what happens when the conveyor belt is not carrying a load.

The results obtained from this method of test will however allow an assessment to be made as to whether the troughing characteristics of the conveyor belt are suitable for the angle of inclination of the side idler rolls of the installation on which the belt is to be installed.

Conveyor belts — Transverse flexibility and troughability —

Part 1:
Test method

1 Scope

This part of ISO 703 specifies a method for determining the transverse flexibility (in terms of troughing ability) of conveyor belts. This method is not suitable or valid for light conveyor belts as described in EN 873.

NOTE The transverse "flexibility" determined by this method is only indirectly associated with the inverse of flexural modulus as specified in ISO 178, *Plastics — Determination of flexural properties*. Nor does it take account of the differences in "flexibility" as exhibited by three-point and four-point bending, which takes into account the flexural strain and the thickness of the test piece.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 703. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 703 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 583-1:—[1)], *Conveyor belts with a textile carcass — Total thickness and thickness of elements — Part 1: Methods of test*.

EN 873, *Light conveyor belts — Principal characteristics and applications*.

3 Symbols

F_1 vertical deflection in the test piece, in millimetres (see Figure 1 and Figure 2)

F vertical deflection in the test piece corrected for the belt thickness, in millimetres

L length of the test piece when laid flat, in millimetres

NOTE It is equivalent to the full width of the installed conveyor belt.

e thickness of the test piece, in millimetres (see Figure 2)

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1) To be published. (Revision of ISO 583:1990)

4 Principle

A test piece, consisting of a transverse section of belt (L) is suspended at both ends, with the carrying face uppermost, so that the upper edges of these ends are in the same horizontal plane.

The troughability (transverse flexibility) is determined by measuring the maximum deflection (F) of the test piece under its own weight. It is expressed as the ratio of F/L.

5 Apparatus (see Figure 1)

5.1 Two rigid horizontal bars, conveniently supported. The unsupported length of the bars shall be greater than the test length (L).

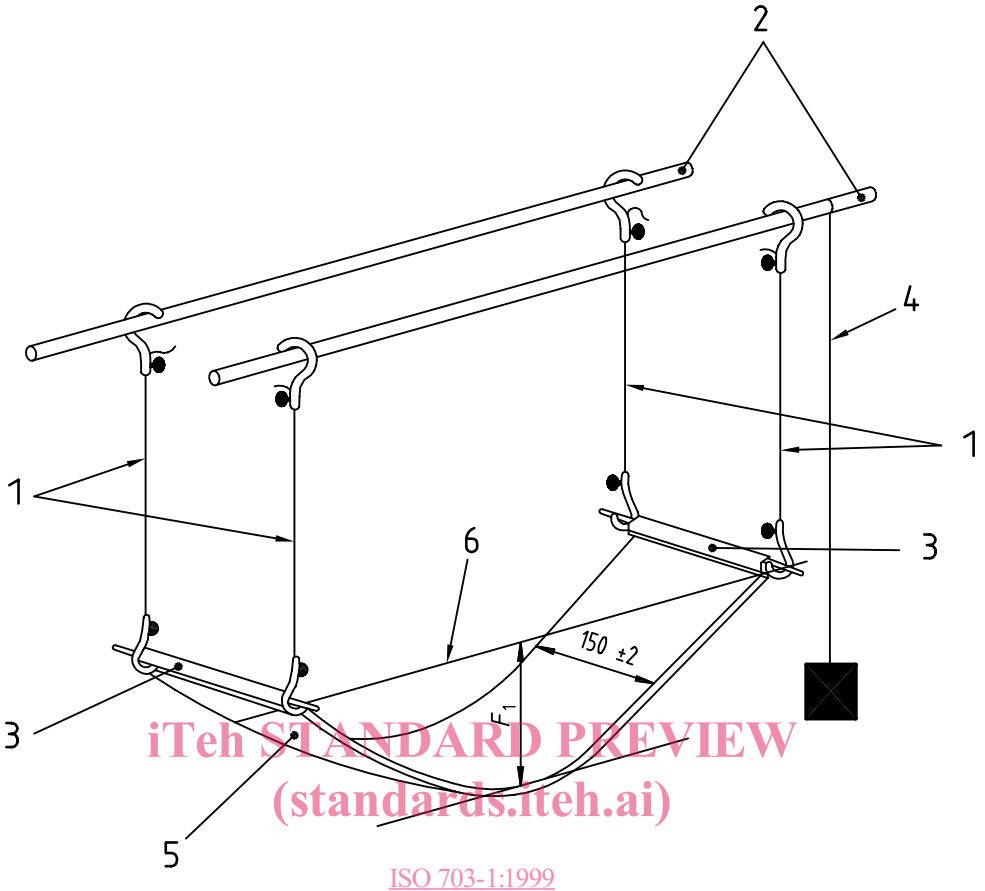
5.2 Two clamps, 150 mm long, to be attached to the ends of the test piece, with suspension lugs for attachment to the suspending wires. The clamps shall be sufficiently rigid to maintain the width of the test pieces free from curvature, and shall exert no bending moment which might influence the deflection of the test piece.

5.3 Four steel suspension wires, of equal length, each with adjustable stirrups on both ends for attachment to the horizontal bars and clamps.

NOTE The attachments to the horizontal bars and clamps should not impede the free movement of the adjustable stirrups when maintaining the suspension wires in the vertical during the test.

5.4 Means of measuring the deflection (F_1) to the nearest millimetre (see Figure 1).

Dimensions in millimetres



Key

1 Four steel suspension wires
2 Two rigid horizontal bars
3 Two clamps each 150 mm long
4 Plumb line
5 Test piece (see 6.1)
6 Datum line

Figure 1 — Typical apparatus for measuring transverse flexibility (troughability)

6 Test piece

6.1 Preparation

Select the test piece at least 16 h after the manufacture of the belt.

The test piece shall comply with the following conditions:

a) form: rectangular parallel piped ($L \times 150$ mm $\times e$);

b) length (L): overall width of the installed conveyor belt, when laid flat, in millimetres;

c) width: (in the longitudinal direction of the belt) = 150 mm;

d) thickness (e): overall thickness of the conveyor belt in millimetres, including covers as determined in accordance with ISO 583-1.

6.2 Conditioning

The tests shall start not less than 16 h after manufacturing. This time includes 8 h for conditioning at one of the temperatures specified below:

— (23 ± 2) °C or (20 ± 2) °C (temperate temperature control only);

— (27 ± 2) °C (tropical temperature control only).

The tests shall be conducted at the same temperature as used for conditioning. A certain humidity for conditioning and testing is not required.

The temperature at which the test pieces were conditioned and tested shall be reported in the test report.

7 Procedure

Immediately prior to the commencement of the test ensure that the clamps are free to swivel and do not exert a bending force on the test piece.

Measure the flat length (L) of the test piece in millimetres.

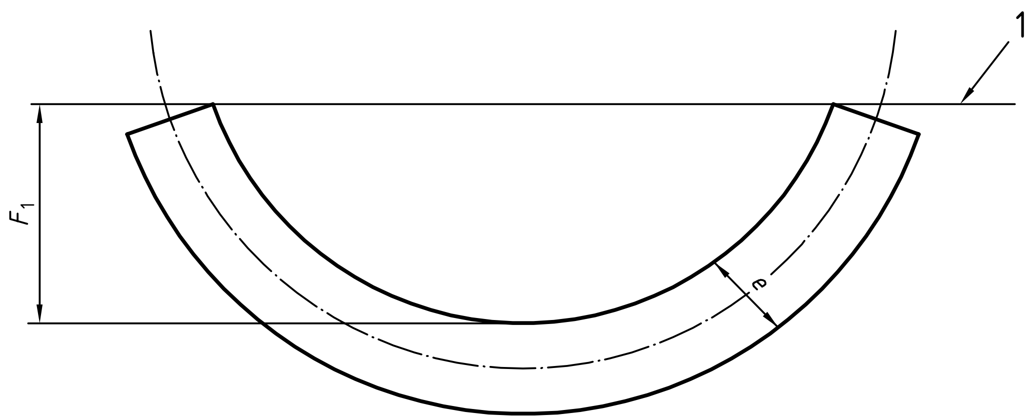
Measure the thickness (e) of the test piece in millimetres in accordance with ISO 583-1.

Fit the test piece, carrying face upper most, while in the flat position, into the suspended clamps.

Allow the test piece to fall under its own mass from the flat position into the troughed position.

Adjust the apparatus so that the suspending forces act vertically throughout the test period.

After 5 min, measure the vertical deflection of the test piece (F_1) (see Figure 2) and add to this measurement the dimension 0,5e to give the value for F.



Key

1 Datum line

Figure 2 — Determination of deflection F_1

8 Calculation and expression of results

Calculate the value of F from the following equation:

$$F = F_1 + 0{,}5\,e$$

Express the results of the measurements taken in the form of $\frac{F}{L}$

9 Test report

The test report shall contain the following information:

a) reference to this part of ISO 703;

b) identification of the conveyor belt tested (e.g. type, manufacturer);

c) the test length (L) (see clause 3);

d) the value of the ratio F/L;

e) the thickness of the test piece (e) (see clause 3);

f) the conditioning and test temperature (see 6.2);

g) date of the test, test centre and signature of tester.