



Plastics — Determination of migration of plasticizers

Matières plastiques — Détermination de la migration des plastifiants

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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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 61 has reviewed ISO Recommendation R 177 and found it technically suitable for transformation. International Standard ISO 177 therefore replaces ISO Recommendation R 177-1961 to which it is technically identical.

ISO Recommendation R 177 was approved by the Member Bodies of the following countries :

Australia	India	Spain
Austria	Israel	Sweden
Belgium	Italy	Switzerland
Bulgaria	Japan	Turkey
Czechoslovakia	Netherlands	United Kingdom
France	Poland	U.S.A.
Germany	Portugal	U.S.S.R.
Hungary	Romania	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 177 into an International Standard.

Plastics — Determination of migration of plasticizers

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the determination of the tendency of plasticizers to migrate from plastic products, in which they are contained, into other plastics or other materials, if both substances are brought into close contact with one another.

NOTE — The surfaces into which the migration takes place may also consist of organic surface coatings, such as lacquers.

This test is suitable :

- a) for the evaluation of the tendency of plasticized plastic materials, especially in the form of sheets and films, to lose some of their liquid components when in contact with plasticizer-absorbing materials;
- b) for the study of the migration tendency of plasticizers contained in a resin or a series of resins in one or more concentrations.

In case b), standard compounds should be prepared on the basis of well characterized resins with known ratios of resin to plasticizer.

NOTE — When the absorbing sheets themselves contain a substance capable of migrating, a simultaneous migration may occur from the specimen to the absorbing sheets and vice versa.

2 REFERENCES

ISO 291, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 293, *Plastics — Compression moulding test specimens of thermoplastic materials.*

3 DEFINITION

For the purpose of this International Standard the following definition applies :

migration of plasticizers : The loss of mass of a sheet consisting of a plasticized plastic if placed in close contact between plasticizer-absorbing sheets of another material, under specified conditions.

4 APPARATUS

4.1 **Analytical balance**, accurate to 0,001 g.

4.2 **Micrometer**, accurate to 0,01 mm.

4.3 **Air circulating oven**, capable of maintaining the temperature to within $\pm 2^\circ\text{C}$ in the range from 50 to 100 $^\circ\text{C}$.

4.4 **Glass plates**, with flat surfaces.

4.5 **5 kg weights**.

4.6 **Absorbing discs**, 60 ± 1 mm in diameter and preferably not less than 0,5 mm in thickness.

Suitable materials may be rubber, polyethylene, polyvinyl acetate. Two absorbing discs are required for each test specimen.

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5 TEST SPECIMENS

5.1 The test specimens shall be in the form of discs 50 ± 1 mm in diameter, preferably not less than 0,5 mm in thickness cut from compression moulded sheet of the appropriate thickness. Attention is drawn to the provisions of ISO 293.

5.2 In the case of film, the specimen of not less than 0,5 mm thickness should be formed from a number of thicknesses of the film, by pressing at a suitable temperature for about one minute.

5.3 If the test is carried out for the determination of the characteristics of specific plasticizers, standard compounds of a given composition, as agreed between vendor and purchaser, shall be used.

5.4 If the plastic material to be tested consists of a support (fabric, paper or other suitable material), coated on one face only by the spreading or calendering of a plasticized resin (such as vinyl fabrics and the like), the test specimen should be obtained by the superposition of two discs, cut from the material itself and superposed in such a way that the free surfaces of the support mate and the resin surfaces are at the outer sides of the "sandwich".

5.5 Three test specimens shall be tested for each material.

6 CONDITIONING

Unless otherwise specified, test specimens and the appropriate absorbing discs shall be conditioned in one of the atmospheres specified in ISO 291.

7 PROCEDURE

7.1 After conditioning, weigh the test specimens and the absorbing discs (4.6) to the nearest 0,001 g and determine the mean thickness to the nearest 0,01 mm.

7.2 Place a test specimen between two of the absorbing discs (4.6), in such a way that they are concentric and form a "sandwich"; place the "sandwich" between two of the glass plates (4.4).

7.3 Place one of the 5 kg weights (4.5) on the test assembly and place it in the oven (4.3) at a temperature of 70 ± 2 °C. Several "sandwiches", but not more than five, separated by glass plates (4.4), may be superposed in one column loaded with only one 5 kg weight. In this case the temperature shall be measured directly above and below the test column.

7.4 A new disc of plasticizer-absorbing sheet shall be used for every test.

7.5 After 24 h, (see note) remove the "sandwiches" from the oven. Separate the test specimens from the absorbing discs and recondition them under the same conditions as those to which they were subjected before the original weighing. Reweigh the test specimens and the absorbing discs.

NOTE — In many cases the duration of the test may have to be extended; in which case, the "sandwiches" are replaced in the oven for a further period of time. In order to determine the progress of the migration with time, readings after testing periods of 1, 2, 5,

10 and 30 days are suggested. In such cases, it is only necessary to recondition the specimens before weighing after the first and the last day.

8 TEST REPORT

The report shall include the following particulars :

- a) reference to this International Standard;
- b) complete identification of the sample and procedure used for preparing the test specimens;
- c) chemical composition and designation of the absorbing discs;
- d) the conditioning procedure;
- e) dimensions of the test specimens and of the absorbing discs (the thickness shall be measured to the nearest 0,01 mm);
- f) mass, in grams, of the test specimens and of the absorbing discs before testing;
- g) the gain or loss in mass, in milligrams, of the individual test specimens and of the absorbing discs, together with the duration of the test periods;
- h) the arithmetical mean of the values obtained from three test specimens;
- i) observations on any change in appearance of the test specimens;
- j) date of test.

NOTE — The loss in mass of the test specimens should be, theoretically, equal to the gain in mass of the two absorbing discs. This is, however, very rarely the case; the difference is considered as a volatile loss.