

Nafion Membrane Comparison Chart

Properties of Nafion™ PFSA Membranes

Membrane Type		Nafion NRE-211	Nafion NRE-212	Nafion NE 1035	Nafion 115	Nafion 117	Nafion 1110
Thickness, Micrometer (mil)		25.4 (1)	50.8 (2)	89 (3.5)	125 (5)	183 (7)	254 (10)
Basis Weight, g/m ²		50	100	175	250	360	500
Tensile Modulus, MPa (kpsi)**					249 (36)	249 (36)	249 (36)
Tensile Strength, maximum, MPa (kpsi)**	MD	23 (3.3)	32 (4.6)		43 (6.2)	43 (6.2)	43 (6.2)
	TD	28 (4.1)	32 (4.6)		32 (4.6)	32 (4.6)	32 (4.6)
Elongation at Break, %**	MD	252	343		225	225	225
	TD	311	352	369	310	310	310
Tear Resistance - Initial, g/mm**	MD				6000	6000	6000
	TD				6000	6000	6000
Tear Resistance - Propagating, g/mm**	MD				>100	>100	>100
	TD				>150	>150	>150
Specific Gravity		1.97	1.97	2	1.98	1.98	1.98
Conductivity, mS/cm	In-Plane						
	Through-Plane						
Available Acid Capacity, meq/g		0.92 min	0.92 min	1.0 min	0.90 min	0.90 min	0.90 min
Total Acid Capacity, meq/g		0.95 to 1.01	0.95 to 1.01	1.03 to 1.12	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%	5	5	5
Water Uptake, % Water		50.0 ± 5.0%	50.0 ± 5.0%	43%	38	38	38
Thickness % Increase (from 50% RH, 23 °C to water soaked, 23 °C)					10%	10%	10%
Thickness % Increase (from 50% RH, 23 °C to water soaked, 100 °C)					14%	14%	14%
Linear Expansion, % Increase (from 50% RH, 23 °C to water soaked, 23 °C)		10%	10%	10%	10%	10%	10%
Linear Expansion, % Increase (from 50% RH, 23 °C to water soaked, 100 °C)		15%	15%	15%	15%	15%	15%

* MD - machine direction, TD - transverse direction

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



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