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Agrément Certificate

21/5872

Product Sheet 1 Issue 2

SIKA FIBRES FOR CONCRETE

SIKAFIBER-1050 B&BA HF

This Agrément Certificate Product Sheet ⁽¹⁾ relates to SikaFiber-1050 B&BA HF, steel fibres for use in fibre-reinforced concrete toppings in suspended beam-and-block ground floors, for loads from single-family dwellings as defined in this Certificate.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Second issue: 23 February 2024

Originally certified on 11 March 2021

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that SikaFiber-1050 B&BA HF, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: A1(1)

Loading

Comment:

The product can be designed to sustain and transmit dead and imposed floor loads to the supporting structure. See section 1 of this Certificate.

Regulation: 7(1)

Materials and workmanship

Comment:

The product is of acceptable materials. See sections 8 and 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)

Fitness and durability of materials and workmanship

Comment:

The product can contribute to a construction satisfying this Regulation. See sections 8 and 9 of this Certificate.

Regulation: 9

Building standards – construction

Standard:

1.1(a)(b)

Structure

Comment:

The product can sustain and transmit dead and imposed floor loads to the supporting structure, with reference to clause 1.1.1⁽¹⁾ of this Standard. See section 1 of this Certificate.

(1) Technical Handbook (Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation: 23(a)(i)(iii)

Fitness of materials and workmanship

Comment:

(b)(i)(ii)

The product can contribute to a construction satisfying this Regulation. See sections 8 and 9 of this Certificate.

Regulation: 30

Stability

Comment:

The product can sustain and transmit dead and imposed floor loads to the supporting structure. See section 1 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, SikaFiber-1050 B&BA HF, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 3.1 *Concrete and its reinforcement* and 5.2 *Suspended ground floors*.

Fulfilment of Requirements

The BBA has judged SikaFiber-1050 B&BA HF to be satisfactory for use as described in this Certificate. The product has been assessed as reinforced concrete toppings in suspended beam-and-block ground floors for loads from single-family dwellings.

ASSESSMENT

Product description and intended use

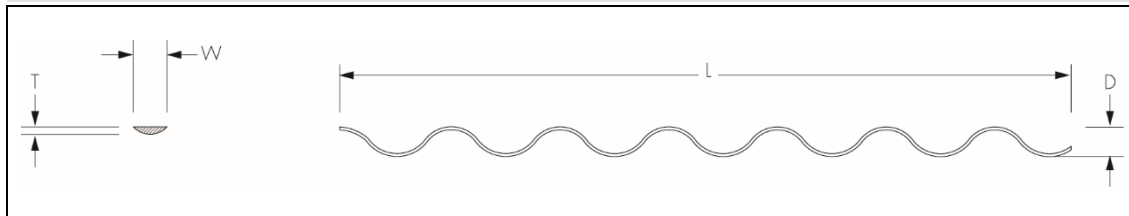
The Certificate holder provided the following description for the product under assessment. SikaFiber-1050 B&BA HF consists of steel fibres.

The steel fibres have the nominal characteristics given in Table 1 and Figure 1.

Table 1 Nominal properties of the steel fibres

Characteristic (unit)	Value
Shape	Corrugated/wavy
Steel grade	Low carbon
Tensile strength (N·mm ⁻²)	700
Length (mm)	50 ± 3
Width (mm)	3.0 ± 0.5
Thickness (mm)	0.75 ± 0.25
Depth (mm)	2.25 ± 0.25
Density (kg·m ⁻³)	7850

Figure 1 Image of the fibre



Ancillary items

The following ancillary items are essential to use with the product.

- normal or self-compacting concrete, to the minimum specification given in Table 2 of this Certificate. The concrete must conform to the requirements of BS EN 206 : 2013, BS 8500-1 : 2023 and BS 8500-2 : 2023 and must be supplied by a ready-mix supplier with third-party quality scheme certification.
- prestressed concrete beams – must be designed in accordance with the principles of BS EN 1992-1-1 : 2004 and its UK National Annex, and must be CE marked/designed in accordance with the principles of BS EN 15037-1 : 2008
- a beam-and-block-type suspended ground floor system with current BBA certification (see Product Sheet 99 of this Certificate).

Table 2 Concrete specification

Concrete grade	C20/25
Maximum aggregate size	20 mm ⁽¹⁾
Consistency class (standard concrete)	S3 or S4
Slump flow class ⁽²⁾ (self-compacting concrete)	SF1 (550 to 650 mm) or SF2 (660 to 750 mm)
Dosage rate of SikaFiber-1050 B&BA HF	11.50 kg per cubic metre of concrete

(1) Aggregate must be in accordance with BS EN 12620 : 2002.

(2) The sand content must be greater than 45%.

Product assessment – key factors

The product was assessed for the following key factors, and the outcome of the assessment is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

1.1 Behaviour under loading

1.1.1 Results of load carrying capacity tests are given in Table 3.

Table 3 Load carrying capacity tests

Product assessed	Assessment method	Requirement	Results
Concrete topping reinforced with steel fibre SF86	BBA test Method	Withstand a declared concentrated load, partition line load as defined in Table 4 of this Certificate at Serviceability Limit States (SLS) and Ultimate Limit States (ULS)	Pass

1.1.2 The characteristic values of imposed concentrated loads and uniformly distributed loads (UDLs) for single-family dwellings in accordance with the principles of BS EN 1991-1-1 : 2002 and its UK National Annex, are given in Table 4 of this Certificate.

Table 4 Maximum characteristic imposed, partition loads and weight of finishes for concrete floors reinforced with Adfil S86 steel fibre for single-family dwellings

Description	Characteristic value of loads for single-family dwellings
Imposed UDL (kN·m ⁻²)	1.5 ⁽¹⁾
Imposed concentrated load (kN)	2.0 ⁽¹⁾⁽²⁾
Line load partitions (kN·m ⁻¹)	1.0 ⁽³⁾
Allowance for moveable partition (kN·m ⁻²)	0.5 ⁽³⁾
Finishes (kN·m ⁻²)	0.25

(1) Imposed concentrated load must not be combined with UDL, or other variable actions.

(2) Imposed concentrated load for residential buildings is assumed to be applied over a square plate (at least 50 by 50 mm).

(3) Either the line load or allowance for moveable partitions must be accounted for.

1.2 On the basis of data assessed, SikaFiber-1050 B&BA HF steel fibres can contribute to resistance of the concrete against the applied loads from single-family dwellings (see Table 3 of this Certificate).

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Not applicable.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

Data were assessed for the following characteristics.

7.1 Environmental information

The concrete and reinforcement steel fibres can be recycled.

8 Durability

8.1 Service life

Under normal service conditions, the product will have a life of at least 60 years, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 A suitably competent and experienced individual must take into account the following:

9.1.1.1 The dosage rate for steel fibre must be in accordance with Table 2 of this Certificate.

9.1.1.2 Concrete topping reinforced with the product must be used with the beam and block floor systems listed in the BBA supplement (PS99) to this Product Sheet.

9.1.1.3 The adequacy of the fibre-reinforced concrete and the detailing of the concrete topping for resistance to shrinkage cracking and minimum reinforcement requirement in accordance with the principles of BS EN 1992-1-1 : 2004 and its National Annex must be taken into account.

9.1.1.4 The concrete mixes must comply with this Certificate and the relevant requirements of BS 8500-1 : 2023, BS 8500-2 : 2023 and BS EN 206 : 2013.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A.

9.3 Workmanship

Practicability of installation was assessed by the BBA on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, installation of the product must be carried out by a competent general builder, or contractor, experienced with this type of product.

9.4 Maintenance and repair

As the product is installed within the floor structure and has suitable durability, maintenance is not required.

10 Manufacture

10.1 The production processes for the product have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The product is manufactured from low-carbon steel using conventional steel fabrication techniques.

10.1.2 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.3 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.4 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.5 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.6 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

† 10.2 The BBA has undertaken to review the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

11 Delivery and site handling

11.1 The Certificate holder stated that the product is delivered to site in packaging bearing the product name, Certificate holder's name, batch number, health and safety information and weight of contents in kilograms.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 Fibres are packaged in measured quantities of 11.5 kg in cardboard boxes.

11.2.2 The product is to be added directly to the concrete mix at a rate of 11.5 kg per 1 m³ of concrete, in accordance with the Certificate holder's instructions.

11.2.3 Care must be taken when unloading, stacking and storing the fibres to prevent damage. Packages of fibres must be stored in a cool, dry environment and protected from exposure to direct sunlight.

Supporting information in this Annex is relevant to the product but has not formed part of the material assessed for the Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 14889-1 : 2006.

Additional information on installation

A.1 Installation must be in accordance with the Certificate holder's instructions and this Certificate.

General

A.2 SikaFiber-1050 B&BA HF must be added to the concrete strictly in accordance with the Certificate holder's instructions.

A.3 Good practice must be followed throughout the installation process, to include:

- cube compressive strength and slump tests for concrete pouring
- limitation of slump for standard concrete and slump flow for self-compacting concrete
- concrete topping not to be poured at a temperature below 5°C
- the maximum temperature at which concrete is placed is 30°C and decreasing
- all the constituents, including the fibres, to be added at the plant mixer
- concrete not to be poured during rainfall.

A.4 To prevent shrinkage cracks:

- joints should be incorporated into the slab, and appropriate joints between the opening of two adjacent rooms should be provided. Inclusion of joints must not compromise the structural performance of the concrete topping
- where the internal walls are built through the slab, a joint should be formed across the door threshold where the wall separates the two rooms
- an aspect ratio greater than 2:1 must be avoided
- a compressible insulating material around the perimeter of the slab must be provided
- the use of high-shrinkage-potential aggregate must be avoided
- the water/cement ratio must not be increased beyond the limits specified in BS 8500-1 : 2023, BS 8500-2 : 2023 and BS EN 206 : 2013
- steel mesh or loose bars should be placed across re-entrant corners and any openings in the slab greater than 500 x 500 mm
- consideration should be given to the provision of an appropriate slab detail (eg crack inducer) over external walls at the position of porches
- particular care should be taken regarding the concrete shrinkage resistance specially near corners, around service openings, at the detail of joints to adjoining members and at discontinuities in the concrete member.

Procedure

Mixing

A.5 The fibres may be added to the mixer during or after the batching of the other concrete constituents.

A.6 The tolerance for the batching process and criteria for acceptability of steel fibre content must be in accordance with Tables 27 and B.2 of BS EN 206 : 2013.

Workability

A.7 When used with either normal or self-compacting concrete, trial mixes should be undertaken by the concrete supplier to establish the effect of the addition of fibres on workability and compaction. Advice, if required, may be obtained from the Certificate holder.

A.8 Care is required when using slump test data as a general indicator of uniformity of concrete mixes containing fibres. The value obtained may suggest a misleadingly low workability, and their compaction under vibration is likely to be better than indicated.

A.9 Additional water must not be added to increase the slump of fibre concrete mixes.

Distribution of fibres

A.10 The fibres will be uniformly dispersed throughout the concrete mix without balling or agglomeration providing the Certificate holder's instructions for batching and mixing are followed. When required, the fibre content of a sample of fresh concrete can be measured in accordance with the principles of BS EN 14721 : 2005. For steel fibres, the maximum allowed deviation of single test results from limit values, from tolerance on a target value or from the limits of the specified class should be in accordance with Table 22 of BS EN 206 : 2013.

Placing

A.11 Concrete mixes containing the product can be transported by conventional methods.

A.12 Special precautions are not necessary when pouring into moulds or shutters.

A.13 Fibre concrete mixes can be hand tamped or vibrated by conventional means to provide the necessary compaction.

Finishing

A.14 Placed concrete mixes containing the fibres may be floated and trowelled using any normal hand or power tools, to provide a smooth, fibre-free surface appearance.

Curing

A.15 It is essential that normal 'best practice' for concrete curing is followed. Concrete containing SikaFiber-1050 B&BA HF should be cured using the same methodology as for a plain or steel-reinforced concrete. Concrete should be protected from direct sunlight, wind and frost for the duration of the curing period. In addition, the concrete surface should be kept moist for the duration of the curing period to prevent excessive drying rates; a curing compound may be used for this purpose.

Bibliography

BS 8500-1 : 2023 *Concrete — Complementary British Standard to BS EN 206 — Method of specifying and guidance for the specifier*

BS 8500-2 : 2023 *Concrete — Complementary British Standard to BS EN 206 — Specification for constituent materials and concrete*

BS EN 206 : 2013 + A1 : 2016 *Concrete — Specification, performance, production and conformity*

BS EN 12620 : 2002 + A1 : 2008 *Concrete — Aggregates for concrete*

BS EN 15037-1:2008 — *Precast concrete products. Beam-and-block floor systems. Beams*

BS EN 14721 : 2005 *Test method for metallic fibre concrete — Measuring the fibre content in fresh and hardened concrete*

BS EN 14889-1 : 2006 *Fibres for concrete — Steel fibres — Definitions, specifications and conformity*

BS EN 1991-1-1 : 2002 *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*

NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*

BS EN 1992-1-1 : 2004 + A1 : 2014 *Eurocode 2 — Design of concrete structures — General rules and rules for buildings*

NA to BS EN 1992-1-1 : 2004 + A1 : 2014 *UK National Annex to Eurocode 2 : Design of concrete structures — General rules and rules for buildings*

Conditions

1 This Certificate:

- relates only to the product that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product
- actual installations of the product, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to UKCA marking and CE marking.

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.