Tensile Membrane Structures
ENERGY USE AND LIGHTING

Tensile membrane structures have high sun reflectivity and low absorption of sunlight. This greatly reduces the solar energy and heat gain that enters the structure, thus resulting in less energy used within a building. The membrane allows for natural daylight to enter into the interior making it a comfortable space while reducing electrical energy costs as there is significantly less use of artificial lighting during the day time. These beneficial characteristics have made fabric membrane readily applicable for use in temperate or hot climates with high solar radiation.

In addition, liner membranes and insulated tensioned membrane composite systems, such as Tensotherm™ (which uses an aerogel insulating blanket), go even further to give tensile membrane roofing applications much desired thermal efficiency in both cold and hot climates.

Summary of Energy Use and Lighting Performance Characteristics of Membrane

Membrane Systems / Properties		PTFE Fiberglass	PVC Membrane	ETFE Film	PTFE High Translucency (ePTFE)	Insulated Tensioned Membrane
SOLAR	**Reflectance**	72 - 75%	75 – 78%	*5 - 60%	59 - 79%	76%
	Absorption	10 - 12%	13 - 22%	*1 – 2%	2 - 3%	10-12%
	Transmission	10 - 21%	4 - 10%	*20 - 90%	19 - 38%	8mm: 3.9% 16mm: 2.6% 24mm: 1.8%
	R-Value (FT2hrF/BTU)	0.78	1.0	Single Layer: 0.80 Double Layer: 1.9 Triple Layer: 2.8	0.96	8mm: 4.9 16mm: 7.5 24mm: 10.1
	U-Value (W/m2K)	7.2	5.6	Single Layer: 5.8 Double Layer: 3.0 Triple Layer: 2.0	5.9	8mm: 1.14 16mm: 0.75 24mm: 0.55
	Solar Heat Gain Coefficient (SHGC) G-Value	14 – 28%	8 – 14%	**Single Layer: 80% Double Layer: 65% Triple Layer: 50%	28 - 44%	8mm: 5.3% 16mm: 3.4% 24mm: 2.3%

**Depending on the number of layers, color and silver frit printing.*
***Depending on the density of the silver frit printing, these values are arbitrary.*

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