



European Technical Approval ETA-11/0410

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	"Cem-FIL AR-Glasfasern" und "Anti-Crak AR-Glasfasern" "Cem-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres"
Zulassungsinhaber <i>Holder of approval</i>	OCV Reinforcements Alcala Spain, S.L. Carretera Madrid-Barcelona, km 34,5 28800 ALCALÁ DE HENARES (Madrid) SPANIEN
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Alkali-resistente, zirconiumdioxidhaltige Glasfasern für die Verwendung in Beton <i>Alkali resistant glass fibres containing zirconium dioxide for the use in concrete</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> bis <i>to</i> 16 November 2011 16 November 2016
Herstellwerk <i>Manufacturing plant</i>	OCV Reinforcements Alcala Spain, S.L. Carretera Madrid-Barcelona, km 34,5 28800 ALCALÁ DE HENARES (Madrid) SPANIEN

Diese Zulassung umfasst
This Approval contains

10 Seiten einschließlich 2 Anhänge
10 pages including 2 annexes

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by law of 31 October 2006⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2006*, p. 2407, 2416
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The alkali resistant glass fibres (AR glass fibres) "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" (see Annex 1 and 2) are made of glass containing zirconium dioxide to have a high alkali resistance. The fibres are produced as chopped strands or as roving chopped up by the user to ≤ 75 mm. The AR glass fibres have a sizing. The strand-in-cement-strength (SIC strength) of the AR glass fibres is greater than 250 N/mm².

1.2 Intended use of the construction product

The AR glass fibres are intended to be used in concrete, mortar and other mixes for construction and for the manufacturing of construction products.

The usage of the 'AR glass fibres' can especially improve the flexural strength and the tensile strength of concrete or mortar and also the cracking characteristics in early age concrete.

1.3 Assumed working life of the construction product

The provisions made in this European technical approval are based on an assumed working life of concrete incorporating the alkali resistant glass fibres "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" for the intended use of 50 years, provided that the conditions laid down in sections 4.2 for installation and 5 for packaging, transport and storage are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of the product and methods of verification

2.1 Chemical composition of glass

The chemical composition of the glass shall be determined by X-ray fluorescence method (XRF) with appropriate standards. The chemical composition of the glass shall show no significant change when compared to the deposited composition provided by the manufacturer.

2.2 Zirconium dioxide content (ZrO₂)

The zirconium dioxide content (ZrO₂) shall be determined by X-ray fluorescence method (XRF) with appropriate standards. The zirconium dioxide content (ZrO₂) of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall be at least 16 %.

2.3 Absolute density

The absolute density of the filament shall be measured according to EN 196-6⁷, 4.5.3, resp. EN ISO 1183-3⁸. The absolute density of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall comply with the requirement $2,68 \pm 0,20$ g/cm³.

⁷ EN 196-6:2010

Methods of testing cement - Part 6: Determination of fineness

⁸ EN ISO 1183-3:1999

Plastics - Methods for determining the density of non-cellular plastics - Part 3: Gas pycnometer method (ISO 1183-3:1999)

2.4 Size content

The size content shall be determined in accordance with ISO 1887⁹. The size content of the alkali resistant glass fibres complies with the combustible organic matter content or loss on ignition. The size content of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall not deviate from the declared value by more than

- $\pm 0,3 \%$ (absolute value) for a size content $\leq 1,5 \%$
- $\pm 20 \%$ (relative value) for a size content $> 1,5 \%$.

2.5 Moisture content

The moisture content shall be determined in accordance with EN ISO 3344¹⁰. The moisture content of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall comply with the requirement $\leq 0,50 \%$ by mass.

2.6 Average diameter of filaments

The average diameter of the filaments shall be determined according to ISO 1888¹¹. The average diameter of the filaments of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall be between $8 \mu\text{m}$ and $30 \mu\text{m}$.

2.7 Length of chopped strands

The length of chopped strands shall be measured with optical equipment, with an accuracy of $0,1 \text{ mm}$. The length of the chopped strands of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall not deviate from the declared value (see Annex 1 and 2) by more than the following tolerances. At least 90% of the individual specimen fibres shall meet the specified tolerances.

Length l [mm]	Deviation of the individual value relative to the declared value	Deviation of the average value relative to the declared value
$l > 30$	$\pm 10 \%$	$\pm 5 \%$
$20 \leq l \leq 30$		$\pm 1,5 \text{ mm}$
$l < 20$	$\pm 2,0 \text{ mm}$	

2.8 Linear density of strand (Strand tex)

The linear density of the strand shall be determined in accordance with EN ISO 1889¹². The linear density of the strand of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall not deviate from the declared value (see Annex 1 and 2) by more than $\pm 10 \%$.

2.9 Linear density of roving (Roving tex)

The linear density of the roving shall be determined in accordance with EN ISO 1889¹². The linear density of the roving of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall not deviate from the declared value (see Annex 1 and 2) by more than $\pm 10 \%$.

⁹ ISO 1887:1995
¹⁰ EN ISO 3344:1997
¹¹ ISO 1888:2006
¹² EN ISO 1889:2009

Textile glass - Determination of combustible-matter content
Reinforcement products - Determination of moisture content (ISO 3344:1997)
Textile glass - Staple fibres or filaments - Determination of average diameter
Reinforcement yarns - Determination of linear density (ISO 1889:2009)

2.10 Tensile strength of strands

The tensile strength of strands shall be determined in accordance with ISO 3341¹³ respectively EN 14649¹⁴. The tensile strength of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall be at least 700 MPa (when tested acc. to EN 14649¹⁴) resp. 1000 MPa (when tested acc. to ISO 3341¹³) (see Annex 1 and 2).

2.11 Alkali resistance (SIC strength)

The alkali resistance shall be determined in accordance with the strand-in-cement (SIC) test method according to EN 14649¹⁴. The alkali resistant glass fibres of the "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" shall be classified in the following categories (see Annex 1 and 2) according to their alkali resistance:

- Class I: ≥ 400 MPa
- Class II: ≥ 350 MPa
- Class III: ≥ 250 MPa.

2.12 Effect on consistence (workability) of fresh concrete

The consistence according to EN 12350-3¹⁵ shall be determined on a reference concrete, conforming to EN 14845-1¹⁶, without fibres, and then on an identical mix with fibres. The reference concrete shall obtain a Vébé time of 10 to 6 sec. (V3). The amount of fibres added shall be the same than used for determination of the effect on flexural tensile strength according to 2.13. The effect on consistence and, if used, the amount and type of plasticizer or superplasticizer shall be declared by the manufacturer (see Annex 2).

2.13 Effect on strength of concrete (Residual flexural tensile strength)

The effect on strength shall be determined according to EN 14845-2¹⁷ and respectively EN 14651¹⁸ using a reference concrete conforming to EN 14845-1¹⁶. The producer shall declare the required dosage of fibres to achieve the following average residual flexural strength (see Annex 2):

- Class I:
F(CMOD 0,5 mm) $\geq 1,5$ MPa
F(CMOD 3,5 mm) $\geq 1,0$ MPa
- Class II:
No Performance Determined (NPD)

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the communication of the European Commission¹⁹ systems "1" and "3" of the attestation of conformity laid down in decision 1999/469/EC of 25/06/1999²⁰ amended by decision 2001/596/EC of 08/01/2001²¹ apply.

13	ISO 3341:2000	Textile glass - Yarns - Determination of breaking force and breaking elongation
14	EN 14649:2005	Precast concrete products - Test method for strength retention of glass fibres in cement and concrete (SIC TEST)
15	EN 12350-3:2009	Testing fresh concrete - Part 3: Vebe test
16	EN 14845-1:2007	Test methods for fibres in concrete - Part 1: Reference concretes
17	EN 14845-2:2006	Test methods for fibres in concrete - Part 2: Effect on concrete
18	EN 14651:2005+A1:2007	Test method for metallic fibre concrete - Measuring the flexural tensile strength (limit or proportionality (LOP), residual)
19	Letter of the European Commission of 13/11/2009 to EOTA	
20	Official Journal of the European Communities L 184/27 of 17/07/1999	
21	Official Journal of the European Communities L 209/33 of 02/08/2001	

These systems of attestation of conformity are defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
 - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks for the approved body:
 - (3) initial type-testing of the product;
 - (4) initial inspection of factory and of factory production control;
 - (5) continuous surveillance, assessment and approval of factory production control.

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
- (b) Tasks for the approved body:
 - (2) initial type-testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.²²

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of alkali resistant glass fibres in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European Technical Approval.

3.2.2 Tasks for the approved bodies

The approved bodies shall perform the

- initial type-testing of the product,

²²

The control plan is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

- initial inspection of factory and of factory production control,
 - continuous surveillance, assessment and approval of factory production control,
- in accordance with the provisions laid down in the control plan.

The approved bodies shall retain the essential points of their actions referred to above and state the results obtained and conclusions drawn in written reports.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the packaging and the accompanying commercial documents respectively. The letters "CE" shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- Description of the product: Alkali resistant glass fibres containing zirconium dioxide for the use in concrete,
- the fibre type (see Annex 1 and 2)
- the fibre length.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The AR glass fibres "CEM-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres" are manufactured from specified constituents in a production plant.

The European technical approval is issued for the product on the basis of agreed data and information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation

The products are AR glass fibres for use in concrete, mortar and other mixes for construction and for the manufacturing of construction products.

Mixing instructions shall be supplied by the manufacturer which recommends the mixing sequence to be adopted.

Concretes, mortars, grouts and other mixes composition, complying with commonly used mix-design parameters given in this ETA, and the constituent materials for described mixes shall be chosen to satisfy the requirements specified for fresh and hardened mixes, including consistence, density, strength, durability, protection of embedded steel against corrosion, taking into account the production process and the intended method of execution of works, following the appropriate standards and/or regulations for concrete and mortar valid in the place of use.

For each case of application initial tests shall be carried out with the intended concrete composition and the intended addition to demonstrate that the concrete can be processed reliably with the intended consistency provided under the conditions of the site and that the required properties are achieved.

5 Indications to the manufacturer concerning packaging, transport and storage

Materials shall be handled and stored with care. For packaging and storage EN 14020-2²³, 8.1 applies. On site the products must be stored in bags and protected against weather.

It is the responsibility of the manufacturer of the product to ensure that the information of these provisions is given to those involved.

Georg Feistel
Head of Department

beglaubigt:
Bahlmann

²³ EN 14020-2:2002

Reinforcements – Specification for textile glass rovings - Part 2: Methods of test and general requirements

Cem-FIL® AR-glass fibres		Size content	Linear density			Tensile strength of strands	Alkali resistance (SIC strength)	Length of strands	Effect on consistence of concrete	Effect on strength of concrete
Type	Fibre type		Average filament diameter	Strand tex	Roving tex					
		[% by mass]	[µm]	[g/1000 meters]	[g/1000 meters]	[MPa]	[N/mm ²]	[mm]		
Integral chopped strands	Cem-FIL® 60.3 82tex	0,8	14	82	-	> 1000	≥ 350 Class II	≤ 40	NPD	NPD
	Cem-FIL® 60.3 45tex	0,8	14	45	-	> 1000	≥ 350 Class II	≤ 40	NPD	NPD
	Cem-FIL® 60.3 135tex	0,8	18	135	-	> 1000	≥ 350 Class II	≤ 40	NPD	NPD
	Cem-FIL® 62.4 45tex	1,8	14	45	-	> 1000	≥ 400 Class I	≤ 40	NPD	NPD
	Cem-FIL® 62.4 82tex	1,8	14	82	-	> 1000	≥ 400 Class I	≤ 40	NPD	NPD
Dispersible chopped strands	Cem-FIL® 70.3	0,6	20	660	-	> 1000	≥ 250 Class III	≤ 40	NPD	NPD
Assembled Roving	Cem-FIL® 54.2 76tex 2450	2,0	14	76	2450	> 1000	≥ 400 Class I	endless*	NPD	NPD
	Cem-FIL® 54.2 38tex 2450	2,0	14	38	2450	> 1000	≥ 400 Class I	endless*	NPD	NPD
	Cem-FIL® 61.2 82tex 2500	1,8	14	82	2500	> 1000	≥ 400 Class I	endless*	NPD	NPD

*chopped up by the user to ≤ 75 mm

"Cem-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres"

DESCRIPTION OF PRODUCT TYPES OF "Cem-FIL® AR-glass fibres"

Annex 1

Anti-Crak® AR-glass fibres		Size content [% by mass]	Linear density			Tensile strength of strands [MPa]	Alkali resistance (SIC trength) [N/mm²]	Length of strands [mm]	Effect on consistence of concrete	Effect on strength of concrete
Type	Fibre type		Average filament diameter [µm]	Strand tex [g/1000 meters]	Roving tex [g/1000 meters]					
Integral chopped strands	Anti-Crak® HP 74/12	0,8	14	45	-	> 1000	≥ 350 Class II	12 ± 2	NPD	NPD
	Anti-Crak® HP 58/12	0,8	17	80	-	> 1000	≥ 350 Class II	12 ± 2	NPD	NPD
	Anti-Crak® HP 37/6	0,8	14	45	-	> 1000	≥ 350 Class II	6 ± 2	NPD	NPD
	Anti-Crak® HP 110/18	0,8	14	45	-	> 1000	≥ 350 Class II	18 ± 2	NPD	NPD
	Anti-Crak® HP 74/18	0,8	18	135	-	> 1000	≥ 350 Class II	18 ± 2	NPD	NPD
	Anti-Crak® HP 67/36	2,0	19	430	-	> 1000	≥ 350 Class II	36 ± 2	Vebe time Reference concrete: V3 (9 sec.) Concrete** with 20 kg fibres/m³: V3 (7 sec.)	Class I (20 kg/m³) F(CMOD 0,5mm) = 3 MPa F(CMOD 3,5mm) = 1.4 MPa
Dispersible chopped strands	Anti-Crak® HD	0,6	14	330	-	> 1000	≥ 250 Class III	≤ 40	NPD	NPD
Assembled Roving	Anti-Crak® HP 82tex 2500	1,8	14	82	2500	> 1000	≥ 400 Class I	end- less*	NPD	NPD

* chopped up by the user to ≤ 75 mm

**superplasticizing agent: 0.6 % of cement mass

"Cem-FIL AR-glass fibres" and "Anti-Crak AR-glass fibres"

DESCRIPTION OF PRODUCT TYPES OF "Anti-Crak® AR-glass fibres"

Annex 2