INTERNATIONAL STANDARD 703

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Conveyor belts — Troughability — Characteristic and method of test

Courroies transporteuses — Aptitude à la mise en auge — Caractéristique et méthode d'essai

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 41 has reviewed ISO Recommendation R 703 and found it technically suitable for transformation. International Standard ISO 703 therefore replaces ISO Recommendation R 703-1968 to which it is technically identical.

ISO Recommendation R 703 was approved by the Member Bodies of the following countries :

Australia	Egypt, Arab Rep. of	South Africa, Rep. of
Austria	Finland	Spain
Belgium	France	Sweden
Brazil	Germany	Switzerland
Chile	India	Turkey
Czechoslovakia	Italy	United Kingdom
Denmark	Japan	Yugoslavia

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Ireland

No Member Body disapproved the transformation of ISO/R 703 into an International Standard.

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Conveyor belts — Troughability — Characteristic and method of test

0 INTRODUCTION

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

It is possible to make a section of the belt take on the shape of a trough under its own weight, by suspending the section by its edges. This indicates what happens in use when the belt is empty.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the required characteristic of the troughability of conveyor belts and the corresponding method of test.

2 REQUIRED CHARACTERISTIC

The minimum value of the ratio of the deflection F (see figure 1) taken by the test piece during the test, to the flat width L of the belt, shall be equal to 0,05.

NOTE — As an indication, in the case of a belt supported by three identical idler rollers, the required relationship between the ratio F/L and the angle of inclination of the side idler rollers is given by the following table :

TABLE

Angle of inclination of the side idler rollers	Minimum values of the ratio $\frac{\text{deflection } F}{\text{width } L}$
25°	0,06
30°	0,07
35°	0,09
40°	0,12
45°	0,17

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 troughability is determined by measuring the maximum deflection of the test piece under its own weight and 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 2)

4.1 Clamps (See figure 3)

Two clamps hold the ends of the test piece; each clamp shall

a) hold the test piece across a width of at least 140 mm (5.6 in) and to a depth into the clamp of not more than 15 mm (0.6 in);

b) prevent curvature across the end of the test piece;

c) be balanced about a horizontal axis of rotation;

d) permit suspension of the test piece so that the horizontal axis of rotation of each clamp corresponds with a line across the respective end of the test piece midway between the top and bottom surfaces.

4.2 Suspension system for the clamps

This system shall

a) maintain the axes of rotation of the clamps parallel and in the same horizontal plane;

b) permit free rotation of each clamp with frictional forces reduced to a negligible value;

c) be adjustable to make the suspending forces act vertically through the axes of rotation of the clamps.

4.3 Means of measuring the deflection of the test piece (See figure 1)

To ensure the greatest possible accuracy when measuring deflection F, it is recommended that the clamps be suspended at an accurately known distance (A_1 or B_1) below or above a horizontal reference plane so that for the determination of F, it is only necessary to carry out one measurement, i.e. the vertical distances (A_2 or B_2) from the horizontal reference plane to the lowest point on the edge of the surface of the carrying face; this measurement, in

conjunction with the suspension threads length and the belt thickness e (measured with a micrometer), will enable F to be calculated accurately.

5 TEST PIECE

5.1 Preparation

Take 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 : (in the transverse direction of the belt) : the flat width L of the belt;

– Width : (in the longitudinal direction of the belt) : 150 mm (6 in);

– Thickness : the thickness e of the belt, with covers.

5.2 Conditioning

Unless there is agreement to the contrary, the test piece shall be conditioned before the test for at least 24 h at a temperature of 20 ± 2 °C. During this period, it shall be maintained in a flat condition so as to remove residual curvature.

6 PROCEDURE

6.1 Unless there is agreement to the contrary, the test shall be performed at a temperature of 20 ± 2 °C.

6.2 Prior to test, the operator shall satisfy himself that the clamps are free to rotate and will 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 Then allow the test piece to fall under its own weight from the flat position to the troughed position.

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

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 1).

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

In addition to the value obtained for the ratio F/L the value of L shall be reported.

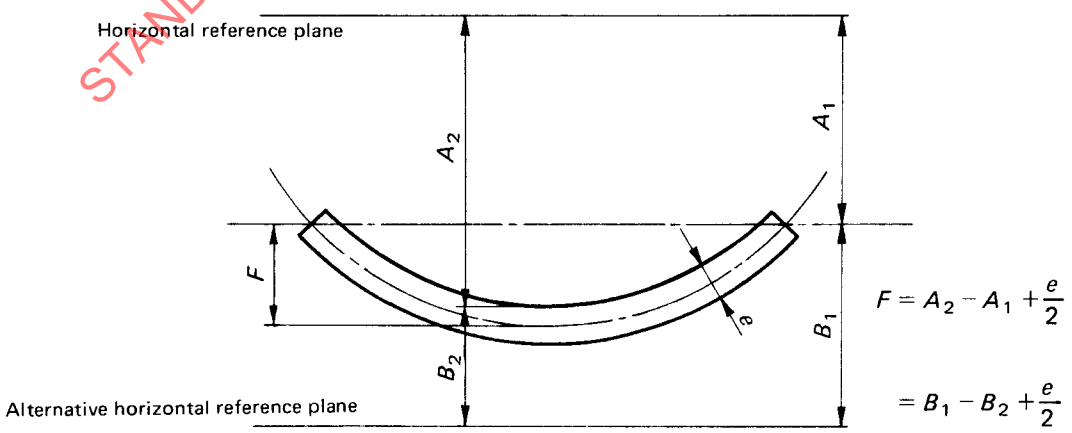

FIGURE 1 – **Determination of deflection** F

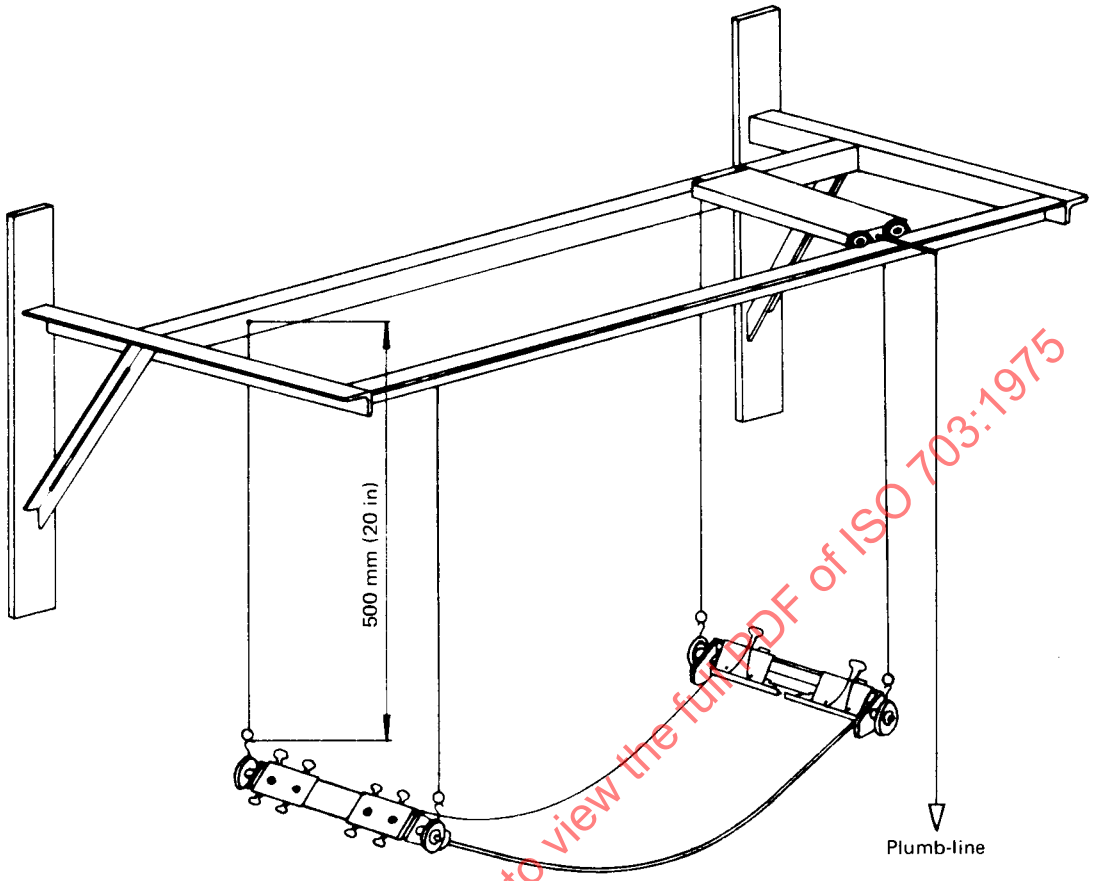

FIGURE 2 – **Apparatus for measuring deflection of test piece**
(Details given only as an indication)

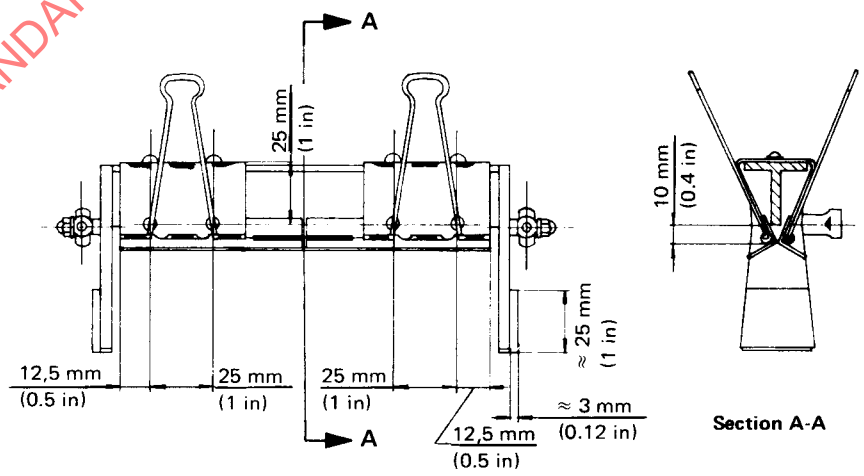

FIGURE 3 – **Clamps**
(Given only as an example)