Technical Datasheet

FRS-CF Saturating Resin

Characteristics

- Epoxy-based saturating resin for application of FRS-W CF Fabric for strengthening of concrete elements with externally bonded reinforcements and for the application of the loose-end of the FRS-FC Carbon Fiber Spike Anchor
- High compressive (≥ 60 N/mm^2) and flexural strength (≥ 50 N/mm^2)
- DoP according to EN 1504-4
- Component of ICC Evaluation service Report 4774
- GB-Code 50728/50550, Class A resin
- Thixotropic fluent consistency for optimal surface priming and saturating performance

General Information

Composition	Thixotropic fluent 2-component epoxy adhesive	
Appearance	Concrete grey viscous paste	
Delivery Unit and packaging	1 x steel can, with 5 kg or 10 kg filling weight	
Mixing ratio	Component A : Component B = 3 : 1 parts by weight	
Art.-No.	569851	5 kg can (Comp. A+B)
	569850	10 kg can (Comp. A+B)
Shelf life	36 months	
Storage conditions	Storage in dry conditions at temperatures between + 5 °C and + 40 °C. Before using the product, please ensure that the product is at application temperature. The product must be protected from direct sun exposure.	

Approvals and Assessments

EN 1504-4	EN 1504-4:2004
ESR-4774 (ICC-ES Evaluation Report)	According to AC 125
GB-Code	GB 50728-2011

Technical data of the components

Property	Performance	Unit	Remark
Chemical base	Epoxy mortar with amine hardener		
Solid content	≥ 99	% by mass	
Consistency component A (mortar)	Viscous liquid		
Consistency component B (hardener)	Fluent liquid		
Density component A (mortar)	1,51	g/cm³	EN ISO 2811
Density component B (hardener)	0,96	g/cm³	EN ISO 2811
Viscosity Component A (mortar)	60	Pa*s	Brookfield, spindle 6
Colour Component A (mortar)	Beige		
Colour Component B (hardener)	Black		
Flashpoint	> 100	°C	

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

Technical data of the mixture

Property	Performance	Unit	Remark
Workability time at 10 °C - 20 °C	≥ 140	min.	EN ISO 9514
Workability time at 20 °C - 30 °C	≥ 60	min.	EN ISO 9514
Workability time at 30 °C - 40 °C	≥ 30	min.	EN ISO 9514
Curing time at 10 °C - 20 °C	96	h	Det. from lap shear strength
Curing time at 20 °C - 30 °C	48	h	Det. from lap shear strength
Curing time at 30 °C - 40 °C	24	h	Det. from lap shear strength
Viscosity, mixture	15 000	mPa*s	Brookfield, spindle 6
Density, mixture	1,37	g/cm³	EN ISO 2811-1
Consistency, mixture	Fluent liquid		
Colour of mixture and cured adhesive	Grey		

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

Technical data of the cured adhesive

Property	Performance	Unit	Remark
Temperature range of use	- 40 to + 40	°C	Without long term load reduction
Temperature range short-term	80	°C	With load reduction during temperature exposure above 40°C
Water resistance	Resistant		
Weathering resistance	Resistant		
UV resistance	Conditionally resistant, in case of permanent UV radiation an adequate coating is recommended		
Tensile strength	≥ 30	N/mm^2	ISO 527-1, after 7 d at RT
Young's modulus (tension)	≥ 3 000	N/mm^2	ISO 527-1, after 7 d at RT
Compressive strength	≥ 60	N/mm^2	EN ISO 604
Flexural strength	≥ 50	N/mm^2	EN ISO 178
Lap shear strength steel at RT	≥ 12	N/mm^2	DIN EN 1465, after 1 d at RT
	≥ 13	N/mm^2	DIN EN 1465, after 2 d at RT
	≥ 16	N/mm^2	DIN EN 1465, after 7 d at RT
Glass transition temperature	≥ 25	°C	EN 12614, after 24 h at RT
	≥ 45	°C	EN 12614, after 72 h at RT
	≥ 50	°C	EN 12614, after 7 d at RT
Glass transition temperature	≥ 60	°C	ASTM E 1640, after 7 d at RT and 4 d at 40°C; max. loss modulus

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

System components of ESR-4774 (ICC-ES Evaluation Service Report)

Externally bonded unidirectional CF fabrics	fischer FRS-W U300 / FRS-W U600
Saturating resin for CF Fabric application	fischer FRS-CF
Fire protection coating against flame spread and smoke development	fischer FRS-FP
CFRP Laminates	fischer FRS-L-H / FRS-L-S
Epoxy mortar for the application of the CFRP Laminates	fischer FRS-CS

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

Mixing ratio mortar to hardener

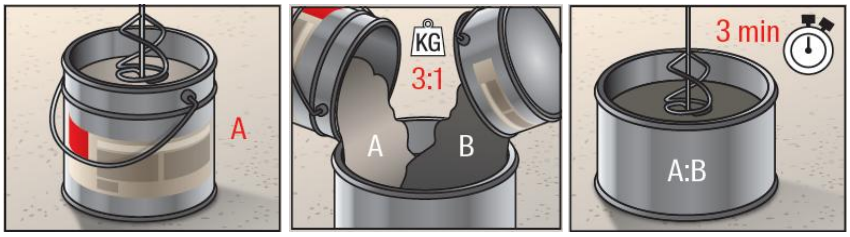
- Component A to Component B: 3 parts by weight to 1 part by weight

Processing temperatures (underground, air, and adhesive)

- at least + 10 °C (and at least 3 K above dew point)
- maximum + 40 °C

FRS-CF consists of two components, supplied in prepacked quantities. Stir component A, then add component B completely. When taking subsets, please take care to ensure the exact mixing ratio using a sufficiently accurate scale.

Stir slowly (max. 300 rpm.) until a homogeneous mass is formed. The hardener needs to be evenly distributed. While mixing, please ensure that the sides and bottom of the pail are stirred for long enough. Care should be taken to keep entrainment of air to a minimum while mixing. Mixing time needs to be at least 3 minutes. After mixing, the resin must be refilled into a clean container or pail and mixed again.



The FRS-CF Saturating Resin may be used to install the unidirectional FRS-W CF Fabric either via dry lay-up or wet lay-up technique. Wet lay-up is recommended for CF-sheets with higher area density of 600 g/m^2 and more. Handle the CF-sheets carefully and always work in fiber direction. The installation of the FRS-W CF Fabric is described in “Installation Manual for C-Fiber Force Strengthening System with Carbon Fiber Fabrics”.

The FRS-CF Saturating Resin is recommended to install the loose-end of the FRS-FC Carbon Fiber Spike Anchor. The installation of the FRS-W CF Fabric is described in the corresponding TD of the FRS-FC Carbon Fiber Spike Anchor as well as in the Installation Manual for Spike Anchor.

Cleaning of tools

The stirrer and all application tools must be clean before mixing FRS-CF. No substances may be used during cleaning that have separating or accelerating properties on the epoxy resins. After application FRS-CA Cleaning Agent or other potent organic solvents such as acetone, toluene, ethyl acetate, butyl acetate or others can be used. Take care to clean all equipment within pot life. Cured material can only be removed mechanically.

Chemical resistance

The hardened resin is largely resistant to diluted acids and alkalis as well as to many solvents, mineral oils, diesel, and gasoline. The long-term exposure of solvents can lead to a product volume increase and affects the performance. Short-term contact (24 h – 48 h) should not have significant impact on the product performance. Concentrated acids and alkalis, in particular organic acids such as acetic acid can impair performance, especially upon prolonged or repeated exposure.

Please take notice of the safety information and advice given on the packaging labels and safety data sheets.