

# FIDSTEEL 3X2-G 12-12-500 HARDWIRE™

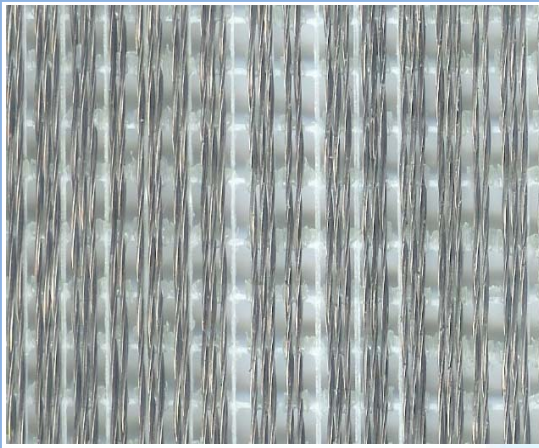
UNIDIRECTIONAL ULTRA-HIGH TENSILE STEEL SHEET  
FOR STRUCTURAL STRENGTHENING



**FIDIA** srl  
Technical Global Services



**HARDWIRE**  
COMPOSITE ARMOR SYSTEMS



## Geometrical and mechanical properties\*

### Filament

Area,  $A_{\text{filament}}$  0,1076 mm<sup>2</sup>

### Sheet

Effective area of one cord (5 filaments),  $A_{\text{cord}}$  0,538 mm<sup>2</sup>  
n° cord/cm 4,72 trefoli/cm  
Weight (thermosetting grid included) 2020 g/m<sup>2</sup>  
Sheet equivalent design thickness,  $t_{\text{sheet}}$  0,254 mm  
Ultimate load of one cord 1517 N  
Sheet ultimate tensile strength,  $f_{\text{sheet}}$  2820 MPa  
Elastic modulus,  $E_{\text{sheet}}$  190 GPa  
Ultimate deformation,  $\epsilon_{\text{sheet}}$  1,50 %

Updated 26<sup>th</sup> February, 2010

\* The properties of the composite have been determined according to the UNI and ASTM standards as indicated in the CNR-DT 200/2004 guidelines "Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structures".

Design and specification values are the one reported for the sheet, and are independent from the type of matrix (mortar or resin) used and will vary based on individual project requirements and safety factors. The matrix has the role to guarantee necessary protection of the steel cords from the environment and to determine the necessary bond with the substrate.

Contact FIDIA engineers to determine appropriate specification values.

## MATERIAL CHARACTERISTICS

### Description

FIDSTEEL 3x2-G 12-12-500 HARDWIRE™ is a high carbon steel cord with a micro-fine zinc galvanized coating. The 3X2 cord is made by twisting 5 individual wire filaments together - 3 straight filaments wrapped by 2 filaments at a high twist angle. The result is an easy to handle cord that combines great engineering values with excellent economics. Medium density is particularly ideal for strengthening masonry elements in need of high strength or reinforced concrete ones in need light retrofit. For masonry applications mortar is preferred to resin matrix while for concrete structures, the opposite, due to the different bond properties and performance reachable.

### Ideal for:

- Strengthening for shear or/and flexural solicitation beams and systems-floor;
- Confining columns and piers to increase the compression strength;
- Strengthening due to load increase;
- Seismic mitigation;
- Mitigate design or post-construction defects;
- Strengthening structures which have been modified for architectural or configuration use;
- Control crack propagation and reduce deformations.
- Retrofit of arches;
- Enhance the shear and compressive strength of masonry walls;
- Retrofit-Increase the flexural strength of masonry walls to prevent overturning;
- Constrain main structural walls through floor level connections;
- Retrofit vaults and cupola subjected to out of plane loads that have cracked their surface;
- Wrapping of prevalently axially loaded columns.

## PACKAGES

The sheet is usually supplied in special spools with dimensions of about 305 mm width, 152m length and weights 93 kg approximately. For special jobs and upon special request the sheet can be cut in length needed by using a special tool.

## RECOMMENDATIONS

When managing the sheet protective clothing and glasses must be worn and the instructions must be followed regarding the application of the materials.

*Skin contact:* no special measures are needed.

*Yard storage:* Keep in a dry covered area which is far from substances which may jeopardize the optimal bond of the matrix.

## APPLICATION EXAMPLES

To learn about structural projects using unidirectional ultra-high tensile steel sheet visit the "Application" area at the following website: [www.fidiaglobalservice.com](http://www.fidiaglobalservice.com).

Or visit the website of our partner Hardwire LLC. at [www.hardwirellc.com](http://www.hardwirellc.com), and download examples of applications around the world.

## QUALITY & CERTIFICATION

Material supply is accompanied by a certificate of origin of the material from the producer and the certificate of characterization of the mechanical properties issued by an Italian laboratory approved by the Ministry of Infrastructure and Transport according to Art. 59 of D. P. R. 380/2001 construction material sector following the law .1086/71, with Decree n.38194 of 14/01/1992 and followings.

### Sede centrale e legale:

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# FIDSTEEL 3X2-G 12-12-500 HARDWARE™

UNIDIRECTIONAL ULTRA-HIGH TENSILE STEEL SHEET  
FOR STRUCTURAL STRENGTHENING



## MATERIAL CHARACTERISTICS (continue)

### Advantages:

- High flexibility for anchoring and ease of installation;
- High tensile strength;
- Very good shear strength of the sheet that allows using mechanical anchorages to develop different type of retrofit solutions (i.e. pretensioning of the sheet).

This material can be impregnated with either epoxy or mortar.

## APPLICATION

### 1. Surface preparation

Clean the surface from dust, grease and other particles by brushing and sand blasting. Clean the reinforcements from eventual traces of rust and seal possible crevices.

### 2. Leveling surface

Leveling the surface in order to eliminate eventual roughness and incoherent materials.

If you are using epoxy matrix follow points (3), (4), (5), (6), (7).

If you are using mortar matrix follow points (5), (6), (7).

### 3. Primer application

Apply to the surface, with a brush or a roller, a layer of primer and wait until it cured. Level the surface with putty.

### 4. Application of the first layer of saturant resin

Apply a first layer of epoxy to impregnate the sheet.

### 5. Sheet installation

Till the epoxy layer is still "fresh", install the sheet previously cut of the required dimension paying attention to not form any bubble by manually smoothing or by passing with a roller.

### 6. Sheet impregnation

Roll several times the sheet ensuring a good level of impregnation eliminating any excess of resin.

### 7. Finishing

Apply a second layer of epoxy and finish by applying silica sand; proceed with the application of polyuretan paint or polyurea for protecting the reinforcement.

## LEGAL NOTES

*The technical advice that Fidia S. r.l. Technical Global Services provides, orally or in writing, as assistance to the customer or installer on the basis of its experiences, corresponding to current scientific knowledge and practices, are not binding and do not demonstrate any legal or contractual obligation accessory with contract of sale. They do not exempt from liability buyer feel our products as regards their suitability for use. For the rest are valid our commercial conditions. Discrepancies that original content and/or use not involve any responsibility by the company's Fidia S. r.l.. The Client is obliged to check that this report, and the values are valid for the consignment of product of its interest and not be overcome, as replaced by subsequent editions and/or new formulations of the product. In doubt, please contact advance our Technical Office.*

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