TOPDA
泰普达新材料

PFSA Membranes

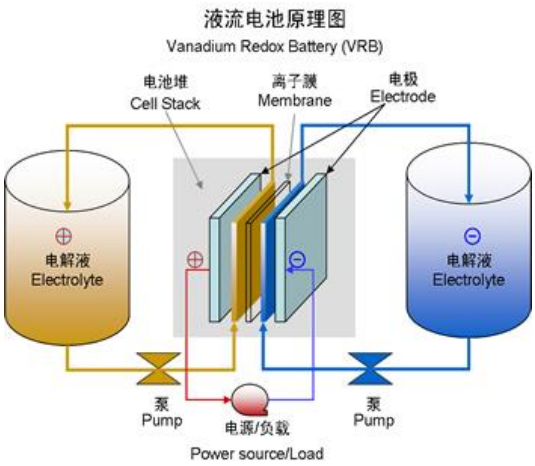
Fuzhou Topda New Material Co., Ltd

福州泰普达新材料有限公司

TOPDA Perfluorosulfonic Acid Ion-Exchange（PFSA）Membrane is an ion exchange membrane prepared by a new tape casting process. Because tape casting process can be combined with doping technology, the prepared membrane not only has the advantages of high tensile strength, isotropy, high conductivity and good chemical properties, but also has the effect of self-humidification. At the same time, Topda PFSA Membrane has low swelling rate and high water content. It is especially suitable for solid electrolyte diaphragms in fuel cells, vanadium batteries, electrolytic cells, electrodialysis and electrochemical sensors.

1. PFSA membrane for vanadium batteries and water electrolysis

Perfluorinated ion membrane TPD-M10H is a single component perfluorosulfonic acid H-type ion membrane produced by tape casting. As a solid electrolyte separating cathode and anode in various electrolytic cells and batteries, Topda membrane has the property of cation unidirectional passage. Because PTFE is used as the main chain to adjust the most suitable molecular weight and ion exchange capacity, TOPDA membrane has the characteristics of chemical resistance and durability.



TPD-M10H membrane is widely used in: vanadium batteries, liquid flow batteries, fuel cells, hydrogen production by water electrolysis and other fields.

Properties

Thickness and Basis Weight Properties

Membrane Type	Thickness(microns)	Weight(g/cm^2)
TPD-M10H-50	51	100
TPD-M10H-60	64	125
TPD-M10H-70	76	150
TPD-M10H-80	89	176
TPD-M10H-100	102	200
TPD-M10H-120	127	250
TPD-M10H-180	183	360
TPD-M10H-250	254	500

Physical Properties

Pysical Properties Measured at 50% RH, 23℃	Value	Test Method
Transverse Tensile Strength, MPa	36	ASTM D 882
Longitudinal tensile strength, MPa	38	ASTM D 882
Elongation at Break, %	186	ASTM D 882
Density, g/cm^3	1.98	-

Chemical Properties

Properties	Value	Test Method
Water Content, % water (50% RH, 23°C)	5%	ASTM D 570
Water Uptake, % water (50% RH, 100°C,1h)	50%	ASTM D 570
Thickness expansion, % increase		
from 50% RH, 23 °C to water soaked, 23 °C	10%	ASTM D 756
from 50% RH, 23 °C to water soaked, 100 °C	15%	ASTM D 756
Linear expansion, % increase		
from 50% RH, 23 °C to water soaked, 23 °C	10%	ASTM D 756
from 50% RH, 23 °C to water soaked, 100 °C	15%	ASTM D 756
Conductivity(at 100% RH, 23 °C), S/cm	0.1	GB/T 20042.3-2009
Acid Capacity, meq/g	0.1	GB/T 20042.3-2009

2. PFSA membrane for fuel cell

Topda PFSA membrane performs as a solid polymer electrolyte in fuel cells and other applications in electrochemistry and separation technology for a variety of electrochemical process and devices including chlor-alkali cells.The membrane is located between the cathode and anode and transports protons formed near the catalyst at the hydrogen electrode to the oxygen electrode thereby allowing the current to be drawn from the cell.

TPD-M20C membrane is a reinforced membrane based on chemically stable perfluorosulfonic acid (PFSA) copolymer. Incorporation of the porous reinforcement such as PTFE improves the mechanical property of the composite membrane and allows the membrane to restrict its swelling. The membrane shows significant improvements in features such as better resistance to chemical attack and longer operating durability in fuel cells.

TPD-M20C membrane is widely used in fuel cells.

Properties

Thickness and Basis Weight Properties

Membrane Type	Thickness(microns)	Weight(g/cm^2)
TPD-M20C-10	10	20
TPD-M20C-15	15	30
TPD-M20C-25	25	50

Physical Properties

Physical Properties measured at 50% RH, 23°C	TPD-M20C-15		TPD-M20C-25		Test Method
	MD	TD	MD	TD	
Tensile Strength, max., MPa	22	29	25	32	GB/T 20042.3-2009

Tensile Modulus, MPa	25	28	30	32	GB/T 20042.3-2009
Elongation at Break, %	150	180	220	230	GB/T 20042.3-2009

Other Properties

Properties	TPD-M20C-15	TPD-M20C-25	Test Method
Conductivity(at 100% RH, 23°C), S/cm	0.085	0.085	GB/T 20042.3-2009
Hydrogen Crossover, (ml/min·cm^2)	＜0.010	＜0.010	GB/T 20042.3-2009

Hydrolytic Properties

Properties	TPD-M20C-15	TPD-M20C-25	Test Method
Water Content, % water (50% RH, 23°C)	8.0±3.0%	8.0±3.0%	GB/T 20042.3-2009
Water Uptake, % water (50% RH, 100°C,1h)	15.0±5.0%	15.0±5.0%	GB/T 20042.3-2009
Linear expansion, % increase			
from 50% RH, 23°C to water soaked, 23°C	2%(MD),5%(TD)	2%(MD),10%(TD)	GB/T 20042.3-2009
from 50% RH, 23°C to water soaked, 100°C	3%(MD),10%(TD)	3%(MD),13%(TD)	GB/T 20042.3-2009

3. PFSA membrane for electrolysis

TPD-M30PTFE is a composite perfluorosulfonic acid H-type ion membrane produced by tape casting. As a solid electrolyte separating cathode and anode in various electrolytic cells and batteries, Topda membrane has the property of unidirectional passage of cation. Because of using high strength polytetrafluoroethylene mesh as support layer, combined with perfluorosulfonic acid resin with the most suitable molecular weight and ion exchange capacity, Topda composite perfluorinated ion membrane has the characteristics of super chemical resistance and durability.

TPD-M30PTFE membrane is widely used in chlor-alkali industry, hydrogen production by water electrolysis, chlorine dioxide generator, amino acid refining, gold salt preparation, etching solution recovery of copper and other fields.

Properties

Thickness and Basis Weight Properties

Membrane Type	Thickness(microns)	Weight(g/cm^2)
TPD-M30PTFE-260	260	496
TPD-M30PTFE-360	360	648

Physical Properties

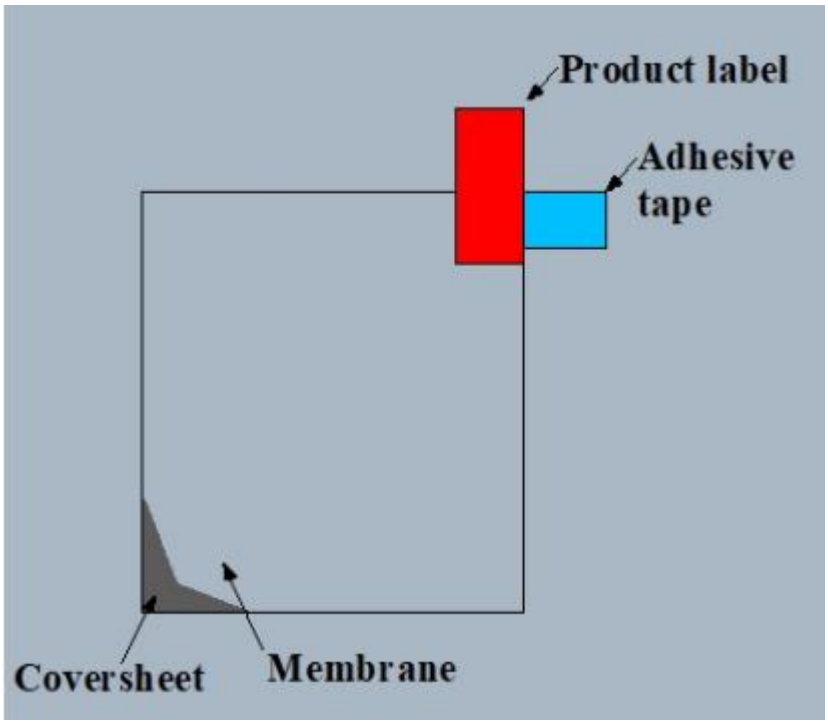
Pysical Properties Measured at 50% RH, 23℃	Value	Test Method
Transverse Tensile Strength, MPa	45	ASTM D 882
Longitudinal tensile strength, MPa	45	ASTM D 882
Elongation at Break, %	120	ASTM D 882

Density, g/cm³	1.98	-

Chemical Properties

Properties	Value	Test Method
Water Content, % water (50% RH, 23°C)	5%	ASTM D 570
Water Uptake, % water (50% RH, 100°C,1h)	43%	ASTM D 570
Thickness expansion, % increase		
from 50% RH, 23 °C to water soaked, 23 °C	3%	ASTM D 756
from 50% RH, 23 °C to water soaked, 100 °C	5%	ASTM D 756
Linear expansion, % increase		
from 50% RH, 23 °C to water soaked, 23 °C	10%	ASTM D 756
from 50% RH, 23 °C to water soaked, 100 °C	15%	ASTM D 756
Conductivity(at 100% RH, 23 °C), S/cm	0.085	GB/T 20042.3-2009

Separating the Membrane from the Coversheet



Remove the plastic tape from the roll, as shown in the diagram. Adhesive tape applied to front side in the center of the roll.

The membrane shall be easily peeled off from the coversheet during this step. The coversheet is 125 micron polyester film.

Themembrane shall be wound on the inside of the roll such that it is protected from contamination and physical damage during handling,storage,and shipping.

Product Labeling

A self-adhesive product label is placed on the inside of the roll core and on the outside over-wrap of each roll. The label contain the following information: Membrane Type, Supplier Lot Number, Quantity.

Order and Packaging Information

The standard product specifications for membrane pieces include:

- Width: 0.20m(max.)
- Length: 0.20m(min)–5.0m(max.)

The membrane for cut pieces will depend on the size and quantity of the customers' order requirements. All the flatted membranes are shipped on a roll. Flat membranes are directly wound into a small roll. The membranes are protected with a polyethylene wrap and inner packaging, then placed in shipping hard cartons.

The standard product specifications for membrane rolls include:

- Width: 200mm and 600mm standard widths; other widths are available from 200mm to 400mm in 100mm increments on special order.
- Length: 100-meter standard roll length, other non-standard lengths are feasible to meet orders of the customer.

There is a 50m^2 minimum order requirement for non standard roll widths and lengths. Membrane pieces or rolls can be cut to non standard sizes, and special packaging provided at additional cost. Please contact our sales staff for details and availability.

Membrane dimensions are based on dry product conditioned at 23°C and 50% relative humidity(RH) before cutting. The moisture content of the membranes will have an influence on their size changes including in the length, width, and thickness directions. Once the coversheet is removed, the membrane will adjust to the environment conditions. The membrane typically adheres to the coversheet, to the extent that it reduces the dimensions.

Recommended Storage Conditions

Prior to opening the original shipping box, the membrane does not require environmentally controlled storage. Membrane should be kept sealed in its original packaging until needed. After opening the package, store the material in a temperature and humidity controlled environment(temperature 25.0±5.0°C and humidity 45±5.0%RH). Acclimatize the membrane to the manufacturing environment for at least 48 hours prior to use.

Once opened and exposed to the environment, the membrane will equilibrate to the ambient relative humidity, and change in dimensions accordingly.

Scrap Disposal

Preferred disposal options are recycling and landfill. Incinerate only if incinerator is capable of scrubbing out hydrogen fluoride and other acidic combustion products. Treatment, storage, transportation, and disposal must

be in accordance with applicable national laws and regulations.

The process of recycling waste Fluoropolymer Resins is extremely complicated as there are many parts to be recycled and many hazardous materials to remove. Therefore, we recommend that it is more appropriate for customers to hand over the waste membrane to us for recycling.