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Tissue paper and tissue products —

Part 6: Determination of grammage

Papier-tissu et produits en tissu —

Partie 6: Détermination du grammage

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12625-6 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 172, *Pulp, paper and board*, in collaboration with Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition cancels and replaces EN 12625-6:1999 which has been technically revised.

With regard to EN 12625-6:1999, the following changes have been made:

a) a more precise description of the preparation of the test piece, cutting of the test piece, dimensions and number of the test pieces were given;

b) a more precise description of the test procedure was given;

c) a calculation was added;

d) Clause 11 **Precision** was added;

e) editorial updating.

ISO 12625 consists of the following parts, under the general title *Tissue paper and tissue products*:

— *Part 1: General guidance on terms*

— *Part 3: Determination of thickness, bulking thickness and apparent bulk density*

— *Part 4: Determination of tensile strength, stretch at break and tensile energy absorption*

— *Part 5: Determination of wet tensile strength*

— *Part 6: Determination of grammage*

— *Part 7: Determination of optical properties*

— *Part 8: Water absorption time and residual water absorption capacity, manual and automated basket immersion test method*

— *Part 9: Determination of ball burst strength*

Tissue paper and tissue products —

Part 6:
Determination of grammage

1 Scope

This part of ISO 12625 specifies a test method for the determination of grammage of tissue paper and tissue products. Grammage may be measured by determining the mass of a test piece or test pieces of tissue paper or tissue products cut to specified dimensions, or by determining the mass and area of a specified number of units of finished tissue products.

It is expressly stated that the detection of impurities and contraries in tissue paper and tissue products should be applied according to ISO 15755.

For the determination of moisture content in tissue paper and tissue products, ISO 287 should be applied.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 536, *Paper and board — Determination of grammage*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

3.1
grammage
g
mass of a unit area of tissue paper or tissue product as determined by the procedure in this part of ISO 12625

NOTE Grammage is expressed in grams per square metre (g/m^2) according to ISO 536.

4 Principle

The mass and area of a test piece or test pieces of either a tissue paper or a tissue product is measured and the grammage is calculated as the mass per unit area of the test pieces taken. For finished paper products, the grammage may also be calculated from the mass and area of a specified number of the finished tissue product items.

5 Apparatus

5.1 Cutting device, in accordance with ISO 536.

5.2 Balance, with a measuring accuracy of 0,001 g.

5.3 Length measurement device: a steel rule, an electronic digital rule, scanner or other device with a minimum measuring accuracy of 0,5 mm.

6 Conditioning

Condition the samples prior to testing in a standard atmosphere at (23 ± 1) °C and (50 ± 2) % relative humidity according to ISO 187. The sample shall remain in the standard atmosphere throughout the testing.

7 Preparation of test pieces

7.1 General

The sample shall be selected in accordance with ISO 186.

Condition the samples as required in Clause 6. Conditioning shall be done prior to the preparation of test pieces.

7.2 Cutting of the test pieces

The test pieces shall be cut to specified dimensions in accordance with ISO 536 with an accuracy of at least 1 % of the true value.

When cutting specimens of tissue paper or tissue products into test pieces, the test sheet or stack of superimposed test sheets can be placed between two supporting sheets of paper, such as cut office paper, in order to obtain test pieces with clean cut edges and dimensions of the accuracy specified.

7.2.1 Size of test pieces

Since tissue paper and tissue products vary greatly in dimensions, it is only possible to give general guidance regarding the dimension of the test piece or test pieces.

The minimum area of an individual test piece shall be at least 100 cm^2.

7.2.2 Number of test pieces

Since tissue paper and tissue products vary greatly in dimensions, it is only possible to give general guidance regarding the number of test pieces that are required to be taken.

The minimum number of test pieces shall be ten. The mass of a minimum area of 1 000 cm^2 shall be determined, and convenient larger areas shall be understood to comply with the provisions of this part of ISO 12625.

7.2.3 Selection of finished tissue-paper products as test pieces

When test pieces are finished paper product items (paper towels or paper napkins, for example) at least ten finished paper product items shall be taken.

The ten or more test pieces (finished product items) shall be selected from the sample in a random manner so as to represent variation in size and mass of the finished product item present in the sample. In any case, sequential finished product units shall never be tested, except in cases where the sample is very limited in quantity.

8 Procedure

8.1 Determination of the mass of the test pieces

8.1.1 Place the balance (5.2) on a horizontal vibration-free surface within the conditioned atmosphere as defined in ISO 187 (see Clause 6).

Determine the total mass to the nearest 0,001 g of the test pieces taken in 7.2.

8.2 Determination of the area of the test pieces

8.2.1 When test pieces have been cut to specified dimensions as described in 7.2, determine the total area of the test pieces by multiplying the area of the cutting device (5.1) used by the total number of test pieces taken for the test (7.2.2).

8.2.2 For the determination of grammage of finished paper products, the total area shall be measured to an accuracy of better than 1 % using a length measurement device (5.3).

When the test pieces are measured, they shall lie flat with no tension applied.

If a scanner is used for this measurement, closing the scan cover is usually sufficient to cause the item to lie flat. Likewise, placing a steel rule along the edge is usually sufficient. Where a digital rule is used, the finished product should be flattened using a flat piece of approximately 4 mm thick plastic, of dimensions larger than the test piece, or a similar flattening means.

After measuring individually all of the test pieces taken, add the values to determine the total area of the test pieces taken.

8.3 Any deviation from the procedure described above shall be explicitly mentioned in the test report.

9 Calculation

Calculate the grammage of each test piece from the following equation:

$$g = \frac{m}{A} \tag{1}$$

where

g is the grammage, in grams per square metre;

m is the total mass, in grams, of the test piece or test pieces taken;

A is the total area, in square metres, of the test piece or test pieces taken.

10 Test report

The test report shall include the following information:

a) a reference to this part of ISO 12625;

b) place and date of testing;

c) description and identification of the sample, such as the product category, dimensions under test;

d) grammage, in grams per square metre, rounded to the first decimal place, number of single values, standard deviation reported to two significant figures and coefficient of variation, reported to two significant figures;

e) any departure from this part of ISO 12625 and any other circumstances which may have affected the test results.

11 Precision

11.1 General

The results of an interlaboratory test done whereby ten laboratories tested four samples according to the provisions in this part of ISO 12625 are shown in Table 1.

Table 1 — Results of an interlaboratory test

Sample	Mean grammage g/m^2	Standard deviation between laboratories s g/m^2	Reproducibility coefficient of variation %	Reproducibility limit [a] R g/m^2
Paper-base, handkerchiefs	15,4	0,10	0,7	0,3
Paper-base, kitchen towels	20,9	0,07	0,4	0,2
Paper towel	39,5	0,40	1,0	1,1
Kitchen roll	53,7	0,63	1,2	1,8

[a] Agreement expected with 95 % probability, $R = 1{,}96\sqrt{2} \times s$