

Fire Performance of Different Membranes



There are four main categories of tensile membrane materials, and within these categories there is a huge range of different products from many manufacturers. Below are some example results that show a typical material performance for each main tensile membrane type that can be used to determine appropriate material types for projects.

The various membranes we work with will almost always have been subjected to Australian and International fire testing standards by the manufacturer. As a general guide, PTFE coated glass fibre membranes provide the best fire hazard properties, followed by ETFE foil, PVC polyester fabrics and finally woven HDPE shade cloth.

This is a guide only and within each product category there will be a range of different results and performance outcomes.

Membrane Type	HDPE	PVC	ETFE	PTFE
Example Brand	Gale Pacific Commercial Heavy 430	Mehler FR900N	AGC Fluon 200µm	Chuckoh FGT600
Expected Lifespan	10+ years	20+ years	40+ years	50+ years
Fire Performance Indices				
Duration of Sustained Flaming ¹	N/A	N/A	N/A	0
Flammability index ² :	21	8	6	0
Spread of Flame Index ³ :	8	7	0	0
Heat Evolved Index ³ :	5	1	0	0
Ignitability Index ³ :	13	16	0	0
Smoke Developed Index ³ :	7	8	0-1	0-1
Observations	Visible smoke, melting, flaming debris.	Visible smoke and melting. Will not propagate flame spread.	Self-extinguishing drops (will melt away from fire source but does not drip). Self extinguishing immediately when fire source is gone.	Will not propagate flame spread.
Recommendation	Usually not suitable for fire escape routes or adjoining buildings.	May be suitable for connecting to existing buildings, but usually not suitable for Type-A constructions or fire escape routes.	Often accepted for Type-A construction with performance solution from fire engineer, sometimes sprinklered and usually as an externally facing element.	Usually accepted for Type-A construction with a performance solution from a fire engineer.

¹ AS 1530.1 Methods for Fire Tests on Building Materials, Components and Structures. Part 1: Combustibility test for materials.

² AS 1530.2 Methods for Fire Tests on Building Materials, Components and Structures. Part 2: Test for Flammability of Materials.

³ AS 1530.2 Methods for Fire Tests on Building Materials, Components and Structures Part 3: Simultaneous Determination of Ignitability, Flame Propagation, Heat Release and Smoke Release.

A NOTE ON NON-COMBUSTIBILITY

Prior to the 2019 BCA, PTFE-coated glass fibre tension membrane materials were generally deemed non-combustible as the code permitted composite materials to be classified as non-combustible, providing the structural elements passed AS 1530.1 and any coatings were sufficiently thin. The glass fibre woven structural base cloth within PTFE fabric is non-combustible to AS 1530.1, but the PTFE coating is not, and the change in wording in the 2019 BCA is generally interpreted by certifiers and fire engineers to now not allow this material to be considered non-combustible.

Where non-combustible construction is required, a deemed to satisfy pathway is usually difficult to achieve, and PTFE-coated glass fibre membranes will normally need a performance solution to be used. Generally, in our experience, fire engineers and certifiers are familiar with PTFE-coated glass fibre membranes and based on the testing values to AS 1530 parts 1, 2 and 3 are usually happy to support a performance solution. PVC coated fabrics have on occasion been given performance solutions that have allowed their use in areas requiring non-combustible construction, however this is rare as the fire performance of PVC materials is inferior to PTFE-coated glass fibre membranes.

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