



SLOVENSKI STANDARD
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Montažni betonski izdelki - Splošna pravila za notranjo kontrolo proizvodnje steklocementnega betona

Precast concrete products - General rules for factory production control of Glass fibre Reinforced Concrete

Vorgefertigte Betonerzeugnisse - Allgemeine Regeln für die werkseigene Produktionskontrolle von Glasfaserbeton

Produits préfabriqués en béton - Règles générales pour le contrôle de la production en usine des composites ciment-verre

Ta slovenski standard je istoveten z: prEN 1169

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Precast concrete products - General rules for factory production control of Glass fibre Reinforced Concrete

Produits préfabriqués en béton - Règles générales de
contrôle de production des composites ciment-verre

Vorgefertigte Betonerzeugnisse - Allgemeine Regeln
für die werkseigene Produktionskontrolle von
Glasfaserbeton

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 229.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 1169:2023) has been prepared by Technical Committee CEN/TC 229 “Precast concrete products”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1169:1999.

EN 1169:2023 includes the following significant technical changes with respect to EN 1169:1999:

- Clarification of the scope, with precision about what is covered and what is excluded,
- Modification of the symbols used in coherence with EN 1170 and EN 15191,
- Updated reference to the new EN 1170:2023 as resulting of the revision and merging of parts of the EN 1170 series,
- Technical modifications in accordance with the new EN 1170:2023,
- Overall rewriting to comply with CEN Internal Regulation part 3.

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prEN 1169:2023(E)**Introduction**

When developing a GRC composite material, the manufacturer should not only consider the properties required for the specific application but also the requirements of the production processes.

Where a customer is considering using products manufactured from GRC composites, early consultation with GRC manufacturers is recommended.

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1 Scope

This document defines the general processes, procedures and rules for production and production control of Glass fibre Reinforced Concrete used to manufacture products commonly used in construction, civil engineering, architecture and other applications.

Glass fibre reinforced concrete can be produced from a range of mix designs comprising various materials and manufactured by different processes. This document covers two primary production processes, namely Sprayed GRC and Premix GRC.

This document does not cover concrete, where the glass fibre does not act as primary reinforcement but is used as an additive. It does not cover but can be used as guidance for injection and extrusion manufacturing processes.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 1170:2023, *Precast concrete products - Test method for glass-fibre reinforced cement*

EN 15191:2023, *Classification of glass fibre reinforced concrete performance*

EN 15422:2008, *Precast concrete products - Specification of glassfibres for reinforcement of mortars and concretes*

3 Definitions and abbreviation

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp/>

— IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Definitions

3.1.1

additive

product that may be added to the matrix composition to improve some properties

Note 1 to entry: It can be reactive (e.g., silica fumes) or inert, mineral or organic (e.g. polymer dispersions).

3.1.2

admixture

constituent added during the mixing process in small quantities related to the mass of cement to modify the properties of fresh or hardened concrete

[SOURCE: EN 206:2013]

prEN 1169:2023(E)**3.1.3****AR glass-fibre (Alkali-Resistant)**

glass fibre resistant to the alkaline environment of matrices made from cement, sand etc.

Note 1 to entry: See "matrix" below

Note 2 to entry: This resistance is due particularly to a specific composition of the glass.

3.1.4**strand**

glass fibre reinforcement element formed by binding together individual filaments of a nominal diameter between 10 µm to 30 µm

3.1.5**glass fibre reinforced concrete (GRC)**

composite material consisting of a matrix of hydraulic binder reinforced with glass fibres as reinforcement usually randomly distributed throughout the matrix, these materials being compatible

3.1.6**matrix**

part of glass fibre reinforced cement comprising the mixture of sand, cement, water, and additives and admixtures when used

3.1.7**spray process**

process whereby a GRC product in which the fibres are oriented randomly in layers parallel to the mould surface is manufactured by simultaneously spraying a cementitious matrix and alkali resistant glass fibres through the same nozzle of a special spray gun specifically designed for the purpose

3.1.8**premix process**

process whereby glass fibres, which have been cut to predetermined lengths, are blended with the cementitious matrix to produce a glass fibre reinforced concrete which can be formed into products by casting, with or without vibration to aid compaction, spraying, injection, extrusion, etc.

3.1.9**roving**

one format in which the alkali resistant glass fibre is supplied

3.1.10**tex**

weight of the roving or strand per kilometre, normally measured in grams

3.1.11**filament**

individual element of the glass fibre from which strands are formed

3.1.12**size**

binder with which the individual glass fibre filaments are bonded together to form strands

3.1.13**textile GRC**

process where a premix is cast or sprayed in layers and additional AR Glass fibres (e.g., textiles, continuous strands, mats, and other forms of continuous, directional reinforcement made from AR Glass) are placed in a defined direction

3.2 Symbols and abbreviated terms

ϵ_{LOP}	strain at limit of proportionality
ϵ_{MOR}	strain at failure
σ_{LOP}	stress at limit of proportionality, in megapascals
σ_{MOR}	stress at failure, in megapascals
AR	alkali resistant
FPC	factory production control
GRC or GFRC	glass fibre reinforced concrete
LOP	limit of proportionality
MOR	modulus of rupture

4 Factory production control**4.1 General**

The manufacturer shall establish, document, maintain and implement a factory production control (FPC) system to ensure that the GRC composite material meets the requirements of this standard and complies with the specified or declared values and with the requirements on technical documentation.

NOTE A manufacturer that operates a quality system in accordance with EN ISO 9001:2015 and takes into account the requirements of this standard is deemed to satisfy the factory production control requirements as described hereafter.

4.2 Organisation

The tasks, competences, responsibilities and authority of the personnel involved in factory production control shall be defined, documented, maintained and implemented, including procedures for the following activities:

- demonstration of conformity of the GRC composite material at appropriate stages,
- identification recording and dealing with any instance of non-conformity,
- establishment of causes of non-conformity and possible corrective action (design, materials or production procedures).

An organisational scheme shall clarify the activities given in a) to c) of the personnel involved.

Special requirements regarding the competence level of various functions may be applicable.

prEN 1169:2023(E)**4.3 Control system**

The factory production control system shall consist of procedures, instructions, regular inspections, tests and the utilization of the results to control equipment, raw materials, other incoming materials, production process and finished GRC composite material.

4.4 Document control

Documents shall be controlled in such a way that only valid copies are available in the workplace. These documents are the procedures, instructions, standards, construction reports, drawings and the factory production control procedures.

The production drawings and documents shall provide the specifications and all data necessary for the manufacture (see 4.5) of the GRC composite material. They shall be dated and approved for production by a person designated by the manufacturer.

In case the manufacturer uses shared product-type results, the FPC shall also include the appropriate documentation as foreseen in Clause 6.2.1.

4.5 Process control

The manufacturer shall identify the relevant features of the plant and/or the production process which affect the conformity of the GRC composite material with the technical specification. He shall plan and perform the production process in such a manner that conformity of the GRC composite material with the requirements of the product standard is ensured.

4.6 Inspection and testing**4.6.1 General**

Inspection and testing shall be performed on equipment, raw materials, other incoming materials, production process and finished GRC composite material. The subjects, criteria, methods and frequencies related to inspection and testing shall be laid down in inspection schemes. The frequency of checks and inspections and the methods which are not specified in this standard shall be defined in such a way as to achieve permanent conformity of the product.

The inspection schemes given in Annexes B to D are reference schemes.

The manufacturer shall apply the relevant parts of these schemes unless he can demonstrate that any changes which he makes to them achieve equal confidence in the conformity of the GRC composite material.

If relevant, additional inspections may be carried out.

The results of inspection which are expressed in numerical terms, all inspection results requiring corrective action and test results, shall be recorded and be available.

The tests shall be carried out in accordance with the methods mentioned in EN 1170:2023 or by applying alternative test methods with a proven correlation or a safe relationship to the standard methods.

Appropriate further testing of samples taken at the factory shall be carried out when it is necessary for the demonstration of the compliance.

The results of testing shall meet the specified conformity criteria and be available.