

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 177

PLASTICS

DETERMINATION OF MIGRATION OF PLASTICIZERS

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BRIEF HISTORY

The ISO Recommendation R 177, *Determination of Migration of Plasticizers*, was drawn up by Technical Committee ISO/TC 61, *Plastics*, the Secretariat of which is held by the American Standards Association, Incorporated (ASA).

Work on this matter which the Technical Committee had begun since 1954, came to an end in 1956, with the adoption of a proposal as a Draft ISO Recommendation.

On 28 November 1958, the Draft ISO Recommendation (No. 192) was distributed to all the ISO Member Bodies and was approved, subject to some editorial amendments, by the following Member Bodies:

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

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1961, to accept it as an ISO RECOMMENDATION.

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PLASTICS

DETERMINATION OF MIGRATION OF PLASTICIZERS

1. SCOPE

The purpose of this ISO Recommendation is to determine the tendency of plasticizers to migrate from plastics products, in which they are contained, into other plastics or other materials generally, if both substances are brought into close contact with one another.

NOTE. The surfaces toward which the migration takes place may also consist of surface coatings, such as lacquer layers made of plastics materials or other products.

2. DEFINITION

Migration of plasticizers is to be considered the loss of mass of a sheet consisting of plasticized plastics, if placed in close contact between plasticizer-absorbing sheets of another material, under certain specified conditions.

3. SIGNIFICANCE OF TEST

This test is suitable :

- (a) for the evaluation of the tendency of plasticized plastics materials, especially in form of sheets and films, to lose some liquid components contained in them, when in contact with plasticizer-absorbing materials;
- (b) for the measuring of the migration tendency of individual plasticizers.

3.1 In case (b), standard compounds with the same polymer and plasticizer percentage, under well defined conditions, should be prepared.

3.2 When it is desired to study the behaviour of different plasticizers in respect of a certain resin and the effect of their concentration, for every individual plasticizer, several tests should be carried out on different compounds, all obtained in the same conditions and the same polymer, but containing different proportions of 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.

4. TEST SPECIMENS

- 4.1 The test specimens should be in the form of a disk 50 ± 1 mm in diameter, preferably not less than 0.5 mm in thickness.
- 4.2 The test specimens may be cut, with a special die, from a sheet not less than 0.5 mm in thickness, which may be prepared by compression moulding the plastic material under examination, at convenient temperature, using as a mould a frame and two smooth metal plates.
- 4.3 If the material to be tested is a plasticizer, a standard compound with a suitable polymer should be prepared.
- 4.4 The moulding of a sheet should be carried out under well defined time and temperature conditions.
- 4.5 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.
- 4.6 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 disks, cut with a die from the material itself and superposed in such a way that the free surfaces of the support should mate and the resin is at the outer sides of the "sandwich".

5. APPARATUS AND MATERIALS

The apparatus and materials consist of the following:

- 5.1 *Balance* : analytical balance, to weigh to 0.001 g.
- 5.2 *Micrometer*, for measuring to 0.01 mm.
- 5.3 *Air circulating oven*, capable of maintaining the temperature to within $\pm 2^\circ\text{C}$ in the range from 50 to 100°C .
- 5.4 *Glass plates*, with flat surfaces.
- 5.5 *5 kg weights*.
- 5.6 *Absorbing sheets* : suitable materials may be rubber, nitro-cellulose, polyethylene, poly-vinyl-acetate, etc., and their thickness should be preferably not less than 0.5 mm.

6. CONDITIONING

- 6.1 The test specimens obtained as indicated under Section 4 should be conditioned according to the relevant ISO Recommendation.*
- 6.2 Disks 60 ± 1 mm in diameter and preferably not less than 0.5 mm in thickness, hereinafter called "absorbing disks", are prepared from the absorbing sheets (see clause 5.6). These disks are conditioned in the same manner as the test specimens.

* The ISO Recommendation relating to standard atmospheres for conditioning and testing plastics materials is being prepared.