FIDSTRONG®

Luckfid Industry Co.,Ltd

Method Statement

FIDSTRONG Carbon Fiber Fabric System

V20240801

Contents

1 Scope

This method statement serves as a guideline for the application of the FIDSTRONG carbon fiber fabric system for structural strengthening. It should be used in conjunction with all relevant technical data sheets (TDS), material safety data sheets (MSDS), and specific project specifications.

Structural strengthening with this system must only be performed by trained and experienced professionals. For any further clarification or technical assistance, please feel free to contact FIDSTRONG's technical support team, who will be happy to assist.

2 System Description

The FIDSTRONG carbon fiber fabric system is a high-performance structural strengthening solution that consists of fiber-reinforced polymer (FRP) fabrics and impregnation resins. These materials are applied directly to the reinforcement site, where they form a fiber composite system. The system typically includes FSC carbon fiber fabrics, levelling epoxy FSE502, primer epoxy FSE302 and a two-part epoxy-based impregnation epoxy FSE322.

The main range of applications includes:

- Structural strengthening of reinforced concrete, masonry, and timber elements.
- Increasing the load-bearing capacity of structures.
- Seismic strengthening of existing structures.
- Repairing and strengthening aging structures.
- Correcting structural design and construction defects.

2.1 System Composition

Fabric:

The table below gives an overview of FIDSTRONG's different fabric weights and widths available.

Specification	FSC200	FSC300	FSC600
Color	Black		
Fiber Orientation	0° Unidirectional		
Density	1.8 g/cm³		
Fiber Content	100%		
Width	10/15/20/25/30/50/60 cm or customized width		
Packaging	100m/Roll/Box		50m/Roll/Box
Areal Weight	200 g/m²	300 g/m²	600 g/m²
Nominal Thickness	0.111mm	0.167mm	0.333mm

Epoxy:

The table below gives an overview of the different epoxy used in the system.

Epoxy	Description	Consumption(kg/m^2)
Levelling Epoxy FSE502	Used to repair concrete surfaces to make them smooth.	Based on actual conditions
Primer Epoxy FSE302	Used to penetrate the concrete surface and increase the strength of the concrete.	0.3~0.7
Impregnating Epoxy FSE322	Used to penetrate carbon fiber fabric and bond the carbon fiber fabric to the concrete.	FSC200: 0.5~0.8 FSC300: 0.8~1.0 FSC600: 1.3~1.6 If used as primer epoxy, additional 0.3~0.7 kg/m^2 for the first layer.

2.2 Limitations

The products must be used strictly according to their intended applications. System configurations, as outlined in the product data sheets, must be fully adhered to and cannot be altered.

The FIDSTRONG carbon fiber fabric system may only be applied by trained and experienced professionals. All structural strengthening works must be supervised and directed by a qualified structural engineer.

For any specific construction or project details, always refer to the relevant engineer's specifications, detailed drawings, and risk assessments.

Local product variations may lead to differences in performance. Always use the most recent and applicable local product data sheets (PDS) and material safety data sheets (MSDS).

Ensure that batch numbers for FIDSTRONG fabrics and resins are recorded daily. At the end of each workday, inspect the fabric application to verify uniformity and smoothness.

Large mixing quantities of the resin or high temperatures can shorten the pot life. To extend the pot life, reduce the mixing quantities and/or keep the materials cool by storing sealed units in a cool environment until just before mixing and application.

When working in extreme hot or cold conditions, pre-condition the resin materials in a temperature-controlled environment for at least 24 hours to ensure optimal mixing, application, and pot life on site.

Pay special attention to ambient environmental conditions. Ensure that the substrate, atmospheric, and material temperatures are within the prescribed limits, and avoid applying the system in dew point conditions (application temperature should be at least 3°C above the dew point).

The moisture content of the substrate must be less than 4%. All treated concrete surfaces must be dry, free of surface water, and ice-free.

This method statement is intended as a guideline and must be adapted to suit local products, standards, regulations, or any other specific requirements.

3 Equipment and Safety

3.1 Equipment

The equipment used in the FIDSTRONG carbon fiber fabric system installation includes:

- Concrete grinder
- Vacuum cleaner
- Brush
- Application trowels
- Plastic roller
- Mixing Container
- Mixing Paddle

3.2 Protection

- Safety shoes, gloves, and appropriate skin protection must be worn at all times. It is strongly recommended to use disposable or clean protective clothing during material preparation and application.
- Always wear nitrile-based protective gloves when handling epoxy adhesives or impregnating resins, as direct contact may cause skin irritation. Apply barrier cream to hands and any unprotected skin areas before beginning work.
- Appropriate eye protection must be worn at all times while handling, mixing, and applying the products. It is recommended to carry an eye wash kit at all times.
- Wash hands with suitable soap and clean water after handling the products and before eating, smoking, using the restroom, or finishing work.
- Ensure that the work area is well-ventilated, and workers should take regular breaks in fresh air to avoid potential health risks.
- Silica dust produced during concrete grinding or blast cleaning can be hazardous. Use vacuum grinders or vacuum blast cleaning equipment with dust extraction and abrasive recycling systems. Always wear a dust mask or respirator when grinding concrete. Avoid inhaling concrete dust.

For more detailed health and safety information, refer to the relevant material safety data sheet (MSDS).

3.3 First Aid

If epoxy resin-based adhesive products contact with the eyes, immediately remove any glasses or contact lenses and rinse the affected area with clean warm water for 10 to 15 minutes. After rinsing, seek medical attention promptly.
Any chemical spillages on the skin must be cleaned immediately and thoroughly rinsed with clean warm water.
For more detailed health and safety information, always refer to the relevant material safety data sheet (MSDS).

4 System Application Procedure

4.1 Substrate Treatment

The substrate surface must be carefully treated. This includes but is not limited to removing the coating on the substrate surface, grinding the substrate surface with a grinder to expose the solid base, and using high-pressure air to blow off the ground surface to ensure that the treated substrate surface is smooth, free of loose particles, and dust-free. If the substrate surface has large holes or defects (such as exposed rebar), the surface must be repaired with levelling epoxy FSE502 to make it smooth.

4.2 Fabric Cutting

Use sharp scissors to cut the carbon fiber fabric to the specified length. Handle the fabric carefully to ensure that the fibers are not bent or broken. Do not fold the fabric.
Do not cut wide carbon fiber fabric into narrow strips along the fiber direction. This may damage the fibers. The carbon fiber fabric should be purchased in the appropriate width according to the design requirements.

4.3 Epoxy Mixing

Weigh the A and B components of the resin according to the specified ratio, then mix them at low speed using a mixer (with a speed below 500 RPM) for at least 3 minutes, until the resin is fully blended with a uniform color and free of air bubbles.
Control the amount of resin mixed as needed to ensure it is used up within its working time. The consumption of epoxy refers to section 2.1.

4.4 Primer Epoxy Application

Apply FSE302 or FSE322 as a primer epoxy to the substrate surface using a trowel, roller, or brush, ensuring the resin fully penetrates the substrate.

4.5 Fabric Placing and Impregnating

Place the pre-cut FIDSTRONG carbon fiber fabric in the required direction onto the priming layer of resin. Using a plastic impregnation roller, carefully work the resin into the fabric, rolling parallel to the fiber direction. Continue until the resin is evenly squeezed through the fiber strands and distributed across the entire surface of the fabric.
Ensure that the fabric is completely saturated with the resin—there must be no dry spots, and the fabric must be firmly pressed onto the substrate. Roll out any trapped air in the direction of the fibers to ensure no bubbles or blisters form between the fabric and the substrate.

4.6 Additional Layer Application

To meet the engineer's specified requirements for the total number of fabric layers, subsequent layers of carbon fiber fabric should be applied by layering resin onto the previous layer in a 'wet-on-wet' manner within 60 minutes (at +23°C) of the previous layer. The same laminating procedure used for the first layer should be repeated for each additional layer.
If it is not possible to apply the next layer within 60 minutes, a waiting period of at least 12 hours must be observed before applying the subsequent layer. The overlapping sections of additional layers should be evenly distributed around the structure's circumference.
At low temperatures and/or in high humidity conditions, a 'tacky' residue (blush) may form on the surface of the cured resin. If an additional fabric layer or coating needs to be applied to the cured layer, this residue must be removed first to ensure a proper bond. The residue can typically be removed using warm soapy water. In any case where the application is on a cured resin layer, ensure that the surface is thoroughly dry before proceeding with the next layer.

4.7 Coating

After the final layer of carbon fiber fabric is applied, apply an additional layer of resin over the surface of the fabric, and then spread quartz sand over the resin. This will enhance the adhesion between the subsequent coating and the carbon fiber fabric system. Once the resin has cured, apply the coating according to the design requirements.

5 Inspection and Repairs

Upon completion of the curing process, the installed FIDSTRONG carbon fiber fabric system must be thoroughly inspected for areas where the impregnation resin has not fully penetrated or where the resin has not completely cured. Any such areas larger than 25 x 25 mm on the surface must be repaired. Repairs must adhere to the same application, curing, and quality control specifications as the original installation.

Small delaminations or bubbles can be injected with a compatible resin system to re-establish the bond between the substrate and the strengthening system.

If large defects are identified, it may be necessary to remove the applied system and reapply it, or to apply additional layers of FRP reinforcement. The type of repair, preparatory work, number of layers, and overlapping lengths must all be approved by the supervising structural engineer.

6 Legal Notes

The Information and recommendations relating to the application and end-use of FIDSTRONG products, are given in good faith based on our current knowledge and experience of the products when properly stored, handled and applied under normal conditions. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any recommendations, or from any other advice offered. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request or may be downloaded from our website at: www.fidstrong.com.