

# Technical Datasheet

## FRS-FC Carbon Fiber Spike Anchor

### Characteristics



- Single, open-end CFRP anchor for the end anchorage of FRS-W CF fabrics
- Prevents premature debonding of CF fabrics in various scenarios such as shear strengthening with U-wraps, flexural strengthening or in concave areas
- High young's modulus (150 000 N/mm<sup>2</sup>) and high tensile strength (>1600 N/mm<sup>2</sup>)
- High alkaline resistance and high environmental and mechanical durability
- Easy application and reproducibility due to the precured end

### General Information

Composition	Partially precured unidirectional carbon fiber reinforced composite anchor with epoxy matrix and an open uncured part for lamination onto CF fabrics
Appearance	Black rod with loose black fiber fan
Delivery Unit	Cardboard box with 25 pcs Spike Anchor inside
Shelf life	24 months (after manufacturing date)
Storage conditions	Storage under dry conditions, below + 50 °C temperature. The product must be protected from direct sun light.
Transport conditions	Only in original packaging or in adequate packaging protected against mechanical impact and aggressive environments.
Packaging	Carton with anchors with carton tube to cover the loose end of each anchor

### Product Geometries

Art.-No.	Diameter [mm]	Fiber Cross section [mm <sup>2</sup> ]	Total length [mm]	Cured length [mm]	Uncured length [mm]
571718	10	≈50,6	≈450	170	280
574641	12	≈72,8	≈450	170	280

## Technical Data of the open end (loose fibers)

Property	Performance	
Tensile strength <sup>1</sup>	Mean value	4200 N/mm <sup>2</sup>
	Values determined in 0° longitudinal fiber direction	
Young's Modulus <sup>1</sup>	Mean value	230 000 N/mm <sup>2</sup>
	Values determined in 0° longitudinal fiber direction	
Elongation at break <sup>1</sup>	Mean value	1,80 %
	Values determined in 0° longitudinal fiber direction	

The values stated represent typical characteristics of the product and are not to be understood as binding products specifications.

<sup>1</sup>According to ISO 13934-1

## Technical Data of the precured end

Property	Performance	
Tensile strength <sup>1</sup>	Mean value	1600 N/mm <sup>2</sup>
	Values determined in 0° longitudinal fiber direction	
Young's Modulus <sup>1</sup>	Mean value	150 000 N/mm <sup>2</sup>
	Values determined in 0° longitudinal fiber direction	
Elongation at break <sup>1</sup>	Mean value	1,00 – 1,10 %
	Values determined in 0° longitudinal fiber direction	
Fiber content*	≥ 64 %	
Glass transition temperature <sup>2</sup>	≥ 95 °C	

The values stated represent typical characteristics of the product and are not to be understood as binding products specifications.

<sup>1</sup>According to ISO 10406-1:2015

<sup>2</sup>According to ISO 11537-2:2013

\*By calculation

## System components / related products

Carbon fibre fabric	fischer FRS-W U300 / FRS-W U600
Saturating resin for CF fabric and for installation of the open-end of the FRS-FC carbon fiber spike anchor	fischer FRS-CF
Epoxy injection mortar for the installation of the precured part	fischer FIS EM Plus
Carbon fiber spike anchor	fischer FRS-FC

## Recommended consumption of FRS-CF Saturating Resin and FIS EM Plus

Type of FRS-FC CF Spike Anchor	Required amount of FIS EM Plus	Required amount of FRS-CF
FRS-FC 10 170/280	30-50 g/pcs	70-100 g/pcs
FRS-FC 12 170/280	40-60 g/pcs	80-120 g/pcs

The required amount of FRS-CF Saturating Resin may strongly depend on the concrete surface condition, roughness, impregnation technique and layer thickness used.

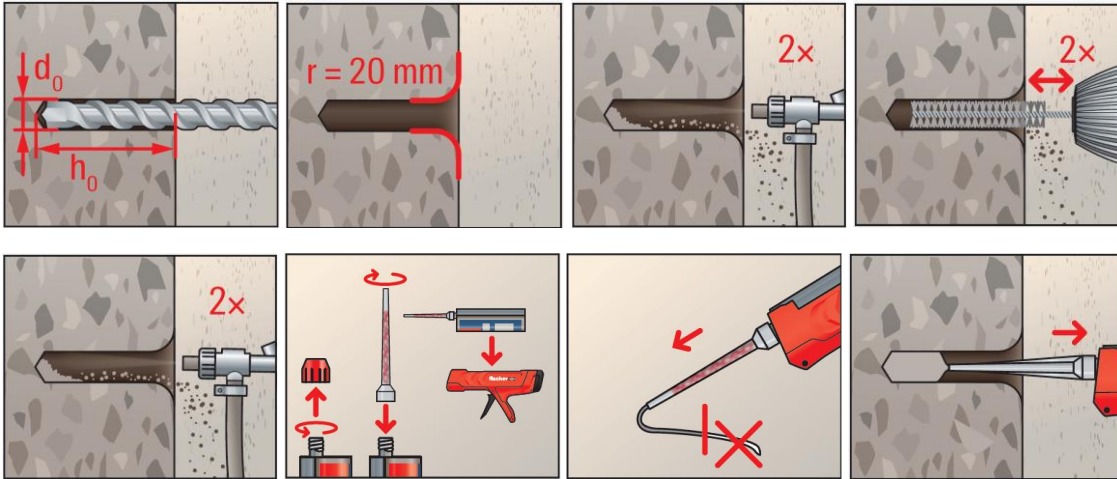
## Measurement data

The technical data given in this datasheet are based on laboratory testing according to given EN or ASTM norms. Actual measured data may deviate depending on the measurement procedures, devices and norms used.

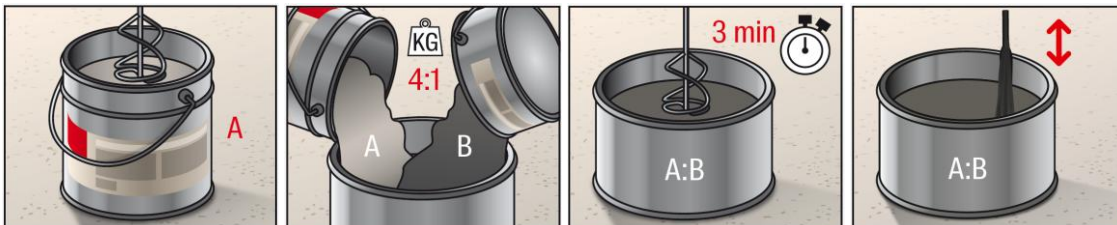
## Processing instructions

The precured part of the FRS-FC is installed into a properly cleaned drillhole using a suitable injection system and the loose fiber filaments (open-end) of the FRS-FC Spike Anchor shall be pre-saturated using FRS-CF Saturating Resin before placing it onto the concrete or CF-Fabric surface. For the installation of the precured part, FIS EM Plus is recommended.

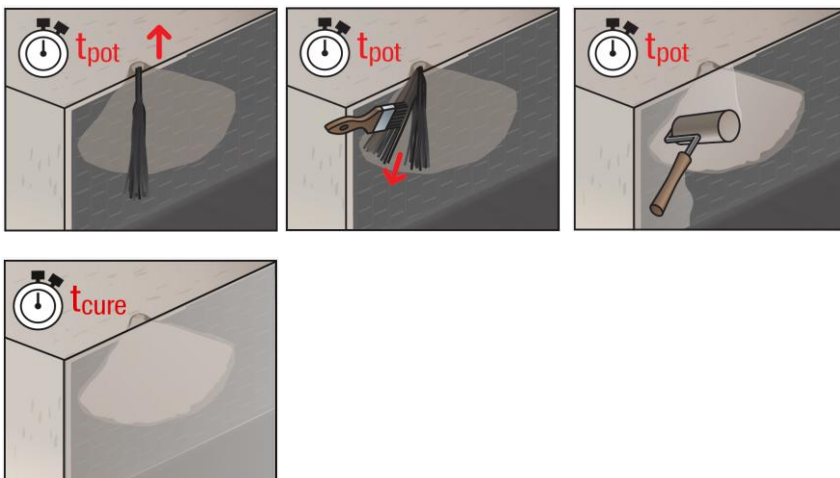
### 1. Preparation of the drilled hole and installation of the precured part of the FRS-FC Spike anchor



### 2. Pre-saturation of the open end of the FRS-FC spike anchor using FRS-CF Saturating Resin



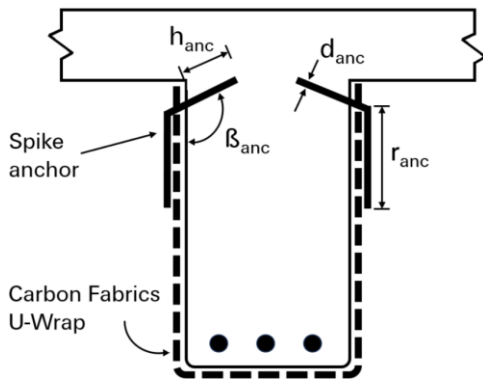
### 3. Final assembly: Inserting the precured part of the Spike Anchor into the prepared and prefilled borehole and placing the loose filaments onto the surface of CF fabric using a roller



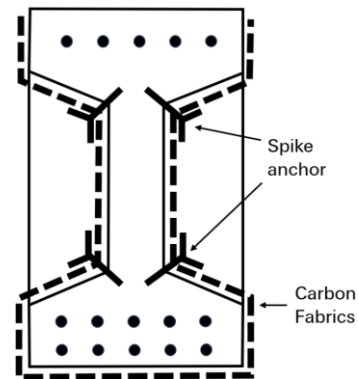
## Further information

- The structural design must be carried out by an experienced structural engineer.
- The application of the FRS-FC CF Spike Anchors using epoxy resins from other manufacturers is out of the responsibility range of the fischer group.
- Well trained and experienced contractors are to be commissioned to carry out the installation works.
- For further information, please contact fischer national technical team or the Spike Anchor Installation Manual.

## Typical arrangements and applications of the FRS-FC Carbon Fiber Spike Anchor



(1) End-anchorage for CF Fabric in shear strengthening



(2) Anchorage against delamination of CF Fabric in corners

Note that further detailing and arrangements might also be possible, based on engineering judgement. In certain applications (e.g. when the spike anchor is used as the end-anchorage of U-wrap shear strengthening), the beneficial effect of the end-anchorage might be considered in the structural design, based on the available design codes.

Please note that the data and information provided above are guidelines from laboratory and real-life experience and are not binding. This general information describes our products and their use, but due to varied working conditions, not every case can be covered. We recommend conducting tests or consulting the fischer technical team if in doubt. We provide information to outline our products and services, without guaranteeing specific properties or suitability for a particular purpose. Please always refer to the latest Technical Data Sheet as well as any national and international regulations. Upon publication of a new version, the previous Technical Data Sheet becomes invalid. Product users must retrieve the latest product data sheet at [www.fischer-international.com](http://www.fischer-international.com). Our current general terms and conditions apply.