Vanadium Flow Batteries

N -11 Series (Vanadium Flow Batteries)

Membrane for VRB

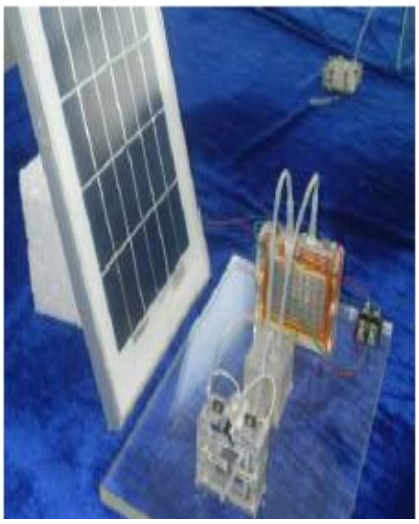
N -11X Series especially for vanadium battery low Vanadium infiltrate ion exchange membrane is made by using brand new means of flowing. Because of the means of flowing can be combined with doping technology, therefore the extention strength of membrane made by is strong. And also have advantage in the isotropic performance and electrical conductivity.

Under the same thickness, the mechanical strength is more than 80% of the traditional imported membrane, while the swelling ratio is low, and the water content is high. N-11 Series of perfluorinated ion exchange membrane is particularly suitable for use as a fuel cell,vanadium batteries,electrolytic cell, electric diaphragm dialysis, Solid electrolyte in an electrochemical sensor.

The strength,moisture retention and vanadium resistance of ion exchange membranes were improved by introducing special nano-graphene materials into the tape casting process.

Package:

N -11x is Packaged by PVC Plastic tube,small size can be packed with enviro



Thickness and Weight:

Type	Thickness（μm）	Weight （g/m2）
N-112	50	99
N-1125	62	122
N-113	75	148
N -1135	87	172
N114	100	197
N -115	**125**	**246**
N -116(w)	150	295
N -117	175	345
N-1110	220	432

Physical properties	Technical Index	Test Method
Tensile strength (transverse, 23oC, loudness temperature 50%)Mpa	38	ASTM D882
Tensile Modulu Mpa	420	ASTM D882
Elongation at break (%)	≥150	ASTM D882
Specific Density	1.97	--
Other properties	Technical index	Test method
Conductivity S/cm	0.100	GB/T 20042.3-2009
acid capacity meq/g	0.95-1.05	GB/T 20042.3-2009
Hydrolytic Properties	Technical Index	Test Method
Water content %	5.0 ±3.0	ASTM D570
Water uptake %	50.0 ±5.0	ASTM D570
Thickness Change From 50% RH,23°C to water penetration ,23°C	≤5%	ASTM D756
Thickness Change From 50% RH,23°C to water penetration ,100°C	≤15%	ASTMD756
Linear expnsion From 50% RH,23°C to water penetration ,23°C	≤5%	ASTM D756
Linear expnsion From 50% RH,23°C to water penetration ,100°C	≤18%	ASTMD756

N-W Series (Hydrogen-Rich Water Cup Membrane)

Perfluorosulfonic acid resin with high purity,the most suitable molecular weight and ion exchange capacity and unique additive technology are used to reduce the impact on the taste and prolong the service life of the membrane .

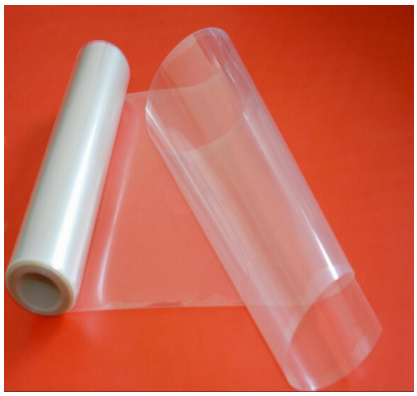
Product Specification:

Type	Thickness（μm）	Weight（g/m2）
N -116W	150	300

Performance Index

Physical properties	Technical Index	Test Method
Tensile strength (transverse, 23oC, loudness temperature 50%) Mpa	38	ASTM D882
Tensile Modulu Mpa	250	ASTM D882
Elongation at break (%)	200	ASTM D882
Specific Density	1.97	--
Conductivity S/cm	0.10	GB/T 20042.3-2009
acid capacity meq/g	0.95-1.05	GB/T 20042.3-2009
Dissolved Hydrogen Concentration (ppb,max)	1000	Almost the same as some abroad brand N11 series
Water content %	5.0 ±3.0	ASTM D570
Water uptake %	50.0 ±5.0	ASTM D570
Thickness Change From 50% RH,23°C to water penetration ,23°C	18%	ASTM D756
Thickness Change From 50% RH,23°C to water penetration ,100°C	30%	ASTMD756
Linear expansion From 50% RH,23oC to water penetration ,23°C	16%	ASTM D756
Linear expansion From 50% RH,23°C to water penetration ,100°C	20%	ASTMD756

FUEL CELL N -21X



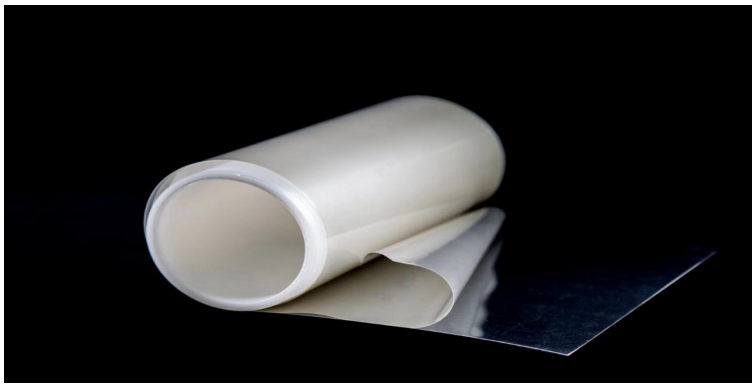
Hydrogen Fuel cell membrane

Perfluorinated Proton Exchange Membrane

Type	Thickness (um)	Weight (g/m^2)
N -211	**25**	**50**
N-212	**51**	**102**

N performance

Performance	Technical Index	Method
Tensile Strength	30MPa (23℃, 50% RH, Isotropy ,N -115)	ASTMD882
Tensile Modulus	400 MPa (23℃, 50% RH, Isotropy)	ASTMD882
Linear Expansion	5±1% (23℃, from 50% RH to water soaked)	ASTM756
Water Uptake	50±5% (100℃, 1h)	ASTMD570
Conductivity	0.1 S/cm	25℃zawodzinski
Equivalent Weight	950 g/eq	Titration

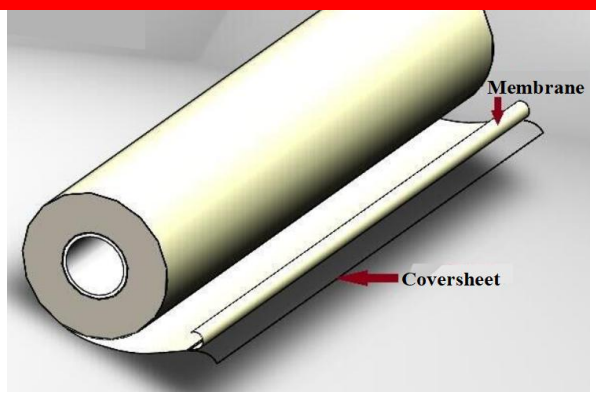
N -30X (Hydrogen Fuel Cell) **Perfluoinated ion-exchange film**	 **For Fuel cells, and other special electrolysis and high temperature environment**

N-3010 and N-3015 （Hydrogen Fuel Cell）

Product Information

Eptfe (expanded Polytetrafluoroethylene) microporous reinforcing material was added to the traditional proton exchange membrane, which has the characteristics of high strength ,high conductivity and low ion permeability.

FIGURE 1: PFSA N-3010/3015/3025 Series membrane Roll Schematic Diagram



The membrane combined with the coversheet eliminates rapid changes in the membrane's water content, and stabilizes the dimensions of the membrane when removed from the roll.

Thickness and Basis Weight Properties

Membrane Type	Thickness(microns)	Weight(g/m2)	
N-3010	12	20	Width 200mm,length can get to 10m
N-3015	15	29.5	
N-211	25	50	
N-212	51	102	

Physical and Other Properties

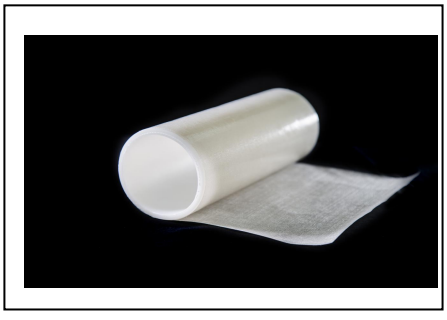
Physical Properties meastured at 50% RH, 23 °C	N-3010		N-3015		N-211/212	Test Method
	MD	TD	MD	TD		
Tensile Strength, max., MPa	45	38	40	35	30	ASTM D882
Tensile Modulus, MPa	480	400	400	350	400	ASTM D882
Elongation at Break, %	175	150	190	170	150/180	ASTM D882
Specific gravity	1.97		1.97		1.97	---

Other Properties	Values			Test Method
Conductivity(at 100% RH, 23 °C), S/cm	0.100	0.110	0.100	GB/T 20042.3-2009
Hydrogen Crossover, (cm^3.cm/cm^2.s.0.1Mpa)	＜5.00X10^{-8}	＜4.5x10^{-8}	/	GB/T 20042.3-2009
Hydrogen crossover current (mA/cm2)	<0.2	<0.2	/	

Hydrolytic Properties	Values			Test Method
Water Content, % water (50% RH, 23 °C)	10.0± 3.0	10.0± 3.0	5.0± 3.0	ASTM D570
Water Uptake, % water (50% RH, 100 °C,1h)	50.0± 5.0	50.0± 5.0	50.0± 5.0	ASTM D570

Linear expansion, % increase from 50% RH, 23 °C to water soaked, 23 °C	MD	TD	MD	TD	/	ASTM D756
	≤3	≤4	≤4	≤5	≤4	
Linear expansion, % increase from 50% RH, 23 °C to water soaked, 100 °C	≤5	≤4	≤7	≤7	≤20	

Thickness change from 50%RH, 23 °C to water soaked, 23 °C	≤10%	≤15%	≤10%	ASTM D756
Thickness change from 50%RH, 23 °C to water soaked, 100°C	≤30%	≤40%	≤30%	ASTM D756



N -41Series membrane (Electrolysis)

Perfluorinated ion exchange membrane which hybrid with high strength PTFE fabric.

Introduction :

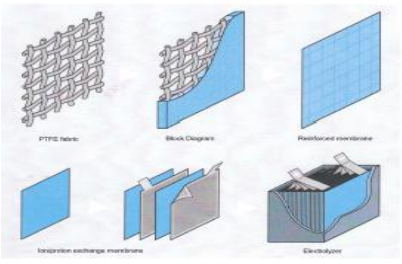
N 41X is hybrided by high strength PTFE fabric and Perfluorinated ion exchange Resin. Thus our film has many outstanding features. It not only has the high tensile strength ,high selection,isotropy,high conductance;but also has the effect of self-humidifying and with low Linear Expansion. It has the good performance in Fuel Cell ,Vanadium batteries,electrolyzer,electrodialysis,elect-chemical sensors as the solid electrolyte film .

Unique tape casting process with appropriate molecular weight and ion exchange capacity of

perfluorosulfonic acid resin is used to form homogenegous memebrane with uniform thickness,it is widely used in electrolytic chlorine dioxide generator,etching solution recovery copper,gold salt preparation, amino acid refining,caustic soda preparation,electrodialysis and other electrolytic industriese.

Thickness and Weight :

Type	Thickness (um)	Weight (g/m2)
N -417	260	340
N -4110	360	470



Composition of PTFE complex PIEM

N series Performance :

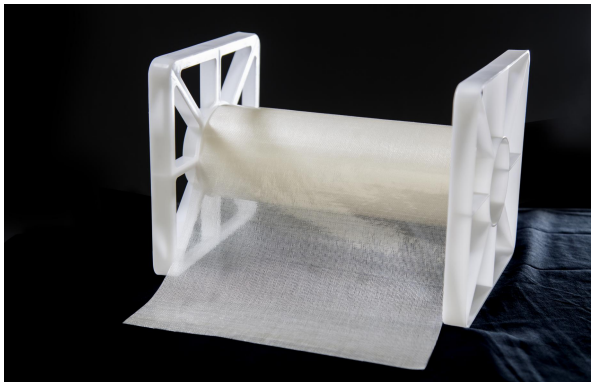
Performance	Technical Index	Method
Tensile strength	50 MPa	ASTMD882
Elongation at break	120 %	ASTMD882
Specification Density	1.35	--
Conductivity (S/cm)	0.083	GB/T20042.3-2009
Acid Capacity (meq/g)	0.95-1.05	GB/T20042.3-2009
Water Content %	5±3.0	ASTM D570
Water Uptake %	50±5.0	ASTM D570
Thickness change from50% RH,23°C to water penetration ,23°C	5	ASTMD756
Thickness change from 50% RH,23°C to water penetration ,100°C	10	ASTMD756
Linear Expansion from 50% RH,23°C to water penetration ,23°C	2	ASTM D756
Linear Expansion from 50% RH,23°C to water penetration ,100°C	5	ASTMD756

Retrieve Cu from etching waste

蚀刻液回收铜

Perfluorinated ion exchange membrane

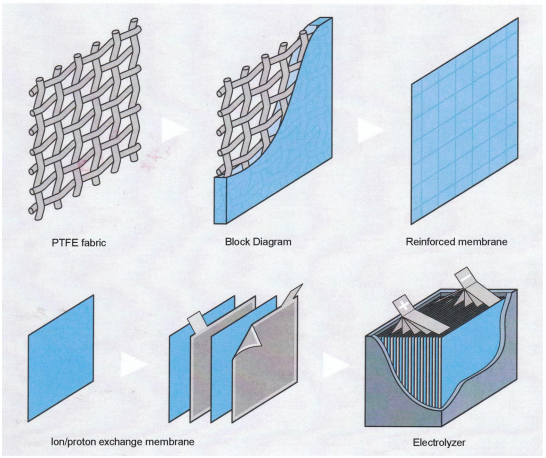
N-51Series （ Water treatment ）



Using High strength PTFE mesh as supporting layer, with perfluorosulfonic acid resin with the most suitable molecular Weight and ion exchange capacity. It has super chemical resistance And durability ,and is widely used in the treatment of high salt Wastewater,electrodialysis and other water treatment fields.

Specification:

N-515 Thickness :220um Weight :290g/m2



Properties:

Physical Properties	Test Data	Test Method
Tensile strength (transverse) (23℃, relative humidity 50%)	50MPa	ASTM D 882
Elongation at break (23℃, 50% relative humidity)	120%	ASTM D 882
Density	1.32	- -
Conductivity (S/cm)	0.083	GB/T20042.3-2009
Acid Capacity (meq/g)	0.95-1.05	GB/T20042.3-2009
Water Content %	5±3.0	ASTM D570
Water Uptake %	50±5.0	ASTM D570
Thickness change from50% RH,23°C to water penetration ,23°C	5	ASTMD756
Thickness change from 50% RH,23°C to water penetration ,100°C	8	ASTMD756
Linear Expansion from 50% RH,23°C to water penetration ,23°C	2	ASTM D756
Linear Expansion from 50% RH,23°C to water penetration ,100°C	5	ASTMD756

Recovery and disposal:

Because this product will volatilize toxic and harmful substances during incineration, it can be disposed by landfill method. Incinerators should only be able to remove hydrogen fluoride and other acidic combustion products. The disposal of this product must comply with the relevant local laws and regulations.
The company provides paid recycling services for perfluorinated membrane waste.

Perfluorosulfonate N-W series （Hydrogen-Rich water cup Membrane）

Perfluorosulfonic acid resin with high purity, the most suitable molecular weight and ion exchange capacity and uniques additive technology are used to reduce the impact on the taste and prolong the service life of the membrane.

Product Specification:

Type	Thickness (um)	Weight (g/m2)
N-116W	152	300

Properties:

Physical Properties	Test Data	Test Method
Tensile strength (transverse) (23℃, relative humidity 50%)	38MPa	ASTM D 882
Tensile Modulu (Mpa)	250	ASTM D882
Elongation at break (23℃, 50% relative humidity)	200%	ASTM D 882
Density	1.97	- -
Conductivity (S/cm)	0.95-1.05	GB/T20042.3-2009
Acid Capacity (meq/g)	1.00	GB/T20042.3-2009
Dissolved Hydrogen Concetration (ppb,max)	1000	Almost same as some foreign brand N11 series
Water Content %	5±3.0	ASTM D570
Water Uptake %	50±5.0	ASTM D570
Thickness change from50% RH,23°C to water penetration ,23°C	18	ASTMD756
Thickness change from 50% RH,23°C to water penetration ,100°C	30	ASTMD756
Linear Expansion from 50% RH,23°C to water penetration ,23°C	16	ASTM D756
Linear Expansion from 50% RH,23°C to water penetration ,100°C	20	ASTMD756

Ion-exchange resin N-1000 series Perfluorosulfonic Acid Ion Exchange Resins

Physical properties	Technical index	Test method
Appearance	White powder or granular	--
Acid Capacity (meq/g)	0.95-1.05	GB/T20042.3-2009
Exchange Equivalent (g/mol)	1000±50	GB/T20042.3-200
Specific gravity	1.97-2.00	--
Decomposition temperature	>350	TG analysis

The main Purpose:

An ion exchange membrane, a fuel cell membrane, an ion exchange membrane for a vanadium battery /chlor-alkali industry,a hollow fiber membrane, a super acid catalyst used in organic synthesis,a super stable ion exchanger,and the one are prepared in various electrolysis apparatuses.

Packing

Packed by plastic bag , 25kgs a drum or 20kgs a carton with water-proof packing .

Keep in clean, dry room ,Water-proof, dust-proof . Ship as the none dangerous-products,Avoid heat, be affected with damp be affected with damp, frozen cargo violent vibration

N-PIES series

perfluorosulfonic acid ion exchange solution

The N-PIES series perfluorosulfonic acid Ion exchange sulotion can be used as a proton exchange membrane electrolyte membrane and a CCM catalyst coating for preparing fuel cells,eletrochemical sensors,it can also be used for the repair of perfluorinated ion membrane.

Technical data

Resin conten	data			
Concentration	5wt.%,	10wt.%	15wt.%	20wt.%
Polymercontent %	5±0.5	10±0.5	15±0.5	20±0.5
Acid capacity	0.95-1.05	0.95-1.05	0.95-1.05	0.95-1.05
Specific gravity	0.91-1.05	0.95-1.05	0.95-1.05	0.95-1.05
Exchange equivalent(g/mol)	950-1050	950-1050	950-1050	950-1050
Dispersant Type	Water and Alcohol mixture			

Packing: bottle

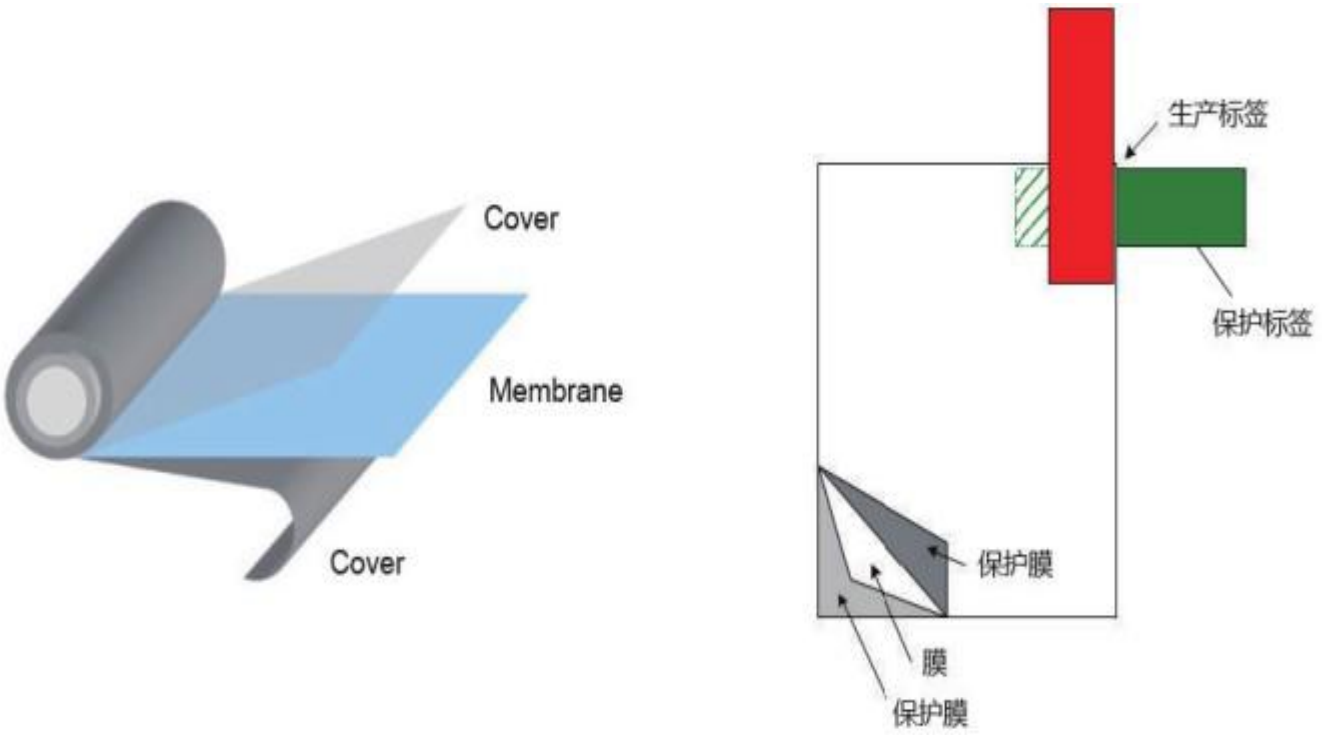
The Perfluorinated ion exchange colution is packaged in a teflon plastic bottle.Thepackage is divided into 200ml,500ml,1L,5L,20L. if you need special packaging,please specify when ordering .

Note:

our N4110 and N417 can take the place of Nafion 2030/NE2100/Nafion 325.

In Chlor-alkali producing field. our membrane current efficiency is 99%, electric current density is 4000-5000A, max 8000A/m2. Perfluorinated sulfonic acid resin equivalent is 900-1000.Dupont's is 1000. Our any type is 10-20% higher than Dupont's . the life is 3-15years. (related to PH ,impurity,ion) .working temperature 5-100C degree.1% expansion rate . 1m2 N41x membrane can produce 150 ton caustic soda one year .

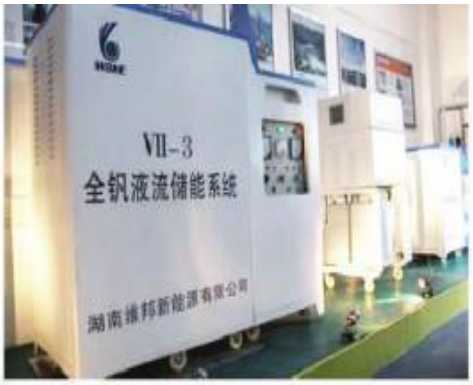
N full range of fluoride ion film packaging standards



桶装，标准卷：0.61m x 100m、0.81m x 100m,特殊规格请联系销售人员。

Barrel, standard volume: 0.61m x 100m, 0.81m x 100m, please contact the sales staff for special specifications.

部分案例
PARTIAL CASE



我公司在氢燃料电池质子交换膜和钒液流电池离子膜的研发上有着十余年的积累，是国内最早从事该领域研发并率先实现规模化量产的企业之一。未来我们将携手与更多合作伙伴一起，共同推动氢能和储能行业向前发展，为洁净能源事业添砖加瓦！

Our company has accumulated more than ten years in the research and development of proton exchange membranes for hydrogen fuel cells and ion membranes for vanadium liquid flow batteries, and is one of the earliest domestic enterprises engaged in research and development in this field and taking the lead in achieving large-scale production. In the future, we will work hand in hand with more partners to promote the development of hydrogen energy and energy storage industry and contribute to the clean energy cause!

PARTNER

合作伙伴