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Conveyor belts — Troughability — Characteristics of transverse flexibility and test method

Courroies transporteuses — Aptitude à la mise en auge — Caractéristiques de flexibilité transversale et méthode d'essai

Reference number
ISO 703 : 1988 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 703 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts).*

This second edition cancels and replaces the first edition (ISO 703 : 1975), of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Conveyor belts — Troughability — Characteristics of transverse flexibility and test method

0 Introduction

A large number of conveyor belts work in the shape of a trough. If a 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 belt take on the shape of a trough under its own mass, by suspending the section by its edges. This indicates what happens in use when the belt is unloaded.

1 Scope and field of application

This International Standard specifies the troughability characteristics of conveyor belts and the method for determining their transverse flexibility which allows calculation of troughability.

2 Requirements

The minimum value of deflection, F, depends on the angle of inclination of the side idler rollers of a belt conveyor. In the case of a belt supported by three identical idler rollers, the minimum required values of the ratio of deflection, F, to the belt width, L, are given in the table.

Table

Inclination of side idler rollers	Minimum values of ratio $\frac{\text{deflection } F}{\text{width } L}$
20°	0,08
25°	0,1
30°	0,12
35°	0,14
40°	0,16
45°	0,18
50°	0,2
55°	0,23
60°	0,26

For concave curve belt conveyors, the values given in the table should be checked for adequacy.

3 Principle of method

A test piece consisting of a transverse full width section of belt 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 suspending forces act vertically and the deflection of the test piece under gravity is unaffected by any other external force. The transverse flexibility is determined by measuring the maximum deflection of the test piece under its own mass; it is expressed as the ratio of the deflection to the flat length of the test piece (i.e. the width of the belt).

4 Apparatus (see figure 1)

4.1 Two rigid horizontal bars conveniently supported over a base. The unsupported length of the bars shall be greater than the width of the belt being tested.

4.2 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 piece free from curvature, and shall exert no bending moment which might influence the deflection of the test piece.

4.3 Four relatively inextensible suspension wires, fitted with adjustable stirrups on each end for attaching to horizontal bars and clamps.

NOTE — It is important that the suspension length of each wire is the same, although the actual length is not so important. Also it is essential that the attachments to the horizontal bars and clamps reduce friction forces to a minimum when maintaining the suspension wires vertical during the test.

4.4 Measuring means for the deflection of the test piece.

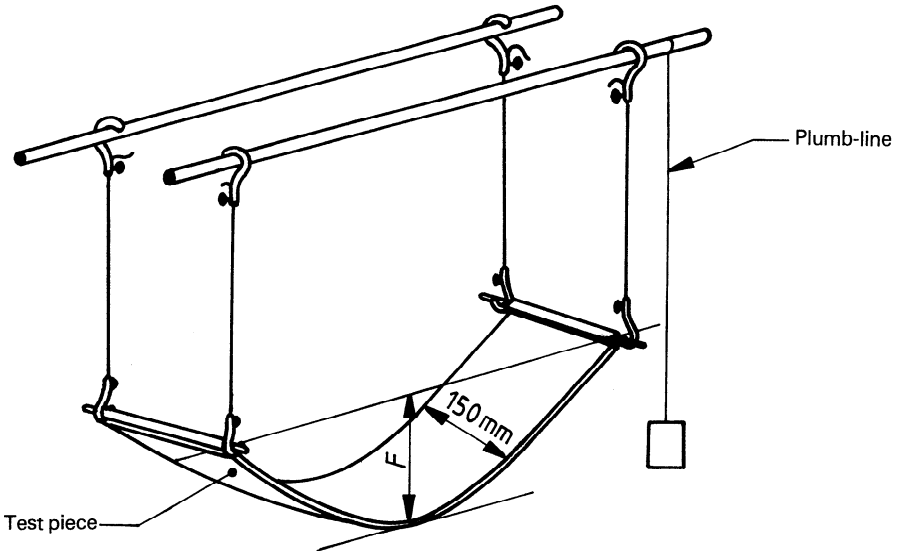

Figure 1 — Apparatus for measuring transverse flexibility

Figure 2 — Determination of deflection F

5 Test piece

5.1 Preparation

Select the test piece at least 5 days after the manufacture of the belt.

The test piece shall comply with the following conditions:

— form : rectangular parallelepiped;

— length (belt transverse direction) : the flat width L of the belt;

— width (belt longitudinal direction) : 150 mm;

— thickness : thickness, e, of the belt, with covers.

5.2 Conditioning

Unless otherwise stated, the test piece shall be conditioned before the test for at least 24 h at a temperature of 23 ± 2 °C. During this period, it shall be maintained flat so as to remove residual curvature.

NOTE — In the case of belts with a textile carcase, a temperature of 20 ± 2 °C may be selected, by agreement between the parties.

6 Procedure

6.1 Unless otherwise agreed, the test shall be performed at a temperature of 23 ± 2 °C.

6.2 Prior to the test, ensure that the clamps are free to rotate and exert no bending moment on the test piece.

6.3 Measure the flat length, L, and the thickness, e, of the test piece.

6.4 Fit the test piece, carrying face uppermost, while in the flat position, into the suspended clamps.

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

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

6.7 After 5 min, measure the vertical deflection F of the test piece. This deflection is the vertical distance from the end of the test piece to the lowest point on the vertical curve, midway between the top and bottom surfaces (see figure 2).

7 Expression of results

The result shall be expressed by the ratio F/L

where

F is the deflection, in millimetres, taken by the test piece;

L is the flat length, in millimetres, of the test piece (width of the belt).

8 Test report

The test report shall contain at least the following information :

a) reference to this International Standard;

b) identification of the belt tested;

c) length, L, of the test piece;

d) value of the ratio F/L

e) date of the test.

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