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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 1813

ANTISTATIC ENDLESS V-BELTS
(SECTIONS Y, Z, A, B, C, D, E)

ELECTRICAL CONDUCTIVITY

CHARACTERISTIC AND METHOD OF TEST

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1813, *Antistatic endless V-belts (Sections Y, Z, A, B, C, D, E) – Electrical conductivity – Characteristic and method of test,* was drawn up by Technical Committee ISO/TC 41, *Pulleys and belts (including V-belts),* the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question led to the adoption of Draft ISO Recommendation No. 1813, which was circulated to all the ISO Member Bodies for enquiry in March 1969. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Greece	Portugal
Austria	Hungary	South Africa, Rep. of
Belgium	India	Spain
Brazil	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Denmark	Netherlands	U.A.R.
Finland	Norway	United Kingdom
France	Peru	U.S.S.R.

The following Member Body opposed the approval of the Draft :

U.S.A.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation	R 1813	April 1971

ANTISTATIC ENDLESS V-BELTS
(SECTIONS Y, Z, A, B, C, D, E)

ELECTRICAL CONDUCTIVITY

CHARACTERISTIC AND METHOD OF TEST

1. SCOPE

This ISO Recommendation specifies the maximum electrical resistance of a classical antistatic endless V-belt for the sections Y, Z, A, B, C, D and E, and the corresponding laboratory method of measurement.

The test is intended to ensure that the belt is sufficiently conductive to dissipate charges of electricity which may form on it in service.

In principle, the application of this ISO Recommendation is limited to cases of contestation about new belts intended to be used in an explosive atmosphere or in situations where there is a fire risk.

In this case, the decision is left to national standards or agreement between parties as to whether the test should be carried out on each belt in a batch or on only a percentage of the batch.

2. CHARACTERISTIC

Designation	Characteristic	Method of test
Electrical resistance	$6 \times 10^5 \frac{L}{l}$ Ω max. L is the distance between the inner edges of the two electrodes l is the sum of the widths of the two driving surfaces of the belt	Section 3

3. METHOD OF TEST

3.1 Principle

Passage of an electrical current of specified voltage through a suitably prepared endless V-belt.

3.2 Apparatus

3.2.1 *Insulation tester* having a nominal open circuit voltage of 500 V. For values of resistance above 10^6 Ω an instrument with a nominal open circuit voltage of 1000 V may be used.

The instrument should be sufficiently accurate to determine the resistance within 5 % and should not dissipate more than 3 W in the test piece. The voltage shall be applied no longer than is necessary to carry out the test, in order to reduce the risk of overheating the test piece.

3.2.2 Two *metal electrodes*, preferably brass, having two flat contact surfaces of minimum width 25 mm (1 in), which are free to rotate around an axis parallel to the side-walls of the belt, ensuring an exact fit with the sides of the belt. The V-groove must have an included angle suitable for the belt under test. Figure 1 shows an example of an electrode of this type.

3.2.3 Two *V-grooved pulleys* having diameters not less than the minimum specified in Table 1 and correctly grooved for the V-belt under test.

3.2.4 *Means of applying a load* of 1 N per millimetre (5.6 lbf per inch) of top width of the belt to force it into the V-groove of the electrodes to ensure adequate electrical contact between electrodes and belt. The load may be applied indirectly by a lever arm. (See Figures 2 and 3 for typical apparatus.)

3.2.5 *Conductive coating material* for forming electrodes on the surface of the belt :

either

(*a*) a conductive silver lacquer or colloidal graphite; the conductive silver lacquer or colloidal graphite should be of a type which dries in air at room temperature and the surface resistivity of the dried film should be below 10 Ω; or

(*b*) a conductive liquid consisting of

- 800 parts of anhydrous polyethylene glycol of molecular mass 600,
- 200 parts of water,
- 1 part of wetting agent,
- 10 parts of potassium chloride.

In the latter case, the electrode contact area should be completely wetted and remain so until the end of the test.

3.3 Test piece

3.3.1 *Shape and dimensions.* The test piece is the complete endless V-belt, which has undergone the various operations indicated below.

3.3.2 *Preconditioning.* Before carrying out the mechanical treatment described in clause 3.3.3, maintain the test piece for a period of not less than 24 hours at a temperature between 15 and 30 °C.

3.3.3 *Mechanical treatment and conditioning.* Before preparation and test, the belt should be submitted to the following mechanical treatment at a temperature of 20 ± 2 °C and a relative humidity of 65 ± 5 %.

Mount the belt on the two pulleys so that the total tension is equally distributed between the two strands of the V-belt, then rotate it two complete revolutions while under tension.

The total tension applied to the V-belt should as near as possible be equal to its maximum safe working tension. For new V-belts, this tension shall in any case be not less than the values specified in Table 1.

TABLE 1 – Belt tensions and pulley dimensions

Cross section symbol	Minimum total tension on belt T		Minimum pulley pitch diameter d_p		Angle α Tolerance ± 30′
	N	lbf	mm	in	
Y	40	9	25	1	28°
Z	110	24	50	2	32°
A	200	44	75	3	34°
B	300	66	125	5	34°
C	750	164	200	8	36°
D	1400	307	355	14	36°
E	1800	394	500	20	36°

3.3.4 *Preparation.* The belt should be maintained in the unstrained state, for a period of not less than 2 hours in the conditions of temperature and humidity given in clause 3.3.3.

Immediately after, clean the surfaces which are to be used in the test by rubbing with dry fuller's earth using a clean cloth.

After cleaning away all traces of the powder, wipe the surface with a cloth moistened with distilled water and rub dry with a clean dry cloth, taking care to avoid straining the test piece. Immediately after, apply the conductive coating material on the two contact areas each for a length of 25 mm (1 in) along the belt; these two zones should be separated by a dry distance of 100 ± 6 mm (4 ± 0.25 in).

3.4 Procedure

3.4.1 *Test conditions.* The test should be made in a place having a temperature of 20 ± 2 °C and a relative humidity of 65 ± 5 % (in accordance with ISO Recommendation R 471).

3.4.2 *Test procedure.* Clean the electrodes. The belt being in the unstrained state, apply the electrodes on the coated contact areas so that only the driving surfaces of the belt are in contact.

Take care not to deform the surfaces of the V-belt during the application of the electrodes and during the test. To ensure adequate electrical contact between belt and V-groove, apply to the belt at each electrode a load of 1 N per millimetre (5.6 lbf per inch) of top width of the belt.

Measure the distance L between the contact areas of the belt and the sum l of the widths of the two driving surfaces of the belt.

Take care not to breathe on the test surfaces as any condensation of moisture may falsify the result.

Measure the resistance in ohms 5 ± 1 seconds after applying the voltage. The voltage applied shall not be less than 40 V.

3.4.3 *Number of tests.* Make not less than five tests spaced at regular intervals along the complete length of the belt.

If a belt is too short to carry out this minimum of five tests then the number of tests may be reduced accordingly.

4. INTERPRETATION OF RESULTS

None of the individual values obtained should be more than the specified limit.

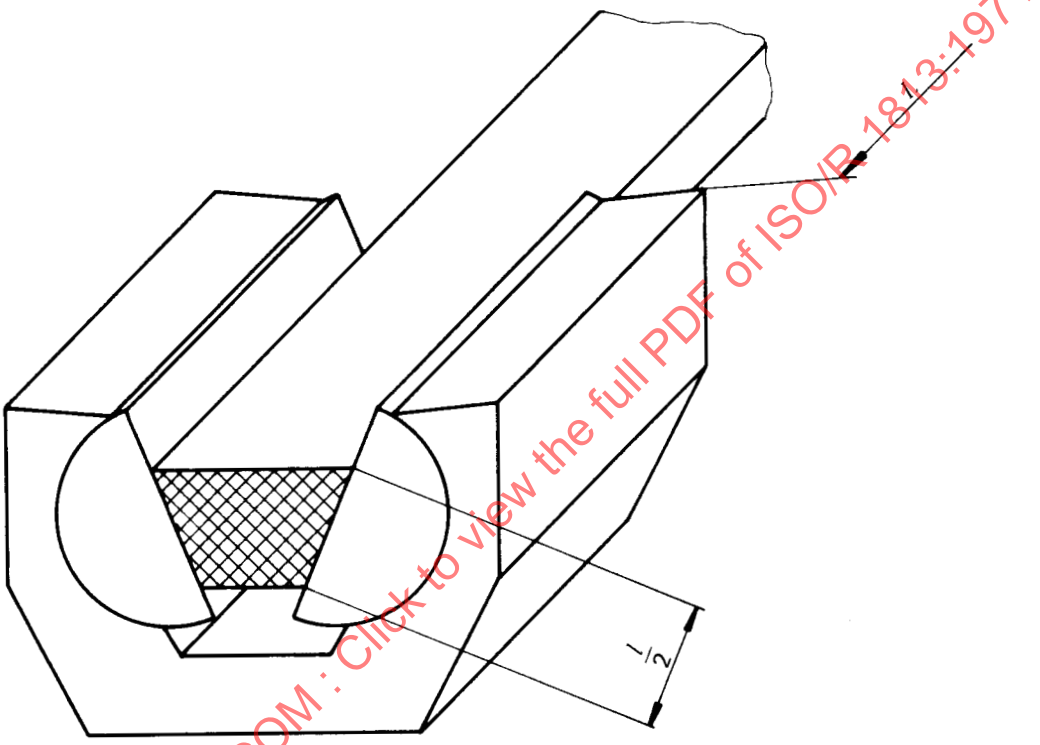

FIG. 1 – **Detail of an electrode**