

## Nafion Membrane Comparison Table

Membrane Type		Nafion HP	Nafion 211	Nafion XL	Nafion 212	Nafion 115	Nafion 117	Nafion 1110
Thickness, Micrometer (mil)		22 (0.8)	25.4 (1)	27.5 (1.1)	50.8 (2)	127 (5)	183 (7)	254 (10)
Basis Weight, g/m <sup>2</sup>		43.5	50	55	100	250	360	500
Tensile Modulus, MPa (kpsi)**						249 (36)		
Tensile Strength, maximum, MPa (kpsi)**	MD	38 (5.5)	23 (3.3)	45 (6.5)	32 (4.6)	43 (6.2)		
	TD	41 (5.9)	28 (4.1)	40 (5.8)	32 (4.6)	32 (4.6)		
Elongation at Break, %**	MD	182	252	200	343	225		
	TD	89	311	185	352	310		
Tear Resistance - Initial, g/mm**	MD					6000		
	TD					6000		
Tear Resistance - Propagating, g/mm**	MD					>100		
	TD					>150		
Specific Gravity			1.97		1.97	1.98		
Conductivity, mS/cm	In-Plane	72		72				
	Through-Plane	50.5		50.5				
Available Acid Capacity, meq/g			0.92 min		0.92 min	0.90 min		
Total Acid Capacity, meq/g			0.95 to 1.01		0.95 to 1.01	0.95 to 1.01		
Water Content, % Water		5.0 ± 3.0%	5.0 ± 3.0%	5.0 ± 3.0%	5.0 ± 3.0%	5		
Water Uptake, % Water		50.0±5.0%	50.0 ± 5.0%	50.0 ± 5.0%	50.0 ± 5.0%	38		
Thickness % Increase (from 50% RH, 23 °C to water soaked, 23 °C)						10%		
Thickness % Increase (from 50% RH, 23 °C to water soaked, 100 °C)						14%		
Linear Expansion, % Increase (from 50% RH, 23 °C to water soaked, 23 °C)		1% to 5%	10%	1% to 5%	10%	10%		
Linear Expansion, % Increase (from 50% RH, 23 °C to water soaked, 100 °C)		3% to 11%	15%	3% to 11%	15%	15%		

\* MD - machine direction, TD - transverse direction

\*\* Specifications performed at 50% RH, 23 °C

Please contact us at [Askus@fuelcellsetc.com](mailto:Askus@fuelcellsetc.com) for pricing on any of the above membranes that you see.

FuelCellsEtc does not guarantee that the data listed on this table is of 100% accuracy.