



Stronger ideas for a sustainable world.

# ADFORS: your partner for innovative ESF technology reinforcement solutions

ADFORS has been developing laid scrim for more than thirty years. We can create infinite combinations of traditional high-quality square scrim, as well as our unique off-angle scrim, from a wide variety of fibers set at various angles to achieve the flexibility, durability and appearance you require.

## About ESF technology

Our strength is utilizing high-tenacity yarns to create innovative, cost-effective materials that offer superior structural reinforcement with less bulk and weight. The resulting, patent-pending, ESF (engineered specialty fabrics) technology products help make a wide variety of engineered solutions stronger and lighter, enabling your design team to reach new product development frontiers.

### Off-angle reinforcement scrims

For more than 20 years, ADFORS has been the world-exclusive provider of off-angle specialty scrims. Originally manufactured as sailcloth reinforcement (3-dimensional membranes), ESF Technology fabrics offer proven reinforcement in the composite market. Through a proprietary process, we create scrims that reinforce load requirements off the 0-90 degree axis. This variation in geometry allows us to construct scrims that not only increase durability and off-load line strength in your product, but also differentiate them visually, if desired.

### Fibers used in ESF technology

Based on your needs, we can create infinite combinations from a variety of high tensile strength fibers set at various angles to achieve the flexibility, durability and appearance you require.

- Polyester
- Dyneema®
- PBO Zylon®
- Carbon
- Aramid
- Spectra®
- Vectran®
- Innegra™

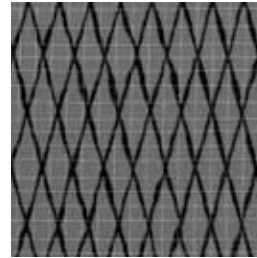
### Carbon fibers

The use of carbon fibers in 0-90 degree scrim is not completely new. However, with unique capabilities and forward-thinking investment, ADFORS has positioned itself to provide the industry with warp only and off-angle carbon yarn scrims. These products were invented to augment the increasing use of carbon fiber within a number of industries. Our years of expertise and inventiveness have led to the development of scrims that will result in new product designs with unsurpassed structural support.

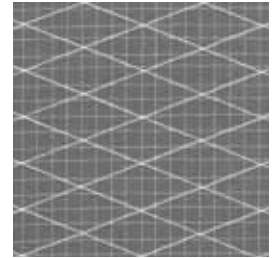
## Product families

### Off-angle scrims - (XP family)

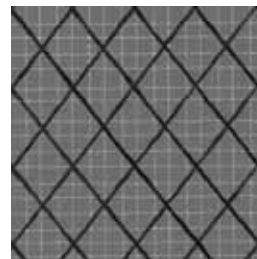
The off-angle XP family of reinforcement scrims feature an off-angle working yarn consistently placed at a given angle onto a “carrier scrim”. This product line has many variables including: yarn type, yarn size (denier or dtex), yarn spacing and the yarn angle from the cross direction. Each application will commonly dictate which yarn, tensile strength and angle is needed to manufacture the appropriate fabric. We have the ability to make hybrid products, slit width products, and can customize the carrier scrim and or substrate to help meet your applications’ needs.



XP206



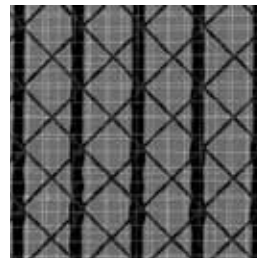
XP315



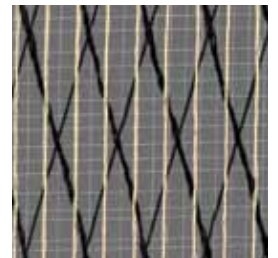
XP206

### Off-angle carbon fiber scrims – (XPC family)

The off-angle XPC family of reinforcement scrims feature a carbon fiber off-angle working yarn consistently placed at a given angle onto a “carrier scrim”. This product line has many variables including: yarn size (denier or dtex), yarn spacing and the yarn angle from the cross direction. Each application will commonly dictate which yarn, tensile strength and angle is needed to manufacture the appropriate fabric. We have the ability to make hybrid products, slit width products, and can customize the carrier scrim and or substrate to help meet your applications’ needs.



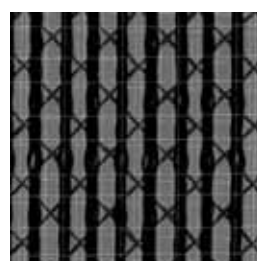
XPC137



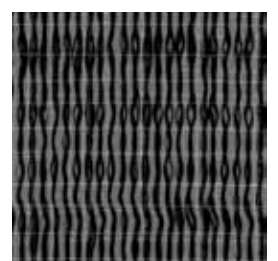
XPC169

### Warp only scrims (XP or XPC family)

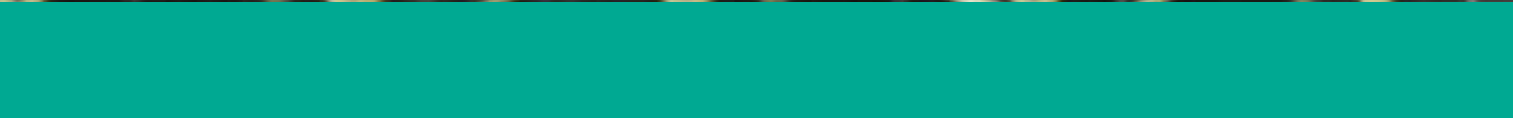
The warp only XP and XPC reinforcements are unique in that the yarns (or tow) are all parallel, and able to be laid down with custom and specific gaps or distances between them. Commonly described by the number of yarns (or tow) per inch these fabrics can be made with a very wide variety of yarns and yarn sizes (denier or dtex and or carbon tow). From 150 denier polyester to 60k carbon tow we can provide a very one direction open and strong solution for directional loading or layers of directional loading at a more reasonable cost than common “uni” fabrics. There are infinite combinations available with the yarn type, yarn size, yarn spacing, carrier scrim configurations and warp yarn spacing.



XPC138



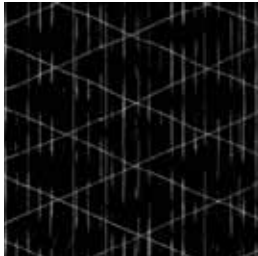
XPC184



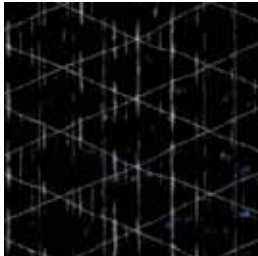
### Uni-directional fabrics (XP and XPC family)

Another ESF product available as part of our scrim laying capabilities, are “uni’s” or “uni-directional” fabrics. These fabrics, commonly carbon fiber tow, are close together to make a tape, a sheet, or a roll good. We can provide fabrics in this family using the same criteria that is used for our open scrims. We can vary the fabric by yarn type, an aerial weight and a width. We can also customize the carrier scrim, provide processing specific substrates, and engineer a solution to fit your specific need. Each application will dictate the preferred means of measurement and our team will work with you to provide you with the optimal design for your need.

This unique solution in the marketplace is also a patent pending product. As with all of our ESF Technology scrims, the ability to customize these products exists by yarn (tow) type, size, spacing and carrier scrim configurations.



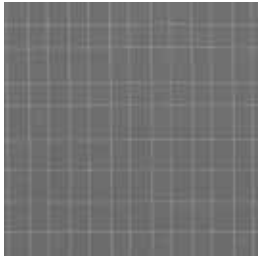
XPC187



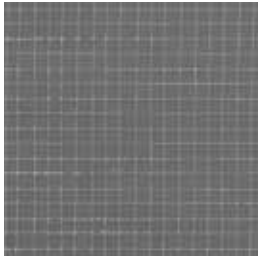
XPC173

### Carrier scrims

In order for us to deliver our Engineered Specialty Fabrics (ESF) we require a fabric to “carry” the working yarns. The carrier scrim provides several benefits: (a) the ability to roll up fabrics delivering our products to you in a usable format (b) a thermoplastic bonding method for your process, and (c) the ability to customize the carrier as a substrate to enhance your process and add additional cross-direction strength. ESF carrier scrims are most commonly made with 70 denier polyester yarn in a 4 yarns per inch (cross-direction and machine direction) and when used in a layered application a 3 yarns (machine) and 2 yarns (cross ) design in 70 denier polyester. Each carrier type is coated with a robust and non-evasive, non-contaminant thermoplastic binder (compatibility test results available).



3 x 2 carrier scrim (multiple layer)



4 x 4 carrier scrim (single layer)

# ESF Specifications

## Scrim characteristics

Width	4" to 58"
Roll length	100 yds to 2,500 yds (specified by client processing needs)
Yarns	Glass, polyester, aramid, carbon, Dyneema®, Vectran®, Spectra®, PBO Zylon®, Innegra™, etc.
Construction	Square, off-angle and warp only
Architecture	Variable by product and application
Tensile strength range	Variable based upon yarn type
Bonding	Thermoplastic chemistry
Complexes for combination materials	Variable substrates and carrier scrims available with multiple types of working yarns

## Example applications

- Custom composite structures
- Three-dimensional laminate membrane
- Reinforcement
- Architectural structures
- Engineered composites
- Engineered laminates
- Sailcloth
- Custom solutions

## State-of-the-art manufacturing

- Key facility in Albion, NY, USA

## Dedicated R&D

- Custom engineered fabrics and products
- Client and application based solutions

## Responsive technical support

- Focused on customer needs
- Experienced sales and technical staff

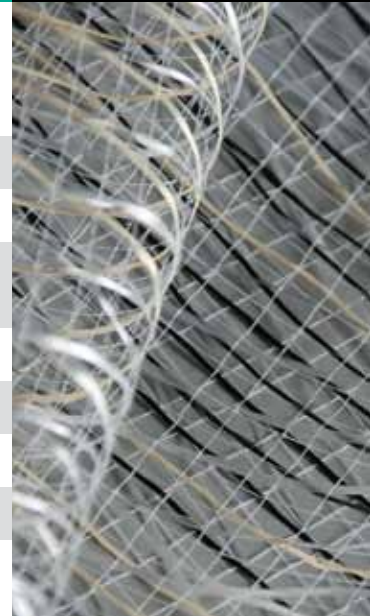
## Environmental policy

ADFORS is engaged in a comprehensive approach to protecting the environment, improving hygiene and safety and reducing the environmental impact of its products and factories. For this purpose, ADFORS engaged in a process of certification ISO 9001 and ISO 14001 for all of its industrial sites.

The ADFORS culture is based on:

- Satisfying our customers' product and service needs
- A continuous improvement in terms of quality, safety, the environment, energy saving and the sustainable development of our products
- Compliance with strict environmental standards and legislation, sometimes even beyond the requirements of applicable laws

To further improve its performance, ADFORS is now involved in a management system for excellence – World Class Manufacturing (WCM) – and focusing its resources on improving quality, customer satisfaction and reducing losses. Our goal is to decrease our environmental impact by reducing our consumption of energy and water, as well as waste and carbon emissions.



# ADFORS

A company with world-class capabilities and worldwide reach

ADFORS is an industry leader in the manufacture and distribution of a wide range of reinforcement fabrics. We offer a diverse selection of products, including some of the world's best-known reinforcement brand names.

With manufacturing plants located around the world, ADFORS is your reliable source for cost-effective materials. Our global network of research facilities connects with strategically located sales offices to give you comprehensive service. As the world's leading manufacturer of reinforced fabrics, we take pride in providing creative solutions that help our customers meet unique challenges.

## State-of-the-art manufacturing

- Facilities located throughout North America, Europe and Asia

## Dedicated R&D

- Pioneering new fabrics and custom products
- Providing innovative solutions

## Responsive technical support

- Focused on customer needs

Call 716-775-3900 or visit  
[www.adfors.com](http://www.adfors.com) to learn more.

[www.adfors.com/esf](http://www.adfors.com/esf)

Saint-Gobain ADFORS America, Inc.  
1795 Baseline Road  
Grand Island, New York 14072  
p: 716-775-3900  
f: 716-775-3901

*U.S. Patent Pending 13/850, 879 and 13/850, 886  
Dyneema is a registered trademark of Royal DSM  
Spectra is a registered trademark of Honeywell International Inc.  
PBO Zylon is a registered trademark of Toyobo Co. Ltd  
Vectran is a registered trademark of Kuraray Co. Ltd.  
Innegra is a trademark of Innegra Technologies, LLC.  
© 2013 SAINT-GOBAIN ADFORS*