International Standard 7322

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Cork — Composition cork — Test methods

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Foreword

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Cork — Composition cork — Test methods

1 Scope and field of application

This International Standard specifies the test methods to be used for the determination of the following characteristics of composition cork : thickness, apparent density, tensile strength, compressibility and recovery, resistance to boiling water, and behaviour in boiling hydrochloric acid.

2 Reagent

Hydrochloric acid, 1,17 g/ml $\leqslant \varrho_{20} \leqslant$ 1,19 g/ml.

3 Apparatus

Ordinary laboratory apparatus, and

3.1 Balance, accurate to 0,01 g.

3.2 Chronometer.

3.3 Conditioning chamber, with adjustable temperature and humidity

3.4 Static load press, with flat parallel plates of dimensions greater than those of the test pieces and equipped with

3.4.1 Cylindrical indentor, made of steel, 28,2 mm in diameter (625 mm^2 surface), fitted on the movable head.

3.4.2 Dial micrometer, accurate to 0,01 mm, attached to the movable head and giving by direct reading the thickness of the compressed material.

3.4.3 Weights, for adjusting the load applied by the mobile head.

3.5 Vernier gauge, accurate to 0,1 mm.

3.6 Tensile testing machine, accurate to 1 N, with one fixed jaw and one mobile jaw, 12 mm apart. The mobile jaw shall move unloaded at a speed of 300 mm/min.

3.7 Open container, for water.

3.8 Device for hydrochloric acid test, equipped with

3.8.1 Flask, of fire-resistant glass.

3.8.2 Reflux condenser.

3.8.3 Heating device with thermostat.

3.9 Metal ruler, graduated in 0,5 mm.

3.10 Cutting dies.

4 Test pieces

4.1 Preparation

Use the dies (3.10) to cut test pieces from each sheet or slab to be tested at the edges and in the middle of the sample, according to the table.

4.2 Conditioning

Unless otherwise specified, tests shall be carried out at ambient temperature, on test pieces conditioned in the chamber (3.3) for 24 h at 20 ± 2 °C and 65 ± 5 % relative humidity.

5 Tests

5.1 Thickness

If the thickness of the test piece is less than 10 mm, use the press (3.6) to determine the thickness. Place the test piece on the base-plate of the press (3.4), apply the indentor to the centre for 15 s under a load of 7 kPa, and then read the thickness on the micrometer (3.4.2).

If the thickness of the test piece is greater than 10 mm, carry out the determination with the vernier gauge (3.5).

The thickness of the sample is the average of the results obtained for the nine test pieces tested.

Express the results in millimetres rounded off to the nearest 0,1 mm.

Table — Dimensions and number of test pieces

Test	Dimensions of test pieces mm	Number of test pieces	Remarks
Thickness	100 × 50	9	
Apparent density	100 × 50	5	Use the test pieces used for the thickness test.
Tensile strength	100 × 50	5	Use the test pieces used for the apparent density test.
Compressibility and recovery	50 × 50 or cylindrical having a cross-sectional area of 625 mm^2	3	See 5.4.1.
Behaviour in fluids	50 × 50 or cylindrical having a cross-sectional area of 625 mm^2	3 for each fluid	Use the test pieces used for the preceding test.

5.2 Apparent density

5.2.1 Procedure

Use the ruler (3.9) to determine the length and the width of each test piece, and weigh on the balance (3.1).

5.2.2 Expression of results

The apparent density of the sample, expressed in kilograms per cubic metre, is given by the formula

$$\frac{m}{l \times b \times d} \times 10^6$$

where

m is the mass of the test piece, in grams, rounded off to the nearest 0,1 g;

l is the length of the test piece, in millimetres, rounded off to the nearest integer;

b is the width of the test piece, in millimetres, rounded off to the nearest integer;

d is the thickness of the piece, in millimetres, rounded off to the nearest 0,1 mm.

The apparent density of the sample shall be the average of the values obtained from each test piece.

Express the result rounded off to the nearest integer.

5.3 Tensile strength

5.3.1 Procedure

Clamp each test piece in the jaws of the machine (3.8) so that the force is exerted on the longitudinal direction of the test piece. Set the machine in operation and record the force at which rupture occurs.

Any test in which rupture occurs in or at the level of the jaws shall be eliminated and replaced by a new test piece.

5.3.2 Expression of results

The tensile strength of the test piece, expressed in megapascals, is given by the formula

$$\frac{F}{b \times d}$$

where

F is the force at which rupture occurs, in newtons, rounded off to the nearest integer;

b is the width of the test piece, in millimetres, rounded off to the nearest integer;

d is the thickness of the test piece, in millimetres, rounded off to the nearest 0,1 mm.

The tensile strength of the sample shall be the average of the values obtained from each test piece.

Express the result rounded off to the nearest 0,01 MPa.

5.4 Compressibility and recovery

5.4.1 Preparation of test pieces

Take three test pieces; each test piece may be composed of one or several piled up units of the material in order to obtain a thickness between 4 and 6,5 mm.

5.4.2 Procedure

Place each test piece (see 5.4.1) on the base plate of the press (3.6). Apply a load of 7 kPa for 15 s and immediately read the thickness d_1. Then increase the load so that a pressure of 700 kPa is reached within 10 s and maintain for a further 60 s. Measure the thickness under load d_2. Remove the major load and allow the test piece to recover under preload of 7 kPa for 60 s, and read the thickness d_3 under this pressure.

5.4.3 Expression of results

The compressibility, expressed as a percentage, is given by the formula

$$\frac{d_1 - d_2}{d_1} \times 100$$

The recovery, expressed as a percentage, is given by the formula

$$\frac{d_3 - d_2}{d_1 - d_2} \times 100$$

where

d_1 is the initial thickness, in millimetres, rounded off to the nearest 0,01 mm;

d_2 is the thickness under load, in millimetres, rounded off to the nearest 0,01 mm;

d_3 is the final thickness, in millimetres, rounded off to the nearest 0,01 mm.

The compressibility and the recovery of the test piece shall be the average of the values obtained from the three test pieces.

Express the result rounded off to the nearest integer.

5.5 Resistance to boiling water

5.5.1 Procedure

Place the test pieces in the boiling water for 3 h. Remove the test pieces from the water and make a visual examination.

5.5.2 Expression of results

The result of the test is expressed by stating the presence or absence of disintegration[1] in the test pieces.

5.6 Behaviour in boiling hydrochloric acid

5.6.1 Procedure

Heat the flask (3.10.1) containing the hydrochloric acid (clause 2) and the test pieces until the acid reaches boiling point. Maintain it at this temperature for 30 min. Then remove the test pieces and make a visual examination.

5.6.2 Expression of results

The result of the test is expressed by stating the presence or absence of disintegration[1] in the test pieces.

6 Test report

The test report shall include the following information :

a) all details required to identify the sample completely;

b) the results obtained;

c) all details of procedure not specified in this International Standard or optional;

d) any occurrences that may have affected the results.

1) A test piece is said to disintegrate if it splits open and/or if it shows substantial loss of particles during the test.

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