



**FABRIC  
STRUCTURES  
ASSOCIATION**

**FABRIC**

**ARCHITECTURE**

Shaping the Future of Building Materials

---

[Textiles.org/FabricStructures](https://Textiles.org/FabricStructures)





# What Are FABRIC STRUCTURES?

Also referred to as tensile fabric structures, tensile membrane structures or fabric architecture, fabric structures are lightweight structures that use a durable membrane or film to create shade, shelter or a facade. These structures rely on the structural characteristics of the material to provide support and stability.

Find out more at  
[Textiles.org/FabricStructures](https://Textiles.org/FabricStructures)



Fabric Structures Association (FSA) represents companies providing fabric structures and related products to end users. It is dedicated to increasing the use of fabric structures as a viable building material within the architectural community. FSA provides a forum to exchange information, solve common problems and develop mutually beneficial relationships.



FSA is a member group of Advanced Textiles Association (ATA), a trade association comprised of member companies representing the global specialty fabrics and advanced textiles marketplace.



# Characteristics and Features

## **Lightweight Construction**

Fabric structures are lightweight, reducing the overall load on supporting structures.

## **Tensioned Fabric**

Fabric is tensioned to create a smooth and weather-resistant surface.

## **Aesthetic Flexibility**

Allows for creative, aesthetically pleasing designs and shapes.

## **Versatile Applications**

Suitable for various architectural elements like roofs, canopies, and facades.

## **Sustainability**

Often considered more eco-friendly due to reduced material use and energy efficiency.

## **Modularity**

Modular design enables easy assembly and reconfiguration.

## **Customization**

Materials can be tailored in terms of color, translucency, and pattern.

## **Translucency Options**

Some fabrics offer translucency, enabling natural lighting and unique visual effects.

## **Durability**

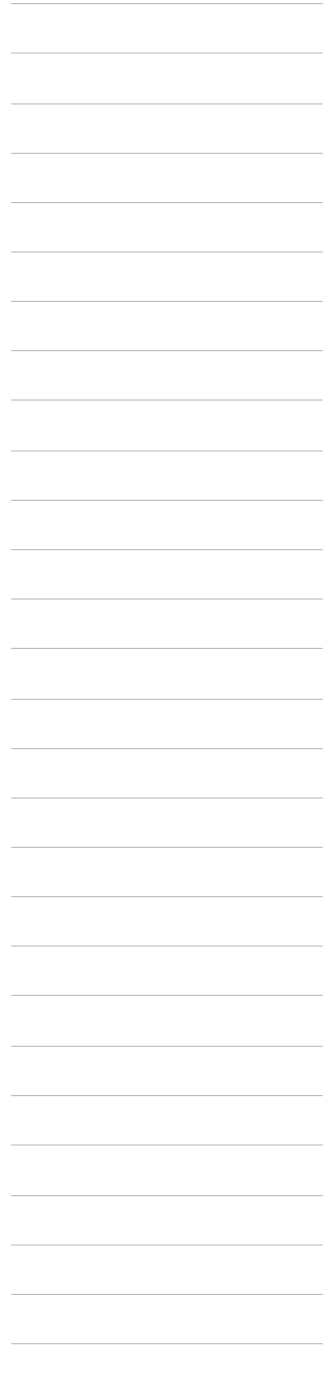
Fabric structures can withstand environmental factors and weather conditions.

## **Quick Installation**

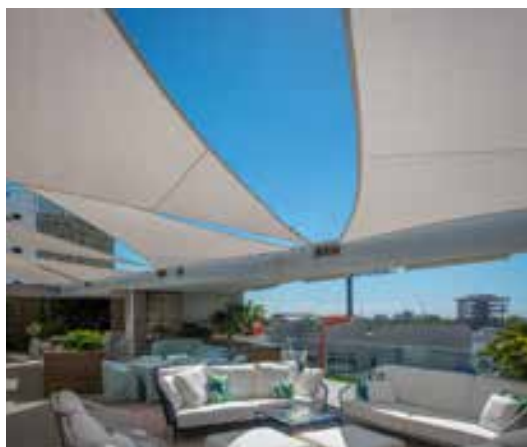
Rapid assembly and disassembly for temporary or semi-permanent structures

## **Clearspan**

Clearspan wide areas without columns.

















## Example Cases

Parks and Recreation Facilities

Residential

Commercial

Interiors

Awnings

Entrances

Hospitality

Plazas and Public Spaces

Pavilions and Amphitheaters

Special Events

Museums

Sports Facilities

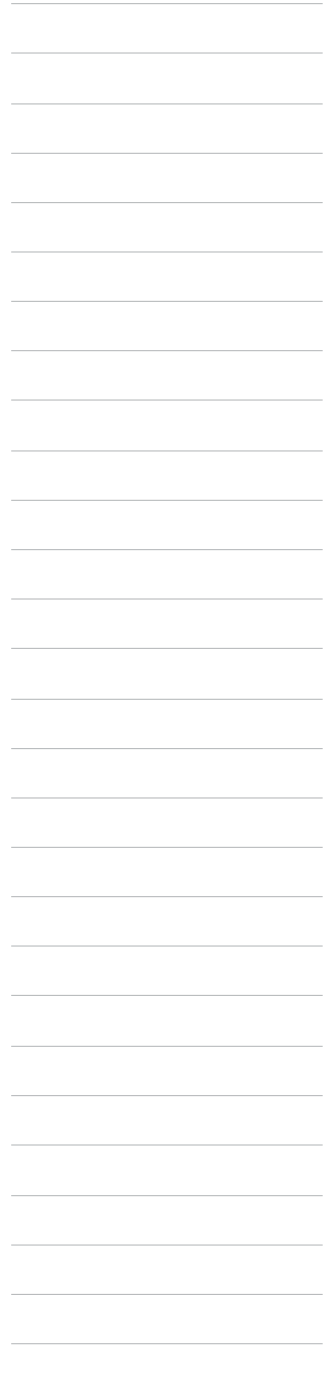
Industrial and Agricultural

Stadiums and Grandstands

Textile Facades

Theme Parks

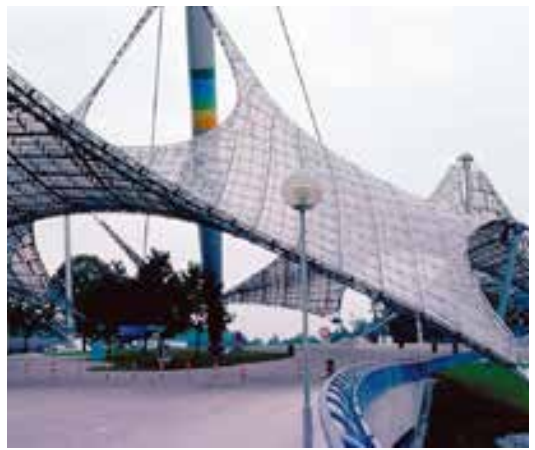
Airports

















# Fabrics and Films

Architectural fabrics and films come in different base compounds, yarns, weights, coatings, and finishes, offering materials that can meet the most rigid of requirements, resulting in qualities that were only imagined a short time ago.

## Present Fabric and Film Types



Solution Dyed Acrylics



High-Density Polyethylene Mesh (HDPE)



Polyester (interior and stretch)



PTFE Glass Fiberglass



Coated Polyester (PVC/PVDF)



HDPE/LDPE/PP

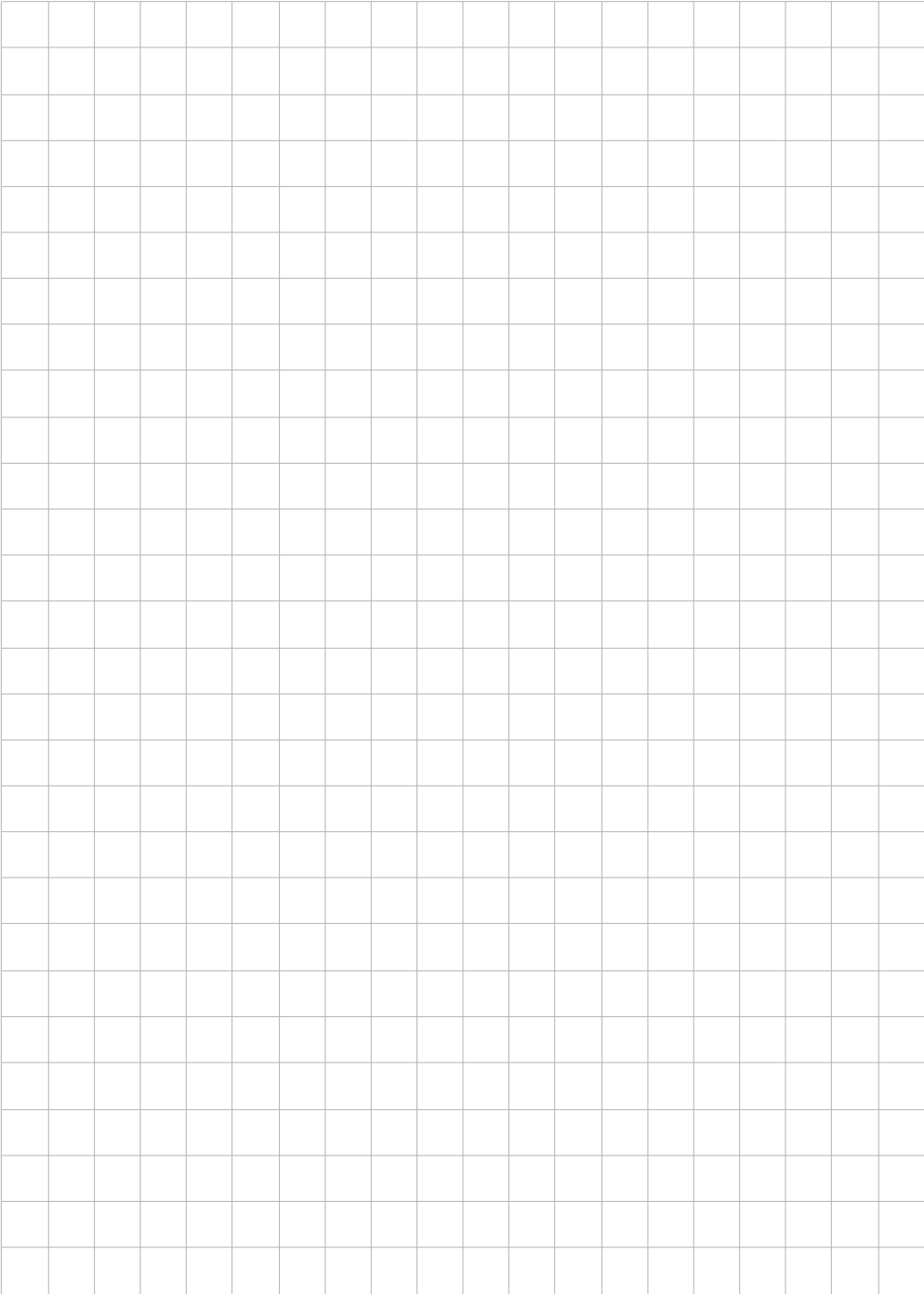


ETFE Film









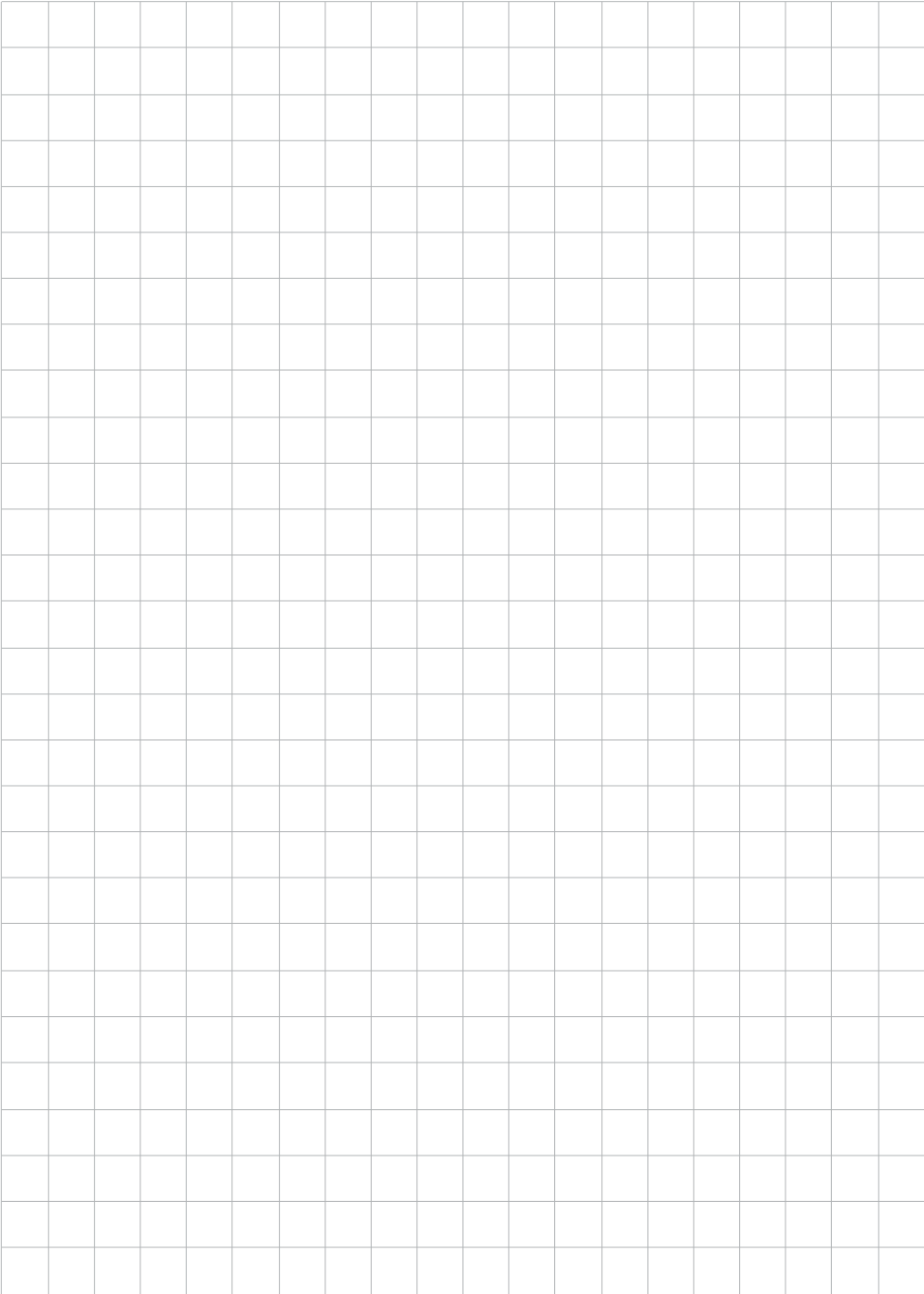
# Acrylic

Used on awnings and small canopies.

- Available in many colors and patterns
- Natural fabric “look and feel”
- Some fabrics are fire-resistant
- Used on retractable awnings
- Can be designed with graphics
- Lifespan 10-15 years

For sourcing of some of these building materials visit [VISTA by ATA at Textiles.org/VISTA](http://VISTA.by.ATA.org)



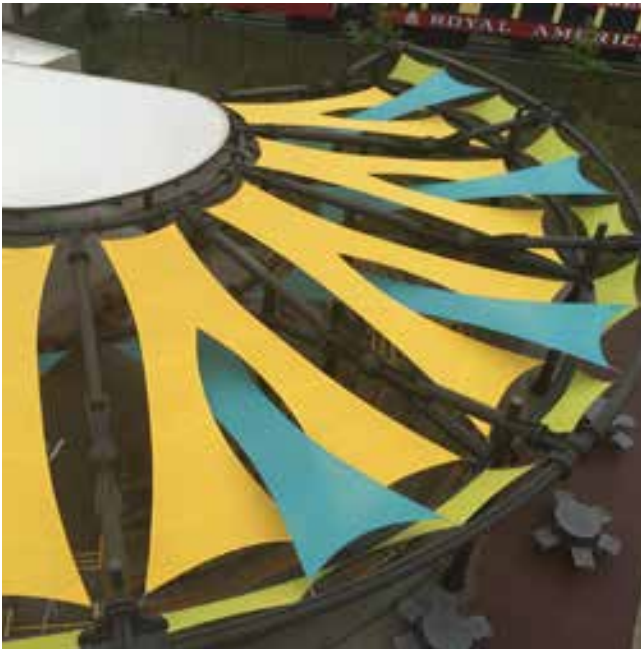


# HDPE

## High Density Polyethylene Mesh

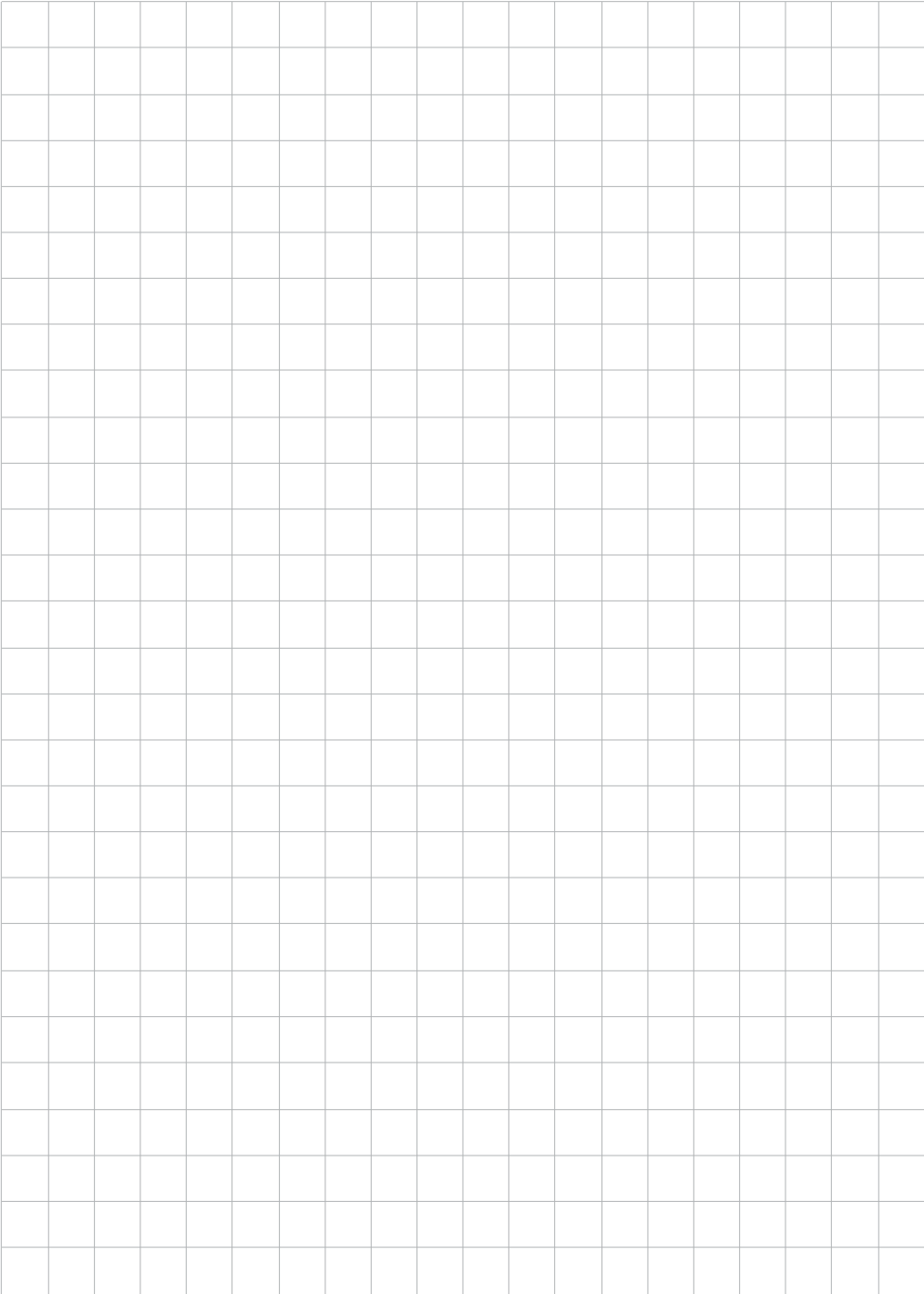
Used primarily on shade structures.

- Shade only material
- Large selection of colors available in wide widths
- Material available as fire-resistant
- Cost-effective vs waterproof membranes
- Material is cut and sewn
- Can cover spans up to 80'
- Provides wind and hail protection.
- High UV protection
- Mold and mildew resistance
- Polyethylene is recyclable
- Not engineered for snow
- Lifespan 10-15 years



For sourcing of some of these building materials visit VISTA by ATA at [Textiles.org/VISTA](http://Textiles.org/VISTA)





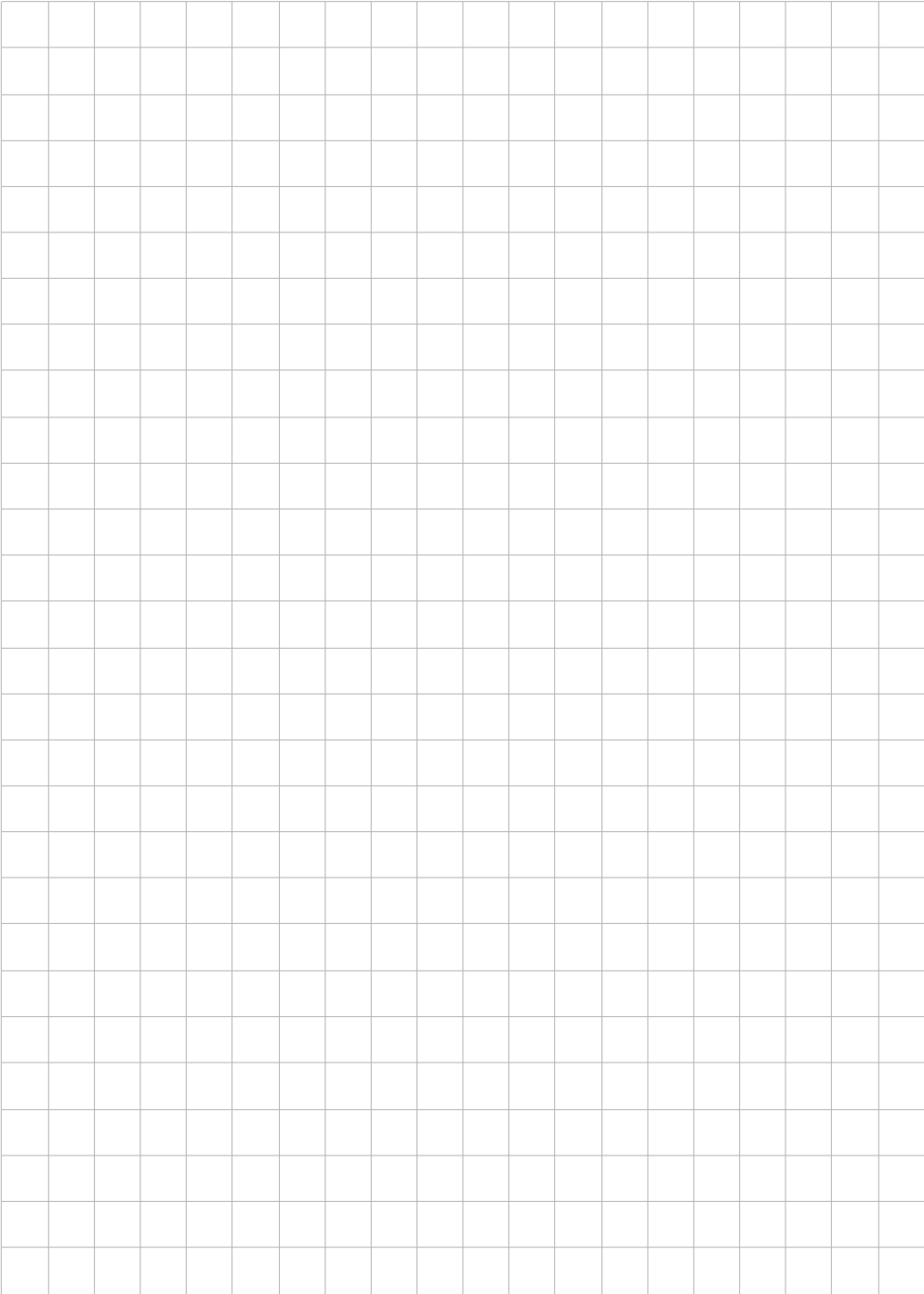
# Polyester

Used on interior projects and temporary structures.

- Typically, uncoated or lightly coated
- Large material selection
- Variety of light transmission
- Available with different stretch
- Material available as fire-resistant
- Material can be draped or tensioned
- Used for ceilings or walls
- Lifespan 10-15 years



For sourcing of some of these building materials visit VISTA by ATA at [Textiles.org/VISTA](http://Textiles.org/VISTA)

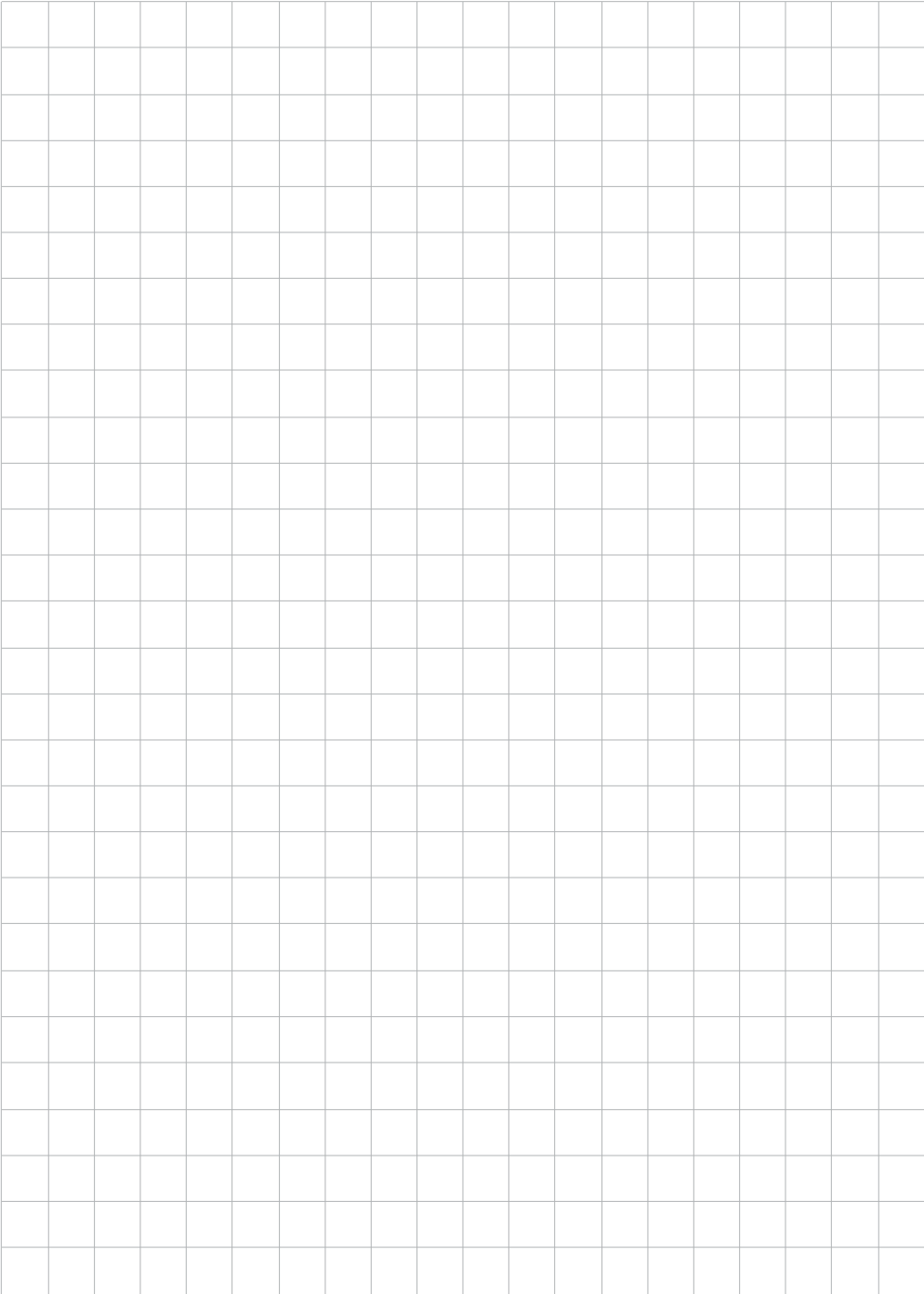


# Coated Polyester

Used for temporary and permanent structures.

- Most coated with Polyvinyl chloride (PVC) or Polyvinyl fluoride (PVDF) with topcoat options
- Material available in opaque or with high translucency
- High solar reflectance
- Wide variety of colors and weights
- Multiple strengths available to meet or exceed structural needs
- Waterproof, mold and mildew-resistant
- Available as a mesh for shade and façade applications
- Printable in select configurations and top finishes
- Available as fire-resistant
- Lifespan 10-30+ years, depending on material chosen







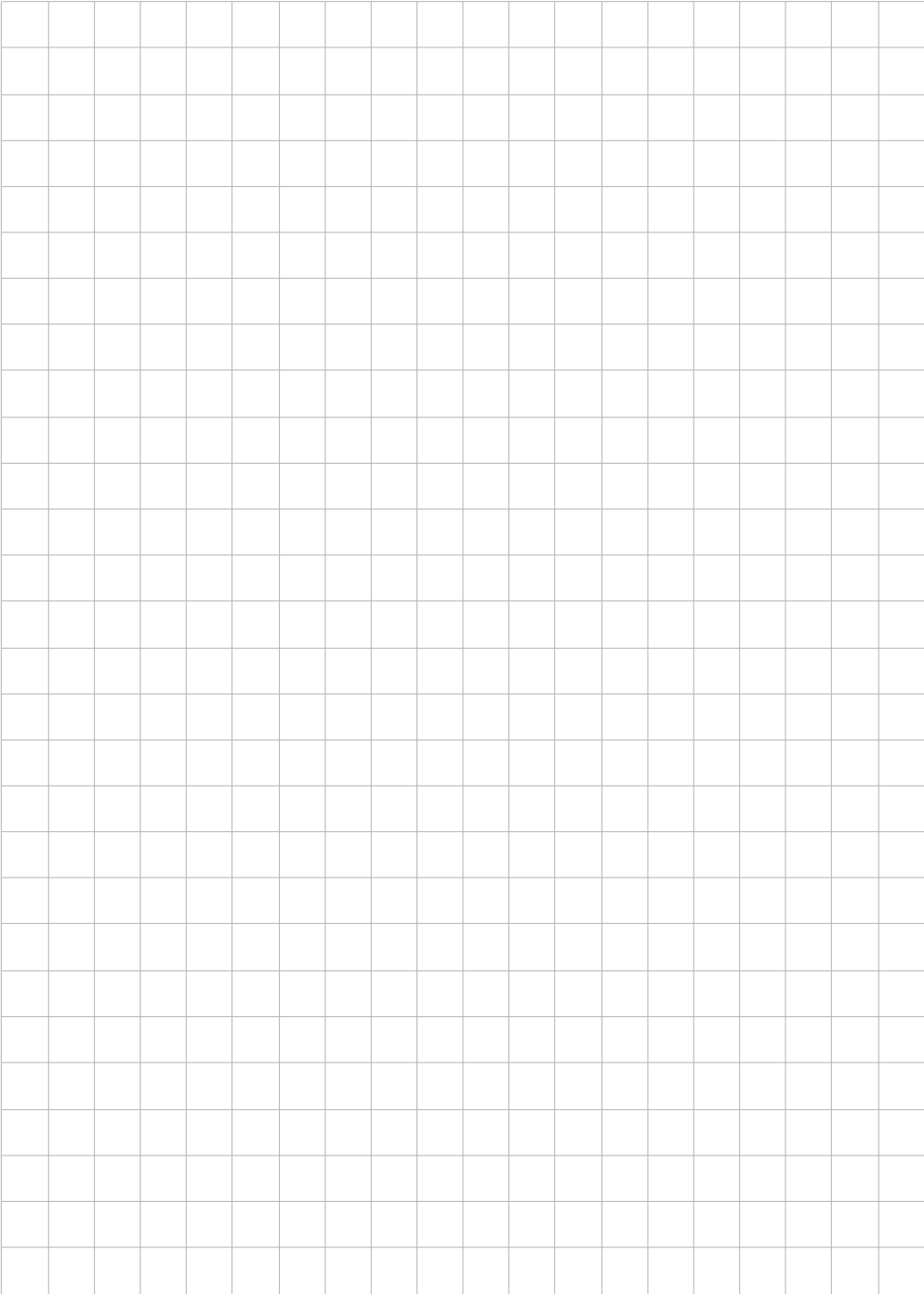
# PTFE Coated Fiberglass

Used for permanent long-term fabric structures.

- Extremely durable and weather-resistant
- High solar reflectance
- Nonstick Teflon™ and “self-cleaning”
- Multiple strengths available to meet or exceed structural needs
- ASTM E136 Non-Combustible Substrate
- Great UV stabilization
- Waterproof
- Available in mesh for shade and façade applications
- Limited colors
- Lifespan 30+ years



For sourcing of some of these building materials visit VISTA by ATA at [Textiles.org/VISTA](https://Textiles.org/VISTA)

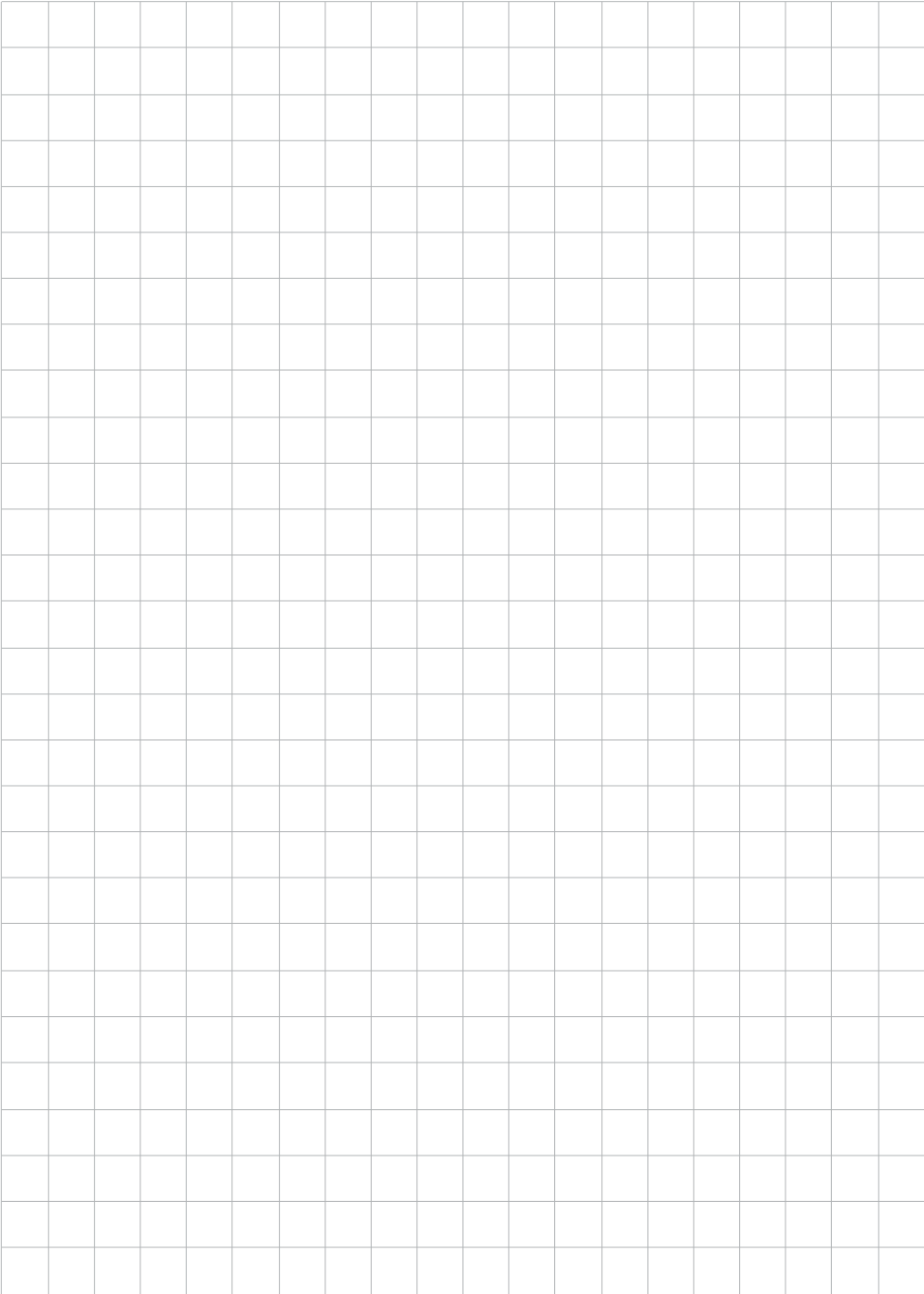


# HDPE/ LDPE/PP

Used for long-term fabric structures.

- High density or low-density polyethylene and polypropylene
- Sustainable certification available
- Suited for a variety of applications, including industrial and environmental conditions
- Excellent solar reflectance and thermal emittance
- High light transmission/illuminance values
- Colors and color combinations
- Excellent UV performance
- Cost-effective
- Waterproof
- Cleanability–water; solvents not required
- Lightweight for faster installations
- High strength-to-weight ratio
- Available in wide-width
- Lifespan 10-20+ years





## ETFE

Used for highly translucent structures, such as inflated pillow structures and single-layer applications. ETFE replaces glass and foil.

- Alternative to structural glass
- Used in single-layer with cable support
- Used in multi-layer “pillows” with mechanical system assistance
- High light transmission
- Great UV transmission for superior vegetation growth below
- Waterproof
- Variety of R-values with layers
- Significantly reduces steel weight in comparison to glass structures
- High stretch in material
- Lifespan 30+ years



For sourcing of some of these building materials visit VISTA by ATA at [Textiles.org/VISTA](http://Textiles.org/VISTA)

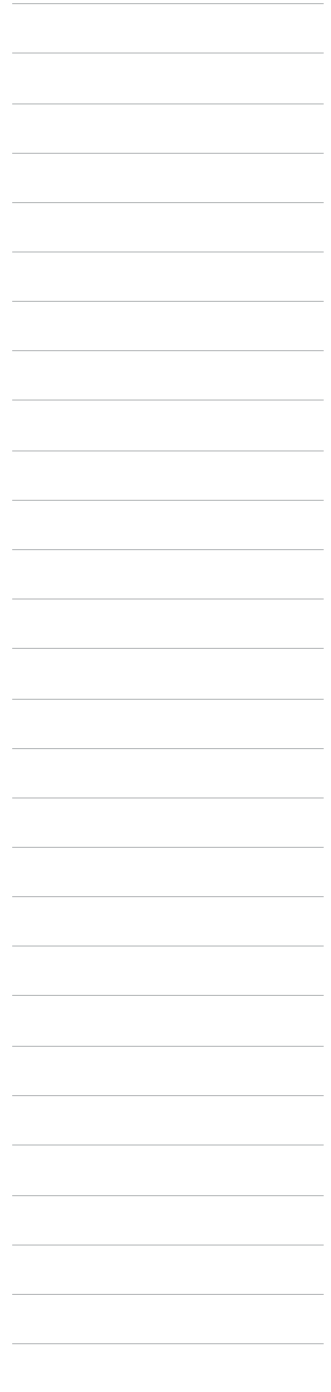


# Advantages of Architectural Fabric Structures

Fabric comes with many advantages not usually found in traditional materials—flexibility in shapes, luminosity, longevity, chemical, and flame resistance. Minimizing the materials required is just the beginning of a list of advantages.

## Design—Fabrication

- Minimal use of materials/lightweight
- Prefabrication
- Transportability
- Heat reflectivity/reduction of heat island effect
- Shade and weather protection
- Recyclable
- Retractability
- Acoustics—reflective and absorptive
- Chemical and flame resistance
- Span large distances
- Durability
- Luminosity
- Innovative structural solutions
- Minimal material—maximizes sustainability
- Quick installation



















# Getting Started With Fabric

This book contains information and images from Fabric Structure Association members. We hope this will inspire you to consider using these durable fabrics and films in the future.

ATA also offers AIA continuing education courses, which give more insight into these fabrics and additional assistance in designing fabric structures.

Copyright © 2024  
Advanced Textiles Association®  
All rights reserved.

