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ISO RECOMMENDATION

R 1627

PLASTICS

METHOD OF TEST TO DETERMINE THE CHANGE IN ELECTRICAL PROPERTIES OF POLYETHYLENE DUE TO THE MIGRATION OF PLASTICIZERS

1st EDITION

October 1970

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BRIEF HISTORY

The ISO Recommendation R 1627, *Plastics – Method of test to determine the change in electrical properties of polyethylene due to the migration of plasticizers,* was drawn up by Technical Committe ISO/TC 61, *Plastics,* the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1627, which was circulated to all the ISO Member Bodies for enquiry in May 1968. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	Israel	Spain
Belgium	Italy	Sweden
Brazil	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
France	Poland	U.A.R.
Hungary	Portugal	United Kingdom
India	Romania	U.S.A.
Iran	South Africa, Rep. of	U.S.S.R.

The following Member Body opposed the approval of the Draft :

Netherlands

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

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ISO Recommendation R 1627 October 1970

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1. SCOPE

This ISO Recommendation describes a method of determining the change in electrical properties of polyethylene caused by the migration of plasticizers from a PVC material in contact with it. This method is complementary to the method given in ISO Recommendation R177, *Plastics – Determination of migration of plasticizers from plastics.*

2. FIELD OF APPLICATION

The method is applicable to the migration of plasticizers from PVC in the form of

(*a*) film or sheet;

(*b*) PVC-coated fabric, paper or other appropriate materials;

(*c*) powder or granules.

NOTE. – For powder or granules a test sheet should be prepared under moulding conditions agreed upon between manufacturer and consumer (see clause 5.4.2 (*d*)).

3. PRINCIPLE

A specimen of PVC sheet is placed in close contact with a specimen of polyethylene sheet at a temperature of 70 °C for 7 days. The dielectric dissipation factor (tan δ) and the mass of the polyethylene specimen are determined before and after exposure.

The product by 10^4 of the change in dielectric dissipation factor so measured is taken as the *index of migration of the plasticizer* and for a given PVC and plasticizer this index is proportional to the change in mass of the polyethylene.

The index so calculated reflects the inherent dissipation factor, and its frequency dependence, of the plasticizer as well as the mass of plasticizer that migrates from the PVC specimen to the polyethylene test specimen. Therefore this index cannot be used indiscriminately to compare the rate of migration tendencies of different plasticizers unless they have the same electrical dissipation factor at the test frequency.

4. APPARATUS

4.1 *Ventilated oven* controlled at 70 ± 2 °C.

4.2 *Glass sheets*, approximate size 60 mm × 60 mm.

4.3 *Circular hollow punch*, to punch out disks 50 ± 1 mm diameter.

4.4 *Analytical balance*, accurate to 0.0001 g.

4.5 *Test apparatus to determine the dissipation factor* at a frequency of 1 MHz.

NOTE. – 1 MHz is the preferred test frequency. If other test frequencies are used, the test frequency should be stated in the test report.

4.6 *Weights*, mass 5 kg.

5. TEST SPECIMENS

5.1 Dimensions

The test specimens should consist of both polyethylene and PVC disks of 50 ± 1 mm diameter. If, due to the dimensions of the dissipation factor test apparatus, disks of any other diameter are required then the polyethylene and PVC disks should have the same diameter.

5.2 Polyethylene specimens.

The exact characteristics of the polyethylene (for example, density, melt index, method of preparation and thermal treatment) should be agreed between the manufacturer and consumer. The polyethylene used should be free from plasticizer and its dielectric dissipation factor should be less than or equal to 2×10^{-4} at the test frequency.

5.3 Number of test specimens

Take six identical polyethylene test specimens and three PVC test specimens for each PVC material to be tested. All test specimens should be clean and smooth.

5.4 Preparation of test specimens.

5.4.1 *Polyethylene.* From a sheet of polyethylene 1 ± 0.1 mm thick, punch out specimens 50 ± 1 mm in diameter using the circular hollow punch (4.3).

5.4.2 *PVC*

(*a*) FILM AND SHEET. From the film or sheet cut out specimens of 50 ± 1 mm diameter using the circular hollow punch (4.3).

(*b*) FABRIC COATED WITH PVC ON ONE SIDE ONLY. From the sheet cut out two disks of 50 ± 1 mm diameter using the circular hollow punch (4.3). Place these two disks back to back so that their uncoated surfaces are in contact with each other. Take this double disk as one test specimen.

(*c*) FABRIC COATED WITH PVC ON BOTH SURFACES. From the sheet cut two disks of 50 ± 1 mm diameter using the circular hollow punch (4.3). Place these two disks back to back so that the surfaces of the sheet *not* under test are in contact with each other (i.e. the side of the sheet to be tested should be the two outer surfaces). Take this double disk as one test specimen.

(*d*) POWDER AND GRANULES. Mould a sheet of PVC at least 0.5 mm thick under moulding conditions agreed upon between manufacturer and consumer. From the moulded sheet cut out specimens of 50 ± 1mm diameter using the circular hollow punch (4.3).

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