INTERNATIONAL STANDARD

ISO 2286-2

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Rubber- or plastics-coated fabrics — Determination of roll characteristics —

Part 2:
Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate

Supports textiles revêtus de caoutchouc ou de plastique — Détermination des caractéristiques des rouleaux —

Partie 2: Méthodes de détermination de la masse surfacique totale, de la masse surfacique du revêtement et de la masse surfacique du support

Reference number
ISO 2286-2:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 2286-2 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

Together with the other parts (see below), it cancels and replaces ISO 2286:1986, which has been technically revised.

ISO 2286 consists of the following parts, under the general title *Rubber- and plastics-coated fabrics — Determination of roll characteristics*:

— *Part 1: Methods for determination of length, width and net mass*

— *Part 2: Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate*

— *Part 3: Method for determination of thickness*

Annex A forms an integral part of this part of ISO 2286.

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Introduction

The total mass per unit area of a material, the mass per unit area of the substrate cloth and the mass per unit area of the coating are quantities which define the basic quality of a coated fabric and determine many of its physical properties. The substrate cloth mass determined by these methods does not necessarily represent the mass of the substrate cloth in the uncoated state. For example, in the case of coated fabrics in which a bonding agent has been used, the substrate cloth mass determined may be substantially higher than the uncoated mass because the prescribed treatment has not removed the entire coating. This will be particularly so in cases where the substrate cloth is made from multifilament or spun-fibre yarns. Dimensional changes in the substrate cloth during processing may also occur.

Rubber- or plastics-coated fabrics — Determination of roll characteristics —

Part 2:
Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate

WARNING – Persons using this part of ISO 2286 should be familiar with normal laboratory practice. This part of ISO 2286 does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This part of ISO 2286 describes methods of determining the total mass per unit area, the mass per unit area of the coating and the mass per unit area of the substrate cloth of a rubber- or plastics-coated fabric. Methods for removing coatings of specific compositions are described in annex A.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 2286. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 2286 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2231:1989, *Rubber- or plastics-coated fabrics – Standard atmospheres for conditioning and testing.*

3 Method A: Determination of total mass per unit area

3.1 Apparatus

3.1.1 Balance, accurate to ±2 mg, with a capacity such that readings remain within 10 % to 90 % of maximum when the balance is used for this method.

3.1.2 Means of maintaining an atmosphere with a relative humidity not greater than 10 % and a temperature of 65 °C ± 5 °C.

NOTE – Air at 20 °C and 65 % relative humidity, when heated at constant pressure to 65 °C ± 5 °C, will have a relative humidity of approximately 5 %. Higher temperatures can lead to changes in some coatings.

3.1.3 Cutter, capable of cutting, from the sample of coated fabric, a test piece of area 100 cm^2 ± 1 cm^2.

NOTE – It has been found convenient to use a circular cutter for this purpose, but square or rectangular test pieces may be used provided they are within the accuracy specified above.

3.2 Preparation of test pieces

Using the cutter (3.1.3) cut five test pieces from the sample, from positions spaced reasonably evenly and close to the diagonal across the width of the sample so that the full width of the coated fabric is represented.

Do not take any test pieces within 1 m of a production-manufactured roll end.

3.3 Procedure

Dry the test pieces to constant mass in an atmosphere with a relative humidity not higher than 10 % at a temperature of 65 °C ± 5 °C.

Condition the test pieces in accordance with ISO 2231 and, without removing them from the conditioning atmosphere, determine the mass of each to the nearest 5 mg and the surface area of each to within 1 %.

NOTE – Any estimate of the mass per unit area of the coated fabric derived from the total net mass of the roll and its known length and width may be inaccurate because a complete roll of coated fabric cannot normally be conditioned to equilibrium in a standard atmosphere. Such inaccuracies are due to excesses or deficiencies in moisture regain through the complete roll.

3.4 Calculation and expression of results

For each of the five test pieces, calculate the total mass per unit area, in grams per square metre, using the formula

$$\frac{m \times 10^4}{A}$$

where

m is the mass of the test piece, in grams;

A is the area of the test piece, in square centimetres.

Calculate the mean of the five determinations, expressing the final result to the nearest 1 g/m^2.

Take this mean as the total mass per unit area of the material under test.

3.5 Test report

The test report shall include the following information:

a) a reference to this part of ISO 2286;

b) a complete description of the coated fabric;

c) the mean value, in grams per square metre, of the total mass per unit area obtained from the five test pieces;

d) details of any deviations from the procedure specified;

e) the date of the determination.

4 Method B: Determination of mass per unit area of substrate

CAUTION – Some of the solvents used may be toxic, flammable or otherwise hazardous. Care in the handling of such materials must be exercised. The inhalation of vapours should be avoided. Suitable protective clothing, including gloves and goggles, should be worn when appropriate. It is recommended that a suitable eyewash be kept in a position convenient for use. Any further precautionary measures recommended by the solvent manufacturer should be followed.

4.1 General

The procedure specified for removing the coating from the substrate cloth is governed both by the nature of the coating and by the nature of the substrate, and indeed for some types of coating there will be no known method of removal. Where this is the case, it shall be reported in the test report.

4.2 Principle

The coating is removed with a stripping agent from the same test pieces as were used for the determination of the total mass per unit area. The stripped test pieces are dried, conditioned and weighed. The procedure is repeated until constant mass is reached.

4.3 Reagent

4.3.1 Suitable solvent system (stripping agent), which has no solvent or chemical action on the substrate. Particular care shall be taken if there are bonding agents or finishing treatments on the substrate which are not essentially part of the coating but which might be removed with it (e.g. bonding agents in nonwoven (bonded-fibre) fabrics, rot-proofing agents, etc.). If it is known or suspected that such an agent has unavoidably been removed with the coating, this shall be reported in the test report.

NOTE – A suitable solvent system may be an organic solvent, a mixture of organic solvents, water or an aqueous solution (see annex A).

4.4 Apparatus

The same apparatus as described in 3.1 is required.

4.5 Procedure

4.5.1 Dissolve the coating from each test piece separately. In many cases, the bulk of the coating may be successfully removed mechanically after moistening the substrate with the stripping agent. Use either Soxhlet extraction where appropriate or immerse the test pieces with occasional agitation in at least three successive portions of the solvent at an appropriate temperature until the coating has apparently been completely removed. Ensure at this and subsequent stages that any loose threads are retained with the test pieces. If the stripping agent used is itself a solution containing non-volatile components, wash the test pieces several times in a suitable pure solvent.

4.5.2 Dry the test pieces for at least 1 h at 65 °C ± 5 °C, allow to stabilize by cooling in a desiccator for 15 min, and determine the mass of each to the nearest 5 mg. Extract the stripped test pieces with a further quantity of stripping agent, wash if necessary, then dry, stabilize and determine their mass as before. If the second determination differs from the first by more than 1 %, repeat the treatment until successive determinations show a difference of less than 1 %.

4.5.3 Condition the test pieces as described in ISO 2231 and determine their masses to the nearest 5 mg to obtain the substrate cloth mass per unit area.

4.6 Calculation and expression of results

For each of the five test pieces, calculate the mass per unit area of the substrate, in grams per square metre.

Calculate the mean of the five determinations, expressing the final result to the nearest 1 g/m^2.

Take this mean as the total mass per unit area of the material under test.

4.7 Test report

The test report shall include the following information:

a) a reference to this part of ISO 2286;

b) a complete description of the coated fabric;

c) the mean value, in grams per square metre, of the substrate mass per unit area obtained from the five test pieces;

d) details of any deviations from the procedure specified;

e) the date of the determination.

5 Method C: Determination of mass per unit area of coating

5.1 Procedure

Calculate the coating mass per unit area by subtracting the figure obtained for the substrate mass per unit area in method B from the figure obtained for the total mass per unit area in method A.

5.2 Test report

The test report shall include the following information:

a) a reference to this part of ISO 2286;

b) a complete description of the coated fabric;

c) the mean value, in grams per square metre, of the coating mass per unit area;

d) details of any deviations from the procedure specified;

e) the date of the determination.

Annex A
(normative)
Coating-removal methods

A.1 General

The methods described in A.2 to A.5 have been found satisfactory for some of the most frequently encountered coatings.

A.2 Simple poly(vinyl chloride) compositions

CAUTION – Attention is drawn to the fact that there is a risk of an explosion occurring if the tetrahydrofuran used is evaporated to dryness, unless the precaution is taken of making sure that no peroxides are present by adding ferrous sulfate.

If the coating is continuous and on one side only, wet the substrate of each test piece with either tetrahydrofuran or butanone. Separate the bulk of the coating mechanically from the substrate. Then immerse each test piece separately in 100 ml of tetrahydrofuran or butanone and leave, with occasional agitation, for 20 min at room temperature.

Remove the stripped test pieces, together with any loose threads, from the solvent and wash them in 100 ml of acetone; then proceed in accordance with 4.5.2 and 4.5.3.

A.3 Nitrocellulose compositions

Wet the substrate of each test piece with acetone and, where possible, separate the bulk of the coating mechanically from the substrate.

Immerse each test piece separately in 100 ml of acetone in a flask fitted with a reflux condenser.

Reflux for 20 min, then replace the solvent with 100 ml of fresh acetone and reflux for another 20 min. Remove the stripped test pieces, together with any loose threads, from the solvent; then proceed in accordance with 4.5.2 and 4.5.3.

A.4 Polyurethane compositions

Immerse each test piece separately in a solution made up as follows:

propane-1,2-diol	100 parts by mass
potassium hydroxide (solid)	3 parts by mass
water	1 part by mass
N-methyl-2-pyrrolidone	25 parts by mass

Heat to 48 °C ± 2 °C and keep at that temperature for a period of 30 min or until the coating has been removed.

NOTE – The above mixture will not attack cotton, nylon or polyester fibres, providing the maximum temperature specified, i.e. 50 °C, is not exceeded and the period of immersion in the solution is not much longer than 30 min.

Remove the test piece from the solution, wash in acetone and wash well with water; then proceed in accordance with 4.5.2 and 4.5.3.

If the substrate is acetate fabric, use ethanol as the washing agent in place of acetone. Polyacrylate tie coats, if used, will swell in the mixture but will not dissolve.