International Standard 1813

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Antistatic endless V-belts — Electrical conductivity — Characteristic and method of test

Courroies trapézoïdales sans fin, anti-électrostatiques — Conductibilité électrique — Spécification 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.

International Standard ISO 1813 was developped by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*. The first edition (ISO 1813-1976) had been approved by the member bodies of the following countries :

Australia	Greece	South Africa, Rep. of
Austria	Hungary	Spain
Belgium	India	Sweden
Brazil	Israel	Switzerland
Czechoslovakia	Italy	United Kingdom
Denmark	Netherlands	USA
Egypt, Arab Rep. of	Norway	USSR
Finland	Peru	
France	Portugal	

No member body expressed disapproval of the document.

This second edition, which supersedes ISO 1813-1976, incorporates draft Addendum 1, which was circulated to the member bodies in November 1977. This draft addendum has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Spain
Austria	India	Sweden
Belgium	Italy	Turkey
Canada	Mexico	United Kingdom
Chile	Poland	USA
Finland	Romania	USSR
France	South Africa, Rep. of	

No member body expressed disapproval of the document.

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Antistatic endless V-belts — Electrical conductivity — Characteristic and method of test

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the maximum electrical resistance of antistatic endless V-belts for the sections Y, Z, A, B, C, D, E, SPZ, SPA, SPB and SPC, 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 in it in service.

The application of this International Standard 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 interested 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 SPECIFICATION

TABLE 1 – **Characteristic**

Designation	Characteristic	Method of test
Electrical resistance	$6 \times 10^5 \frac{L}{l} \Omega$ max. L is the distance between the inner edges of the two electrodes l is the sum of the heights of the two sidewalls of the belt	Clause 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 Metal electrodes (two) preferably brass, having two flat contact surfaces of minimum width 25 mm, 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 V-grooved pulleys (two) having pitch diameters not less than the minimum specified in table 2 and correctly grooved for the V-belt under test.

3.2.4 Means of applying a load of 1 N per millimetre 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·m; 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.

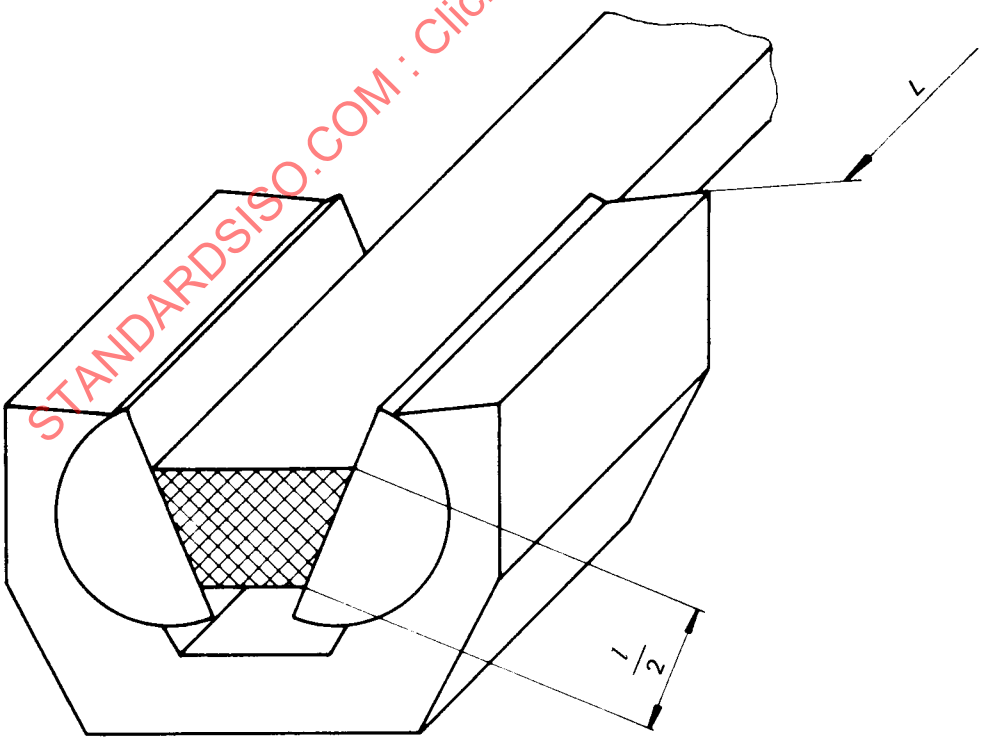

FIGURE 1 – **Detail of an electrode**

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 3.3.3, maintain the test piece for a period of not less than 24 h at a temperature between 15 and 30° C.

3.3.3 *Mechanical treatment and conditioning.*

Before preparation and test, the belt shall 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 two pulleys with a pitch diameter equal to or greater than the minimum given in table 2 and having functional dimensions according to the International Standard specifying pulleys.

Rotate the belt at least two revolutions to distribute the tension equally between the two strands.

The total tension applied to the V-belt shall as near as possible be equal to its maximum safe working tension. This tension shall in any case be not less than the values specified in table 2.

TABLE 2 — **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	mm	
Y	40	25	28°
Z	110	50	32°
A	200	75	34°
B	300	125	34°
C	750	200	36°
D	1 400	355	36°
E	1 800	500	36°
SPZ	360	63	34°
SPA	560	90	34°
SPB	900	140	34°
SPC	1 500	224	34°

3.3.4 *Preparation*

The belt shall be maintained in the unstrained state, for a period of not less than 2 h in the conditions of temperature and humidity given in 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 along the belt; these two zones shall be separated by a dry distance of 100 ± 6 mm.

3.4 Procedure

3.4.1 *Test conditions*

The test shall be made in a place having a temperature of 20 ± 2 °C and a relative humidity of 65 ± 5 % (in accordance with ISO 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 of top width of the belt.

Measure the distance L between the contact areas of the belt and the sum l of the heights of the two sidewalls 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 s 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

The specified limit value, R, is calculated from the following formula which is defined in table 1 :

$$R = 6 \times 10^5 \frac{L}{l} \Omega$$

None of the individual values obtained in 3.4.3 shall be more than the specified value.