

PRODUCT DATA SHEET

Edition 03.2023/v1

COMPOSITE REINFORCING



HorseWrap- FX

CARBON FIBRE STRING FOR STRUCTURAL CONNECTION AND ANCHORING OF CFRP SYSTEMS

Description	HorseWrap- FX is a unidirectional, carbon fibre string, sheathed in an elastic envelope. The gauze can be cut onsite to create a fan end which anchors CFRP fabrics and plates used in the structural strengthening of masonry and concrete.																																	
Where to Use	> Anchoring and connecting CFRP fabrics and plates on concrete and masonry walls, in ‘side- by- side’ configuration. > Flexible Near Surface Mounted strengthening (NSM) system																																	
Advantages	> Very light and easy to install. > Suitable for use on many substrates. > Multifunctional use. > Eliminates need for temporary fixing system. > Carbon- fibre eliminates problem of corrosion . High chemical resistance . > Very durable and long lasting.																																	
	<table><tr><td colspan="2">Technical Data</td></tr><tr><td>Packaging</td><td>Box containing a roll of 25 m (82 ft) mounted on a plastic reel dispenser</td></tr><tr><td>Colour/Appearance</td><td>Black, unidirectional carbon fibre rope within white sheathing.</td></tr><tr><td>Yield</td><td>Consumption is project dependent, including depth and diameter of anchoring holes.</td></tr><tr><td>Shelf Life</td><td>Unlimited. Store in dry conditions (max. 50 °C / 122 °F) and away from exposure to direct sunlight.</td></tr><tr><td colspan="2">Physical Properties (Dry fibres)</td></tr><tr><td>Density</td><td>1.82 kg/L</td></tr><tr><td>Tensile Strength</td><td>4 GPa (5.8 x 10⁵ lb/in²)</td></tr><tr><td>E-modulus Long.</td><td>240 GPa (3.48 x 10⁷ lb/in²)</td></tr><tr><td>Elongation at Break</td><td>≥ 1.6 % (nominal)</td></tr><tr><td>Physical Properties (Composite) -</td><td>Values in longitudinal direction of the fibres - Impregnating resin: H M - 1 8 0 C 3 P</td></tr><tr><td>Tensile Strength</td><td>2.1 GPa (305 lb/in²)</td></tr><tr><td>E-Modulus</td><td>230 GPa (33.4 x 10⁶ lb/in²)</td></tr><tr><td>VOC Content</td><td>N/A</td></tr><tr><td>Chemical Resistance</td><td>Consult Horse</td></tr><tr><td colspan="2"><i>Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods</i></td></tr></table>		Technical Data		Packaging	Box containing a roll of 25 m (82 ft) mounted on a plastic reel dispenser	Colour/Appearance	Black, unidirectional carbon fibre rope within white sheathing.	Yield	Consumption is project dependent, including depth and diameter of anchoring holes.	Shelf Life	Unlimited. Store in dry conditions (max. 50 °C / 122 °F) and away from exposure to direct sunlight.	Physical Properties (Dry fibres)		Density	1.82 kg/L	Tensile Strength	4 GPa (5.8 x 10 ⁵ lb/in ²)	E-modulus Long.	240 GPa (3.48 x 10 ⁷ lb/in ²)	Elongation at Break	≥ 1.6 % (nominal)	Physical Properties (Composite) -	Values in longitudinal direction of the fibres - Impregnating resin: H M - 1 8 0 C 3 P	Tensile Strength	2.1 GPa (305 lb/in ²)	E-Modulus	230 GPa (33.4 x 10 ⁶ lb/in ²)	VOC Content	N/A	Chemical Resistance	Consult Horse	<i>Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods</i>	
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Design	Design in accordance with the China Building Code Standard or ACI 440.2R-08.																																	

HOW TO USE

Surface Preparation

Substrates must be clean, dry (max 4 % moisture content by weight), sound and free from all surface coatings or treatments, dirt, oil, greases and other contaminants that may impair the bond of the system. Prepare the surface adjacent to the locations where holes will be drilled and anchors will be placed by sandblasting or use other approved mechanical means to provide an open texture (CSP 3, as per ICRI). Remove dust and loose particles by means of an industrial vacuum cleaner.

Defects and depressions must be repaired with suitable Horse mortars and all cracks and fissures greater than 0.3 mm (0.01 in) filled with Horse injection resins . Protrusions must be ground down and finished to a condition suitable to receive CFRP anchors and epoxy adhesives.

The string saturated with epoxy resin will have a diameter of 10 mm (3/8 in). Drill holes in the prepared concrete as per dimensions on drawings, the preferred diameter being at least 14 -16 mm (9/16 - 5/8 in) and the depth calculated and achieved in accordance with the specific project requirements.

Note: Do not use water in the drilling process and ensure that all entrances to the holes are rounded off to reduce the risk of cutting or damaging the fibres during installation.

Remove all dust and debris from within the holes using oil-free and filtered compressed air or a suitable hand pump flowed by brushing out with an appropriately sized brush, ensuring that the hole is then clean and free from loose and friable material.

Preparation of Anchors

Cut HorseWrap-FX string to the required length, including the length to be embedded and that to be adhered to the substrate adjacent to the hole. Ensure that the elastic envelope is cut to the length of the cord that will be embedded within the substrate. Use industrial scissors or similarly sharp tools to cut the anchor, avoiding crushing, crimping or fraying the fibres and the envelope. Attach a zip tie, cutting off excess tie, or similar circular fastener to the end of the anchor being placed into the drilled hole. This will prevent the envelope and the underlying fibres from separating. Saturate the cut anchor string in HM-180C3P epoxy resin (see separate Product Data Sheet for instructions), making sure that sufficient resin is used to enable the length of HorseWrap-FX not inserted into the drilled hole to be fanned out and to adhere to the substrate.

Installation

The drilled holes are to be filled to $\frac{3}{4}$ of the total the depth, or where very damaged substrates exist, completely fill the hole, with a suitable Horse epoxy resin for embedding the anchor. The resin selection will be dependent upon project specifics and prevailing conditions, but may include the following:

HM-180C3P: a fluid, two-part epoxy resin applied by spatula or gravity fed and suitable for vertical, slightly sloping or horizontal applications.

Once the anchoring resin has been applied into the hole, firmly insert the pre-cut and saturated HorseWrap-FX into the hole using a rod or probe. The rod/probe is carefully fed into the core of the fibres and along the length of the cord until it meets the zip tie or fastener, thus providing a solid support within the rope and keeping the fibres and gauze properly aligned while being inserted into the anchoring resin. Insert the anchor, slightly rotating the rod/probe and the anchor, to ensure that the anchoring resin saturates the cord length being embedded. Press home the anchor until it cannot be inserted any further and carefully withdraw the rod/probe leaving the anchor in place. Excess anchoring resin will be ejected from the hole while the anchor is being inserted and must be cleaned away. The envelope must be firmly pressed into the resin-hole ensuring that none of it protrudes. Bend the protruding end of the HorseWrap-FX over, and press onto the substrate adjacent to the hole. The protruding end needs to be 'fanned out' to approx 30°, with the fibres being pressed onto the substrate with suitable pressure using a rubber roller.

Note: The saturation of the rope and the pressure with which its loose end is placed against the substrate are key to achieving the necessary adhesion. If necessary, for example where a subsequent cementitious finish is to be applied, a second application of the saturating resin, HM-180C3P, may be applied onto the fanned fibres and fully broadcast with dry and clean quartz sand to provide a key for such finishes.

Limitations

- ③ The minimal tensile strength of concrete (substrate) must be at least 1 MPa (145 lb/in²) or as specified in the reinforcement calculations .
- ③ Design calculations must be made and certified by an independent licensed professional engineer. H o r s e cannot and will not determine the locations, spacing nor orientation of the H O R S W R A P - F X elements on the actual project. Design guidelines are available from HORSE
- ③ Minimum/ maximum air and substrate temperatures: 8 - 35 °C (46 - 95 °F)
- ③ must be protected against direct sunlight .
- ③ Use an appropriate system for protection against exposure to direct heat > 50 / 60 °C (122 / 140 °F)
- ③ Maintain the condition of the cord, avoiding twisting of fibres as this will distort and render useless
- ③ Carbon fibres can generate galvanic current if in contact with any metal . In the case of anchoring in the presence of reinforcement bars, an appropriate quantity of epoxy resin (insulating) or alternative insulating systems must be used.

Health and Safety Information

For information and advice on the safe handling, storage and disposal of chemical products, users should refer to the most recent SAFETY DATA SHEET containing physical, ecological, toxicological and other safety-related data.

KEEP OUT OF REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY