



## Tensioned Membrane Structures



**structurflex**

MIDDLE EAST CONTRACTING LLC

# Why Use A Tensioned Membrane structure as a roof glazing system or shade structure ?

The use of Tensioned Membrane Structures provide the opportunity to design a beautiful form, with large uncluttered spans thus creating exceptional lighting characteristics often not achieved with conventional materials and systems

## Natural Light

Typical interior environmental benefits are the high reflectivity of the membrane returning 75-85% of heat and light externally which makes them a very suitable alternative to polycarbonate or glass as a roof glazing system, without the heat load inherent to clear transparent materials

Natural light penetrating the fabric provides an ambience of great appeal to occupants and can support growth of specific plants. Daylight transmission is typically 9-18%, sufficient to eliminate or greatly reduce the need for artificial lightening, therefore providing an energy efficient system

## Reflects Artificial Light

At night with the use of up lighting the fabric offers considerable benefit as a reflective background providing subtle and evenly diffused light typically reducing the lighting requirements by more than 40%

Golden Gate - Mirdif



Abu Dhabi Ladies Club



## Signage

Branding and corporate identity can be applied to the roofing membrane providing the perfect background both during the day and night when lighting illuminates the membrane providing a highly visible marketing tool

## Sound Quality

Fabric offers the benefit over steel of reduced noise from rain, hail and wind. The curvature of the membrane diffuses the sound, with absorption and reflection working in a non-accumulative action

## As a Roofing system

Tensioned membranes offer both the structure and the cladding in one element. Appropriately shaped fabric in tension offers large spans at competitive costs to conventional roofing systems

## As a Relocatable Structure

The history of tension membrane structure development is closely tied to major relocatable events such as expos, where large shelters are required for finite periods. Many structures have been designed for rapid relocation and re-erection



# Membrane Types

## PVC

Polyester reinforced PVC Architectural fabrics are the most cost effective and the most prevalent in Tensile Architecture. These fabrics, which are typically coated with PVDF lacquer on both surfaces to improve the life of the membrane and also provide for effective cleaning of both surfaces have a lifespan exceeding 20 years.

## PTFE

Woven fibreglass coated with polytetrafluoroethylene (PTFE) is the most durable Architectural Fabric available today. PTFE is essentially inert to environmental contaminants, ultraviolet light, has fire resistant properties and a proven lifespan exceeding 30 years.

## ETFE

Ethylene tetrafluoroethylene (ETFE) is an extremely lightweight transparent film with similar light transmission to glass while only 1% of the weight. ETFE has been used on many high profile sports centres and stadiums. ETFE has excellent weathering properties and a lifespan exceeding 20 years.



Capital Mall - Abu Dhabi



Dubai Outlet Mall

# Engineering

Tensioned Membrane Structures are designed to comply with the appropriate design standards and loadings for each country or region as with conventional buildings.

Critical shape and deflection analysis is a major consideration when designing tension membrane structures to ensure ponding cannot occur for runoff and snow loading.

# Fire Safety

Fabric membranes that meet NFPA701 and AS 1530 flame resistant tests are classified as flame retardant and provide safe membrane structures. In actual fire situations, these fabrics do not support combustion.

# Cleaning and Repairs

## Cleaning

Generally Fabric Structures are easier to clean than conventional roofs due to very few external mechanical fixing and extremely smooth and continuous surface

Cleaning is performed using water and a simple domestic detergent through a low pressure water system Spot cleaning can be carried out as required

## Repairs

Small tears and damage can typically be required quickly on site. Fabric panels requiring large repairs can be removed easily and repaired by the manufacturer Should it be necessary individual panel replacement is also a simple process and with planning can be performed with minimal disruption

Abu Dhabi Shooting Club



Polo Hote - Dubai

# Structurflex Services

Structurflex will design, fabricate and install tension membrane structures including the support structure and all necessary terminations.

Structurflex can assist architects, designers and engineers by providing specialist advice to pave the way from design concept to realisation.

Structurflex offers advice from the most preliminary of sketches on:

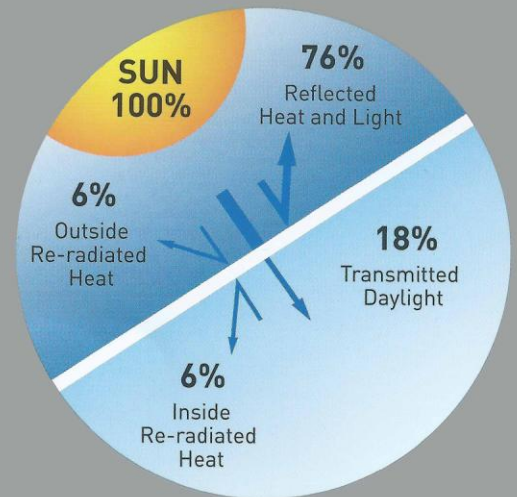
1. Suitability of shapes
2. Approximate costs
3. Critical path, design analysis and building logistics
4. Provision of preliminary reaction loads



# The Benefits of Tensile Architecture

Tensile Architecture offers the potential to create spaces that are aesthetically pleasing and compliment the natural environment

Tensile Architecture offers savings in both complexity and cost of the supporting structure by utilising a variety of free forms Cones Arched Vaults Hypars and Framed Fabric Roofing Systems



During the past 30 years the use of Tensioned Membrane Structures has greatly expanded and there have been a numbers of landmark projects that demonstrate the benefits of tensile architecture.

Tensioned Membrane Structures have been used extensively to enhance the environment in many of the major event centres airports campuses and stadiums built in recent years.







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