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Fibre-cement flat sheets AMENDMENT 1

Plaques planes en fibres-ciment
AMENDEMENT 1

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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Foreword

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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.

Amendment 1 to ISO 8336:1993 was prepared by Technical Committee ISO/TC 77, *Products in fibre reinforced cement*.

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Fibre-cement flat sheets

AMENDMENT 1

Page 1, subclause 4.1

Replace the text by:

4.1 Type A

Type A sheets are intended for external applications where they may be subjected to the direct action of sun, rain and/or snow. They may be supplied coated or uncoated. Type A sheets shall comply with the requirements of the type-tests in clause 6.

The sheets are further classified into three categories according to their modulus of rupture based on bending strength.

The manufacturer shall declare the type and the category of his product in his literature.

Page 2, subclause 4.2

Replace the text by:

4.2 Type B

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Type B sheets are not subjected to the type-tests and are intended for internal and external applications where they will not be subjected to the direct action of sun, rain and/or snow.

The sheets are further classified into five categories according to their modulus of rupture based on bending strength.

The manufacturer shall declare the type and the category of his product in his literature.

Page 2, subclause 5.1.3 b)

Replace the text by:

b) on thickness, e : ± 10 %

For sheets without texture on the exposed face the maximum difference between extreme values of the thickness measurements within one sheet shall not exceed 15 % of the maximum measured value.

The measurement method is given in 8.1.1.3.

Pages 2 and 3, subclause 5.2.1 and NOTE 5

Replace the text by:

5.2.1 Bending strength

When tested as specified in 8.1.2.1, the minimum modulus of rupture of the sheets, expressed in megapascals, shall be as specified in Table 1. The modulus of rupture shall be the average of the values obtained from testing the samples in both directions.

This determination of mechanical properties shall be carried on preconditioned specimens in ambient or wet conditions or as specified by national standards. In the absence of national standards, type testing shall be carried out for type A only on wet preconditioned specimens.

Type B sheet strengths shall only be specified in the ambient condition and the specimens shall be tested in this ambient condition.

NOTE 5 If the manufacturer includes product strengths in his literature, it should be clearly stated whether they are mean or minimum values and they should be determined using the methods specified in 8.1.2.1. The minimum values are based on the same sampling and inspection procedures as for classification in Table 1.

Table 1 — Minimum modulus of rupture

Values in megapascals

Category	Minimum MOR	
	Type A sheets (Wet)	Type B sheets (Ambient)
1	—	4
2	4	7
3	7	10
4	13	16
5	18	22

Page 3, subclause 6.3

Replace the text by:

6.3. Frost resistance⁵⁾ (optional test)

The total number of freeze-thaw cycles shall be defined by the national standards specifying the test with a minimum of 25 cycles. In the absence of national standards, 25 cycles shall be carried out.

Sheets are tested as specified in 8.2.3. After completion of the specified cycles a visual inspection and, if required, a bending strength test are carried out in accordance with 8.2.3.

Interpretation of the results shall be described in the national standards.

5) These requirements do not apply to surface coatings.

Page 3

Add a new subclause, 6.7

6.7 Reaction to fire

For the purpose of conformity with national regulations, products may be subjected to specific reaction to fire tests. The details of the specifications and acceptance criteria shall be defined by national standards and/or regulations.

Page 4, subclause 7.2

Replace the text by:

7.2 Type-tests

A type-test is concerned with the approval of a new product and/or a fundamental change in formulation and/or method of manufacture, the effects of which cannot be predicted on the basis of former experience.

The test shall be performed on the as-delivered product.

The test is required to demonstrate conformity of a generic product to a specification but is not required for each production batch.

When type-tests are carried out, the product shall also be subjected to the acceptance tests to ensure that it complies with the requirements of this International Standard.

These type-tests are:

- a) bending strength (compulsory), see 6.1.
- b) water permeability (compulsory), see 6.2.
- c) frost resistance (optional), see 6.3.
- d) warm water (optional), see 6.4.
- e) soak-dry (optional), see 6.6.

Page 4, subclause 8.1.1.1

Replace the text by:

8.1.1.1. Apparatus

- a) Smooth, flat, rigid inspection surface of production quality and of dimensions appropriate to the dimensions of the sheets.

Two metal rules shall be fixed at right angles along adjacent edges of the inspection surface. The straightness of each metal rule shall be at least 0,3 mm/m and the right angle shall be accurate to at least 0,1 % (less than 1 mm deviation from normal per metre of length) or 0,001 rad. The arms shall be at least the length of the sheet edges.

- b) Suitable metal rulers, capable of being read to 0,5 mm.
- c) Dial gauge, reading at least to 0,05 mm, with flat parallel metal jaws, between 6 mm and 15 mm in diameter.

Page 5, subclause 8.1.1.4

Replace the text by:

8.1.1.4 Measurement of straightness of edges

Measurement of straightness of edges may be carried out according one of the two following alternative methods:

- a) Apply each of the edges to the relevant arm of the square. Measure, to the nearest 0,5 mm by means of a steel rule, the greatest separation between the edge of the sheet and the arm of the square. Report the results.
- b) Assess each result against the tolerance given in 5.1.4.1
- c) Measure, to the nearest 0,5 mm by means of a steel rule, the greatest separation between the edge of the sheet and a string or wire stretched from one corner of the sheet to the adjacent one. Report the results.

Assess each result against the tolerance given in 5.1.4.1

Page 6, subclause 8.1.2.1.3

Replace the text by:

8.1.2.1.3 Conditioning for ambient strength

Store the test specimens in the laboratory at a minimum temperature of 5 °C, for a minimum of 3 d if the nominal thickness of the sheets is ≤ 20 mm, and for a minimum of 7 days if the nominal thickness is > 20 mm.

Specimens have to be placed in such a manner that all the faces are adequately ventilated.

Information on temperature and relative humidity at the beginning of the conditioning shall be indicated in the report.

Page 8, subclause 8.2.1.1

Replace the text by:

8.2.1.1 General

This test method is designed to assess the ambient modulus of rupture and the wet modulus of rupture.

Page 9, subclause 8.2.1.4

Replace the text by:

8.2.1.4 Expression and interpretation of results

The ambient modulus of rupture shall be the arithmetic mean of the test results obtained in the ambient conditions. The wet modulus of rupture shall be the arithmetic mean of the test results obtained in the wet condition.

Assess the results against the specifications of 6.1.

Page 9, subclause 8.2.2.4

Replace the text by:

8.2.2.4 Procedure

Place and seal the frame on top of the face of the specimen and fill with water to a height of 20 mm above the face of the sheet. Place the specimen at ambient temperature (above 5 °C). The duration of the test shall be 24 h.

Page 9, subclause 8.2.3.3

Replace the text by:

8.2.3.3 Procedure

Submit one lot of 10 specimens to the bending test in accordance with 8.2.1 and at the same time submit the other lot of 10 specimens to the following freeze-thaw test.

At the same time immerse the specimens in water at ambient temperature (above 5 °C) until the difference of mass between two consecutive weighings spaced 24 h apart is less than 0,5 %.

Submit the specimens to the required number of cycles consisting of:

- cooling in air to $-20\text{ °C} \pm 2\text{ °C}$ in not less than 1 h and not more than 2 h. The specimens shall be held at $-20\text{ °C} \pm 2\text{ °C}$ for 1 h (see notes in 8.2.3.4);
- thawing in water to reach $+20\text{ °C} \pm 2\text{ °C}$ within 1 h and 2 h maximum. The specimens shall be maintained in water at $20\text{ °C} \pm 2\text{ °C}$ for 1 h and then freezing shall recommence (see notes in 8.2.3.4).

Each freeze-thaw cycle shall have a minimum cycle time of 4 h and a maximum of 6 h.

The temperature specified above refers to the freezing cavity.

At the end of this period, place the specimens in a laboratory atmosphere for 7 d.

Examine the specimens with the naked eye in order to detect possible cracks, delamination or other defects, and record any observation.

After preliminary conditioning, carry out the bend test as specified in 8.1.2.1.

Page 11, subclause 10.1

Replace the text by:

10.1 Conformity with requirements

The manufacturer shall establish and maintain an effective documented quality control system developed, e.g., on the basis of the standards of the series ISO 9000.

The AQL shall be determined in accordance with national standards. For acceptance tests, 90 % in the statistical meaning of the delivered products shall fulfil the requirements of 5.1. and 5.2. In absence of national documents, the sampling schemes provided in ISO 390 with an AQL of 4 %⁶⁾ and an inspection level

6) A sampling scheme with an AQL of 4 % means that the batches containing up to 4 % defective items have a high probability of acceptance.