International Standard 4593

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Plastics — Film and sheeting — Determination of thickness by mechanical scanning

Plastiques — Film et feuille — Détermination de l'épaisseur par examen mécanique

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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 4593 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in May 1977.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Poland
Austria	India	Portugal
Belgium	Iran	Romania
Brazil	Ireland	South Africa, Rep. of
Bulgaria	Israel	Spain
Canada	Italy	Sweden
Chile	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	USA
Germany, F.R.	Peru	USSR

No Member Body expressed disapproval of the document.

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Plastics — Film and sheeting — Determination of thickness by mechanical scanning

1 Scope and field of application

This International Standard specifies a method for the determination of the thickness of a sample of plastics film or sheeting by mechanical scanning.

This method is not suitable for use with embossed film and sheeting.

2 Reference

ISO 4591, *Plastics — Film and sheeting — Determination of average thickness of a sample and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness).*

3 Apparatus

Measuring device, capable of measuring to the following accuracies :

— up to 100 µm with an accuracy of 1 µm (see note);

— above 100 µm and up to 250 µm with an accuracy of 2 µm;

— above 250 µm with an accuracy of 3 µm.

NOTE — Most commercial devices will not measure to an accuracy better than 1 µm. Where this accuracy is not adequate, other methods should be used. Refer to ISO 4591.

The transmission of the measured values may be performed, for example, mechanically (micrometer), optically (mirror instrument) or electronically (inductively).

The lower measuring surface shall be plane. The upper surface may be either plane or radiused. All surfaces shall be polished.

For plane/plane faces, the surface diameters shall be between 2,5 and 10 mm; they shall be parallel to better than 5 µm. The lower face shall be capable of being adjusted to meet this requirement. The load on the foot shall be 0,5 to 1,0 N.

For plane/radiused faces, the diameter of the plane lower surface shall not be less than 5 mm and the radius of curvature of the upper surface shall be 15 to 50 mm. The radiused measuring face shall apply a load of 0,1 to 0,5 N on the film or sheeting.

4 Test specimens

Strips, about 100 mm wide, shall be cut across the width of the sample at positions approximately 1 m apart in the longitudinal direction of the sample. The test strips shall not contain creases or other defects.

5 Procedure

5.1 Condition the test strips for at least 1 h at 23 ± 2 °C. For moisture-sensitive films, the conditioning time and atmosphere shall be as stated in the specification for the material under test or as specified between buyer and seller.

5.2 Ensure that the test strips and the faces of the measuring device (clause 3) are free from contamination, for example dust.

5.3 Check the zero point of the measuring device before starting the measurements and recheck after each series of measurements.

5.4 When determining the thickness, lower the foot gently to avoid deforming the material.

5.5 Determine the thickness of the test strips at ten points at approximately equally-spaced intervals along the length of the test strips at 23 ± 2 °C. In the case of samples from rolls less than 300 mm wide, measurements shall be made every 50 mm along the length of the test strips. In the case of untrimmed rolls, measurements shall not be taken within 50 mm of the edges.

6 Test report

The test report shall include the following particulars ;

a) reference to this International Standard;

b) full identification of the sample;

c) type of measuring faces and load;

d) length of sample;

e) number of test strips;

f) the arithmetic mean of the individual measurements, to the nearest 1 µm or 0,001 mm, reported as the average mechanically-measured thickness of the sample. If called for, the individual readings shall also be reported;

g) total number of measurements made and, if required, the standard deviation.