BRITISH STANDARD

BS EN
1718:1999

Light conveyor belts — Test method for the measurement of the electrostatic field generated by a running light conveyor belt

The European Standard EN 1718:1999 has the status of a British Standard

ICS 53.040.20

National foreword

This British Standard is the English language version of EN 1718:1999.

The UK participation in its preparation was entrusted to Technical Committee PRI/67, Conveyor belts, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 5 and a back cover.

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English version

Light conveyor belts — Test method for the measurement of the electrostatic field generated by a running light conveyor belt

Courroies transporteuses légères — Méthode d'essai pour le mesurage du champ électrostatique engendré par une courroie transporteuse légère en marche

Leichte Fördergurte — Prüfverfahren zur Messung des von einem laufenden leichten Fördergurt erzeugten elektrostatischen Feldes

This European Standard was approved by CEN on 8 November 1998.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 1718:1999 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 188, Conveyor belts, the Secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 1999, and conflicting national standards shall be withdrawn at the latest by July 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

1 Scope

This European Standard specifies a method of test for the measurement of the electrostatic field generated by a running light conveyor belt as described in EN 873.

This dynamic procedure is required since the antistatic behaviour of light conveyor belts can in many cases not always sufficiently be described by measurement of the electrical resistances described in prEN 1637.

2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

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

prEN 1637, *Light conveyor belts — Test methods for the measurement of the electrical resistances.*

prEN 1723, *Light conveyor belts — Determination of the relaxed elastic modulus.*

ISO 22, *Belt drives — Flat transmission belts and corresponding pulleys — Dimensions and tolerances.*

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

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 4287-1, *Surface roughness — Terminology — Part 1: Surface and its parameters.*

3 Principle

The test piece runs under specified conditions and produces an electrostatic field of which the course of its variation with time is recorded.

The test is carried out successively with both sides of the belt in contact with the pulleys.

4 Apparatus

Testing apparatus (see Figure 1) consists of the following main parts.

4.1 Pair of pulleys

The pulleys shall be electrically connected and earthed.

4.1.1 *Material*

Steel.

4.1.2 *Dimensions*

Diameter is 200 mm or larger; rim width is 120 mm.

4.1.3 *Surface finish*

Raw, unplated surface roughness of maximum R_a = 1,6 µm, in accordance with ISO 4287-1. Final coating is of chromium plating.

4.1.4 *Drive pulley*

Fixed, cylindrical.

4.1.5 *Driven pulley*

Moveable for tensioning, crowned in accordance with ISO 22 (h = 0,6 mm).

4.2 Tensioning device

To achieve uniform surface pressures, the test piece shall be loaded according to its $k_{1\,\%}$ value (see Table 1) by means of a suitable tensioning device.

Table 1 — Shaft load required

$k_{1\,\%}$[1)] N/mm	**Shaft load**, F N
≤ 2,5	50
> 2,5 to 10	300
> 10 to 30	900
> 30	As per agreement

[1)] $k_{1\,\%}$ value has to be established in accordance with prEN 1723.

4.3 Drive

The belt runs directly from the drive pulley to the measuring device at a speed of 5 m/s.

4.4 Measuring device

Standard commercial electrostatic field meter with signal output.

4.5 Recording

For example, a y/t recorder.

4.6 Electrostatic field corrections

4.6.1 *Field distortion created by the measuring electrode*

Correction is obtained by equipping the electrode with an earthed steel plate 200 mm × 200 mm (see Figure 1).

Edges all round are bent up with a radius of approximately 10 mm (see Figure 1).

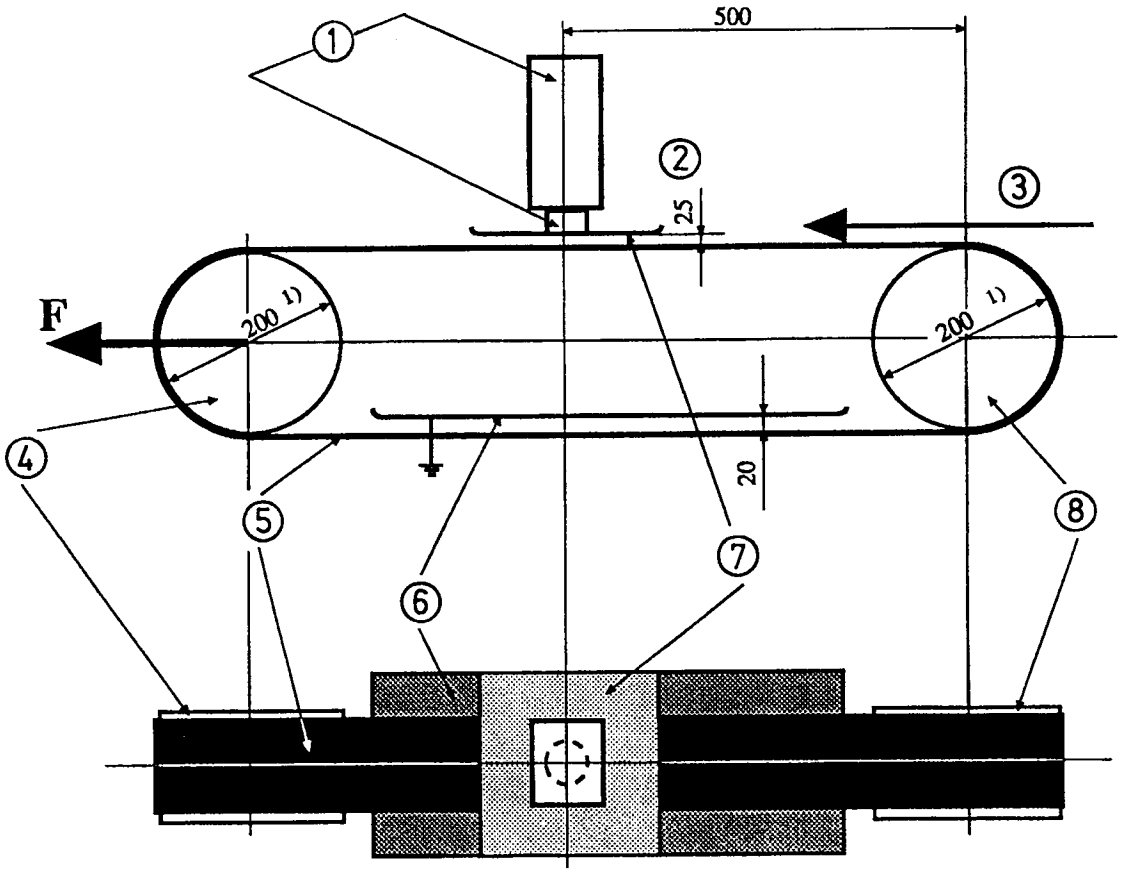
The lower surface of the electrode is flush with the lower surface of the steel plate.

4.6.2 *Field distortion created by the test piece return side*

The test piece return side generates its own field. The field to be measured shall be shielded from it by means of an earthed steel plate 600 mm × 200 mm (see Figure 1).

Edges all round are bent up with a radius of approximately 10 mm (see Figure 1).

Dimensions in millimetres



[1)] Diameter 200 mm or larger: see clause **6**.

1 Measuring device with electrode, diameter 50 mm to 55 mm.
2 Measuring distance of test piece surface not being in contact with pulleys.
3 Direction of run.
4 Driven pulley, movable, crowned.
5 Test piece, endless (2 500 $\pm$ 50) mm $\times$ (100 $\pm$ 1) mm.
6 Earthed steel plate, 600 mm $\times$ 200 mm.
7 Earthed steel plate, 200 mm $\times$ 200 mm.
8 Drive pulley, fixed, cylindrical.

Figure 1 — Basic arrangement of test bench for the measurement of the electrostatic field strength generated by a running light conveyor belt

5 Test piece

5.1 Material

Test piece material shall be new, unused ("virgin"), and shall not be tested earlier than 5 days after manufacture.

It shall exhibit no contamination or superficial damage.

5.2 Dimensions

The endless length shall be $(2\,500 \pm 50)$ mm.

The width shall be (100 ± 1) mm.

5.3 Endless joining

The test piece shall be joined endless according to the producer's standard recommendations.

5.4 Cleaning of the pulleys

The pulleys shall be metallic clean.

5.5 Conditioning

Before testing, expose the test piece for a minimum of 24 h to a test-room climate of (23 ± 2) °C and (50 ± 5) % relative humidity, as specified in ISO 471 and ISO 554.

To obtain results with high-conductivity belts, the relative humidity may have to be reduced to (25 ± 5) %.

6 Procedure

Conveyor belts which, due to their construction, require pulley diameters of more than 200 mm, shall be tested with the smallest diameter admissible, following the manufacturer's indication.

— Check the test-room climate (see **5.5**).

— Clean both pulleys (see **5.4**) and, if necessary, remove any dust from the shielding steel plates.

— Install the endless-joined (see **5.3**) and conditioned (see **5.5**) test piece on the test device, with the normal running side in contact with the pulleys.

— Tension the test piece in accordance with **4.2**.

— Install the recorder.

— Position the measuring device on the centre line of the test piece, 500 mm from the centre of the drive pulley, with a space of 25 mm between the test piece surface which is not in contact with the pulley (see Figure 1).

— Start the test piece and run it from the drive pulley directly to the field measuring device.

— Record the electrostatic field strength E in volts per metre.

— The measurement time shall be 30 min.

— Repeat the procedure, with the other side of the belt in contact with the pulleys.

7 Expression of results

The two significant results within the test period shall be firstly the maximum value reached, and secondly a value judged to be constant (i.e. when a change over the final 10 min is less than 10 %) and these two figures shall be recorded, together with their respective polarities, as the test results in volts per metre. From these values of the field strength E, the appertaining surface potential U in volts shall be calculated as follows:

$$U = E \times a$$

where

a is the distance in metres between the measuring electrode and the conveyor belt surface.

These results are valid for virgin material as per **5.1**.

If more than one measurement on one side is carried out (several measurements on one test piece or several test pieces), the arithmetic mean of the individual values of E in volts per metre shall be taken. All the values are to be indicated.

8 Test report

The test report shall include the following particulars:

a) complete designation of the tested conveyor belt material and manufacturing date;

b) $k_{1\,\%}$ value of the test piece(s);

c) reference to this European Standard, and any necessary exceptions;

d) places from which test piece(s) were taken;

e) test-room temperature and relative humidity;

f) conditioning period;

g) the shaft load in newtons;

h) indication of the belt side in contact with the pulleys;

i) the test results in accordance with clause **7**;

j) date of test.

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