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Light conveyor belts — Determination of the electrostatic field generated by a running light conveyor belt

Courroies transporteuses légères — Détermination du champ électrostatique engendré par une courroie transporteuse légère en marche

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21179 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*.

This International Standard is based on EN 1718:1999, prepared by CEN/TC 188.

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Light conveyor belts — Determination of the electrostatic field generated by a running light conveyor belt

1 Scope

This International Standard specifies a test method for the determination of the electrostatic field generated by a running light conveyor belt according to ISO 21183-1.

This dynamic procedure is required because the antistatic behaviour of light conveyor belts cannot in many cases be sufficiently described by measurement of the electrical resistances in accordance with ISO 21178.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 18573:2003, *Conveyor belts — Test atmospheres and conditioning periods*

ISO 21178, *Light conveyor belts — Determination of electrical resistances*

ISO 21181, *Light conveyor belts — Determination of the relaxed elastic modulus*

ISO 21183-1, *Light conveyor belts — Part 1: Principal characteristics and applications*

3 Principle

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

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

4 Apparatus (see Figure 1)

4.1 Pair of pulleys, as follows:

a) electrically connected and earthed;

b) made of steel;

c) diameter 200 mm or larger, rim width 120 mm;

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d) raw, unplated surface roughness, maximum Ra = 1,6 µm, in accordance with ISO 4287;

e) final coating of chromium plating;

f) drive pulley fixed, cylindrical;

g) driven pulley moveable for tensioning, crowned in accordance with ISO 22 (h = 0,6 mm).

4.2 Tensioning device, such that the test piece can be loaded according to the relevant $k_{1\%}$ value given in Table 1 to achieve uniform surface pressures.

Table 1 — Shaft load required

Modulus of elasticity $k_{1\%}$[a] N/mm	**Shaft load** F N
$k_{1\%} \leqslant 2{,}5$	50
$2{,}5 < k_{1\%} \leqslant 10$	300
$10 < k_{1\%} \leqslant 30$	900
$k_{1\%} > 30$	As per agreement
[a] The value of $k_{1\%}$ shall be established in accordance with ISO 21181.	

4.3 Drive, such that the belt runs directly from the drive pulley to the measuring device at a speed of 5 m/s.

4.4 Measuring device, either an electrostatic field meter with signal output that gives readings of the electrostatic field strength, E, in volts per metre, or a device that gives a direct reading of the surface potential, U, in volts.

4.5 Recording device, e.g. y/t recorder.

4.6 Means of correction for electrostatic fields

4.6.1 Earthed steel plate equipping the electrode, 200 mm × 200 mm, with the edges bent up with a radius of approximately 10 mm, to correct field distortion created by the measuring electrode. The lower surface of the electrode shall be flush with the lower surface of the steel plate. The size and shape of the perforation of the steel plate shall be adapted to the shape of the electrode used. The gap between the electrode and the steel plate shall not exceed 2 mm (see Figure 1).

4.6.2 Earthed steel plate, 600 mm × 200 mm, with the edges bent up with a radius of approximately 10 mm (see Figure 1), to shield the field to be measured from the field distortion generated by the return side of the test piece.

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5 Test piece

5.1 Material

Test piece material shall be new, unused (“virgin”), but shall not be tested sooner than five days after manufacture. It shall be free from contamination and superficial damage.

5.2 Dimension

The test piece shall have an endless length of (2 500 ± 50) mm and a width of (100 ± 1) mm.

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5.3 Endless joining

The test piece shall be joined endlessly according to the manufacturer's instructions.

5.4 Conditioning

Before testing, condition the test pieces in accordance with ISO 18573:2003, Atmosphere B, for 24 h, except that for high conductivity belts, the relative humidity may be reduced to (25 ± 5) %.

6 Procedure

Test conveyor belts which, due to their construction, require pulley diameters of more than 200 mm, with the smallest diameter possible and according to the manufacturer's instructions.

Measure the temperature and relative humidity in the test room.

Clean both pulleys (4.1) and, if necessary, remove any dust from the shielding steel plates (4.6.1 and 4.6.2).

After endlessly joining and conditioning the test piece, install it on the testing apparatus with the normal running side in contact with the pulleys.

Tension the test piece in accordance with 4.2.

Install the recording device (4.5).

Position the measuring device (4.4) on the centre line of the test piece, 500 mm from the centre of the drive pulley, with a distance of 10 mm to 100 mm between the measuring device and the test piece surface not in contact with the pulley (see Figure 1).

NOTE Experience has shown that a distance of 25 mm is preferable.

Start the test piece and run it from the drive pulley (4.3) directly to the field measuring device.

Either record the electrostatic field strength, E, in volts per metre or, if the measuring device used gives a direct reading of the surface potential, U, record that value, in volts.

The measurement time shall be 30 min.

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

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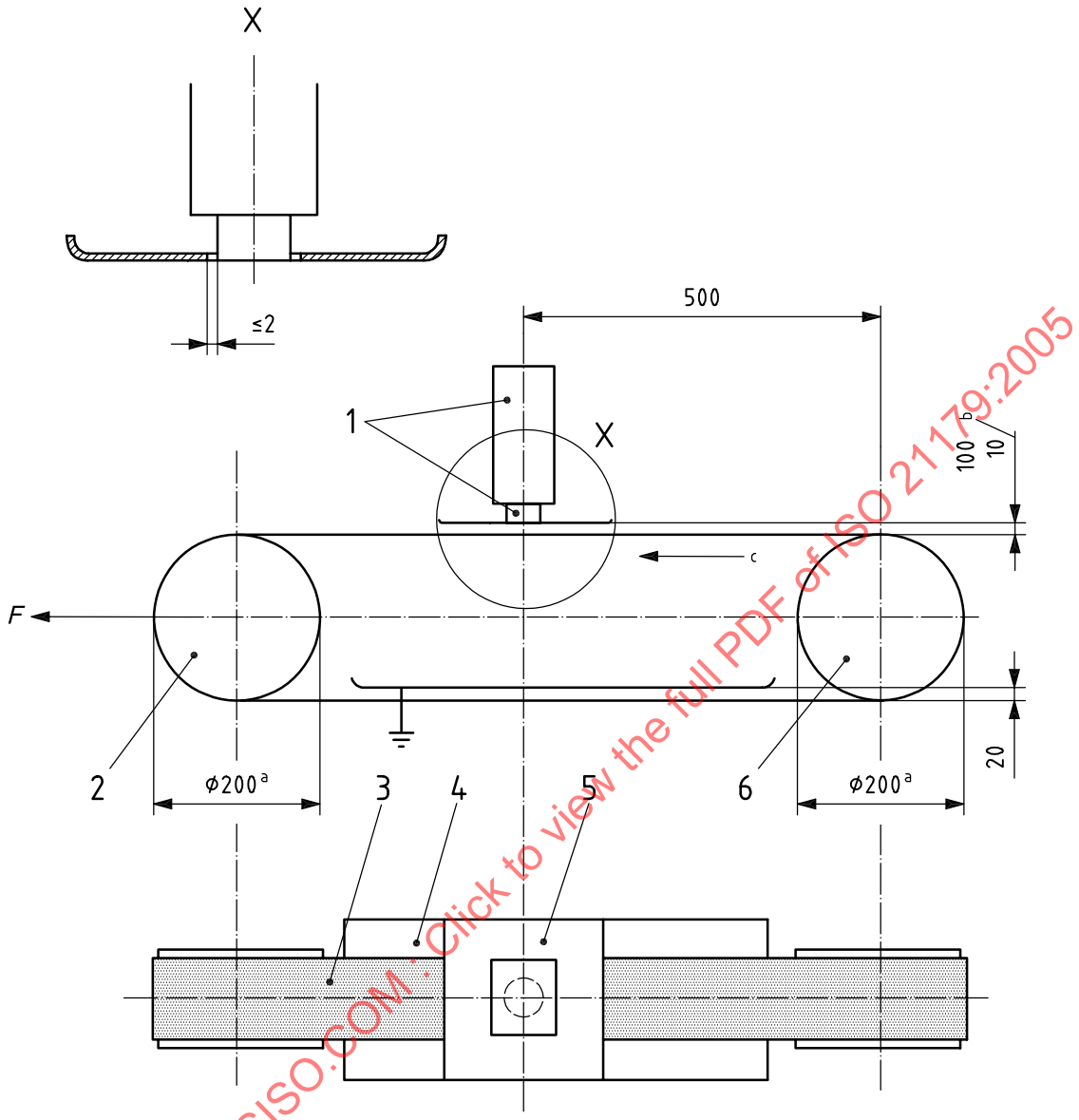
Dimensions in millimetres



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Key

1 measuring device with electrode
2 driven pulley, movable, crowned
3 test piece, endless (2 500 ± 50) mm × (100 ± 1) mm
4 earthed steel plate, 600 mm × 200 mm
5 earthed steel plate, 200 mm × 200 mm
6 drive pulley, fixed, cylindrical

a Diameter 200 mm or larger, see Clause 6.
b Measuring distance of test piece surface not in contact with pulleys.
c Direction of run.

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

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