



SLOVENSKI STANDARD SIST EN 492:1998

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Vlaktocementne strešne plošče in fazonski kosi - Specifikacije in preskusne metode

Fibre-cement slates and their fittings for roofing - Product specification and test methods

Faserzement-Dachplatten und dazugehörige Formteile für Dächer - Produktspezifikationen und Prüfverfahren

Ardoises en fibres-ciment et leurs accessoires en fibres-ciment pour toiture - Spécification du produit et méthodes d'essai

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EUROPEAN STANDARD

EN 492

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English version

**Fibre-cement slates and their fittings for roofing -
Product specification and test methods**

Ardoises en fibres-ciment et leurs accessoires
en fibres-ciment pour toiture - Spécification
du produit et méthodes d'essai

Faserzement-Dachplatten und dazugehörige
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by CEN/TC 128 "Roof covering products for discontinuous laying", the secretariat of which is held by ON.

A distinction has been made between product appraisal (test types) and routine quality control requirements (acceptance tests).

Attention is drawn to the need for observance of EC and/or EFTA Directives transposed into national legal requirements restricting the use of certain materials and to the related marking and labelling requirements.

The performance of a roof constructed with these products depends not only on the properties of the product as required by this standard, but also on the design, construction and performance of the roof as a whole in relation to the environmental and conditions of use.

Annex D is an informative Annex and contains an A-Deviation.

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by August 1994, and conflicting national standards shall be withdrawn at the latest by August 1994.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 SCOPE

This standard specifies the technical requirements and establishes methods of inspection and test as well as acceptance conditions for fibre-cement slates and their fibre-cement fittings for roofing.

It applies to fibre-cement slates with a height dimension h (see clause 4) not exceeding 850 mm for overlapping assembly into coverings for roofs.

For the purpose of this standard fibre-cement slates have been classified according to their bending moment.

2 NORMATIVE REFERENCES

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 29001 : 1987 Quality systems - Model for quality assurance in design, development, production, installation and servicing

EN 29002 : 1987 Quality systems - Model for quality assurance in production and installation

ENV 197-1 : 1992 Cement - Composition, specifications and conformity criteria - Part 1: Common cements

ISO 390 : 1993 Products in fibre reinforced cement - Sampling and inspection

ISO 2859-1 : 1989 Sampling procedures for inspection by attributes - Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection

ISO 3951 : 1989 Sampling procedures and charts for inspection by variables for percent nonconforming

3 DEFINITIONS

For the purposes of this standard the following definitions apply:

3.1 acceptance test:

Test to establish whether a batch of products conforms to a specification. The test is performed on samples drawn either from continuous production or from a consignment.

NOTE: Test methods and specification limit values are specified in this standard. Sampling levels and acceptance criteria are given in 6.1.2.

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3.2 type test:

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Test carried out for the approval of a new product and/or when a fundamental change is made in formulation and/or method of manufacture the effects of which cannot be predicted on the basis of previous experience.

The test is performed on the as delivered product; it is required to demonstrate conformity of the generic product to a specification but is not required for each production batch.

3.3 acceptable quality level (AQL) :

In a sampling plan, the quality level which corresponds to a specified, relatively high probability of acceptance.

It is the maximum percent defective (or maximum number of defects per 100 units) that for purposes of sampling inspection can be considered satisfactory as a process average.

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

3.4 as delivered:

The same condition as the producer intends to supply the product after completing all aspects of the process including maturing and, when appropriate, painting.

3.5 upper face:

Face normally exposed to the weather

4 SYMBOLS AND ABBREVIATIONS

- b*** 1. Dimension of the specimen (length or width) measured parallel to the test machine supports in millimetres
2. One of the coefficients of the regression line (annex B)
- d*** Apparent density of the fibre-cement slate in grams per cubic centimetre
- e*** Thickness of the fibre-cement slate in millimetres
- F*** Load at rupture in newtons
- h*** Dimension of the fibre-cement slate measured perpendicular to the line of fixing which is at or nearest to the horizontal plane of the roof (see annex C, Figures C.1 and C.2), in millimetres
- l_s*** Span between the centers of the test machine supports in the bending moment test in millimetres
- m*** Mass of the specimen after drying in grams
- M*** Bending moment at rupture in newtons metres per metre
- M_{fi}*** Bending moment at rupture of the specimen from the *i*th pair tested after the type test (second lot) in newtons metres per metre
- M_{fci}*** Bending moment at rupture of the specimen from the *i*th pair tested for reference in the type test (first lot) in newtons metres per metre
- R*** Average ratio of the bending moments at rupture before and after the type test

- R_i Individual ratio of the bending moments at rupture of the i^{th} pair of specimens before and after a type test
- R_L Lower estimate of the mean of the ratios at 95% confidence level of the bending moments at rupture before and after the type test
- s Standard deviation of the values in the appropriate calculation
- V Volume of the specimen in cubic centimetres
- x_o Actual result obtained when dry testing
- x_{std} Minimum value to be used as the specification for the dry method of test. This value is calculated at the 97,5% lower confidence level from the value y_{std} specified for the wet method of test in this standard
- y_o Value calculated from the value obtained from a specimen tested dry, which is the estimate at the 97,5% lower confidence level of the value expected from a specimen tested wet
- y_{std} Minimum value specified in the standard for wet testing.

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5 REQUIREMENTS FOR FIBRE-CEMENT SLATES

5.1 General requirements

5.1.1 Composition

Fibre-cement slates shall consist essentially of cement or a calcium silicate formed by chemical reaction of a siliceous and a calcareous material, reinforced by fibres. The cement shall comply with relevant national standards of CEN members and/or ENV197-1.

Two types of fibre-reinforced cement slates are included in this standard:

Type AT (Asbestos Technology) for products the formulation of which contains chrysotile asbestos.

Type NT (Non-asbestos Technology) for products reinforced by other fibres and not containing asbestos.

The reinforcing fibres shall be one or more of the following forms:

- discrete elements randomly dispersed;

- continuous strands or tapes;
- nets or webs.

Process aids, fillers and pigments which are compatible with the composite may be added.

5.1.2 Appearance and finish

The exposed face of the fibre-cement slates can be with or without texture. The fibre-cement slates can be coloured or left in their natural colour. The fibre-cement slates can also receive adherent coloured or uncoloured coatings on their surface.

The fibre-cement slates can be supplied holed for fixing.

On exposure the surface and/or its coating will be affected by weathering which may vary with site location, aspect, pitch of roof and duration of exposure. Any deterioration in this respect shall not detract from the minimum mechanical and physical characteristics as specified in this standard or from the function of the fibre-cement slate as a durable element.

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5.2 Dimensions and tolerances

5.2.1 General

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The manufacturer shall specify the shapes, sizes and configuration of edges.

NOTE: See 5.5 for designation and information.

5.2.2 Thicknesses

The actual fibre-cement slate thickness determined in accordance with 7.2 shall be not less than that shown in table 1.

The nominal thickness shall be specified by the manufacturer.

5.2.3 Tolerances on nominal dimensions

The maximum dimensional variation when measured as specified in 7.2 shall be as follows:

Length and width: ± 3 mm

Thickness:
- 10
+ 25
% of the nominal value.

5.3 Physical requirements and characteristics

5.3.1 General

Mechanical and material properties are normally determined on products as delivered. The results shall be identified as applying to coated or uncoated material.

NOTE: See 6.1 for statistical interpretation.

5.3.2 Apparent density

The manufacturer's literature shall specify the minimum apparent density of the fibre-cement slates. The fibre-cement slates shall have an apparent density equal to or greater than that specified by the manufacturer when tested in accordance with 7.3.1.

5.3.3 Mechanical characteristics

When tested in accordance with 7.3.2 the fibre-cement slates shall have a minimum average bending moments per metre width in newtons metres per metre as specified in table 1.

The minimum bending moment at rupture in the weaker direction shall be not less than 60% of the specified values for the average of the two directions.

Table 1: Minimum bending moment per meter and minimum thickness

h mm	Min. e * mm	Average of the two directions	
		Class A N m/m	Class B N m/m
$h \leq 350$	2,8	25	35
$350 < h \leq 450$	3,0	30	45
$450 < h \leq 600$	3,5	35	50
$600 < h \leq 850$	4,0	45	60

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e)* being the arithmetic mean of four measurements (according to 7.2.4).

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NOTE 1: The following special classes are also available:

- class AS: For mild climatic conditions lower bending moments than above are permissible for fibre-cement slates of $h \leq 450$ mm with a minimum equivalent to the numerical value of $h/20$;
- class BS: When higher bending moments are required for batten spacings > 250 mm, the required minimum shall be equivalent to the numerical value of $h/5$.

NOTE 2: All classes are suitable for laying on three or more battens or directly onto a continuous rigid roof surface but only classes B and BS are suitable for laying on two battens.