PVDF **P**iezoelectric film

PVDF Piezoelectric fluorpolymer film or piezo film is a kind of fresh high polymer piezoelectric material made from Japan . Till now ,only a few countries can produce this kind of film in the world.

PVDF has the unique effect of the dielectric, piezoelectric effect, the thermoelectric effect.Compared with the conventional piezoelectric materials with wide frequency response, dynamic range, high sensitivity electromechanical conversion and mechanical properties of high strength, acoustic impedance matching, and has a light weight, soft, not brittle, impact resistant, less susceptible to water and chemical pollution, easily made into any shape and size, ranging from plates or tubes advantage.

A wide range of applications in mechanics, acoustics, optics, electronics, measurement, infrared, security alarm, health care, military, transportation, information engineering, office automation, marine development, geological exploration and other technical fields. The products have mainly three varieties of gold, silver, aluminum, thickness 30-500μm. Product shape and size can be determined according to user's needs.It is the new transducer materials to produce improvements Dynamic Pressure sensors and ultrasound, intelligent exploration .

Performance and Characteristics:

PVDF piezoelectric film has a high chemical stability, low moisture absorption, high thermal stability, high resistance to UV radiation capacity, high impact resistance, fatigue resistance capacity, and its chemical stability is 10 times higher than the ceramic,. It can be used at the temperature bellow80 □ long-term . PVDF piezoelectric film texture is soft, light weight, with similar acoustic impedance of water, matching well, application of high sensitivity; PVDF piezoelectric film has high stretching vibration of the harmonic frequency in the thickness direction , you can get a wide flat response.Its frequency response width is far superior to the ordinary piezoelectric ceramic transducer; high capacitance

PVDF piezoelectric film's advantages:

(1) good manufacturability . Existing equipment is available for processing;

(2) It can be made into large area sensitive element;

(3) The band respond to a wide (500MHz);

(4) Acoustic impedance closes to human tissue and water, and so it can be used for the structure of sensitive medical diagnostic devices;

(5) High impact strength (enable sensors for shock wave);

(6) Corrosion resistance (Using this performance in the active medium is required);

(7) Lower relative dielectric constant; corresponding high piezoelectric constant value d_{33} (one or more order of magnitude than other piezoelectric materials) and thermal signal sensitivity (p / ε) values;

(8) Lower thermal conductivity than piezoelectric ceramic , and even thinner film;

(9) Soft and tough (PVDF's supple coefficient is about 30 times of that of PzT and light (specific gravity is only about

1/4 of PzT). It can be made into a variety of complex shapes (cone, dome-shaped, etc.),it can be used in the components which need to have a special orientation.

Overall: PVDF piezoelectric film has a large piezoelectric constant, wide frequency response, good mechanical strength, impact resistance, light weight, flexible, easy to match the acoustic impedance than quartz, PZT, easy to process into big area products, less susceptible to water and general chemical pollution, the price is cheap. It is not only alternative in many areas of piezoelectric ceramic materials, but also can be applied to the occasion where the piezoelectric ceramic materials can not use. Therefore, it is an extremely promising transducer sensitive polymer materials.

PVDF piezoelectric film varieties of technical specifications:

1.Surface requirements:

Item	Index
Color	Metallic luster, basically the same
bubble, perforation	No
Scratches, wrinkles	Does not allow any obvious scratches and wrinkles (scratches and wrinkles extent, see samples)
Spot	No visible spots from the membrane surface 300mmvisual

PVDF Piezoelectric film performance indicators:

ITEM	Index
Piezoelectric constant d_{33}	18-32 PC / N
Dielectric constant $\varepsilon / \varepsilon_0$	9-13 (IKHZ)
Speed of sound c	2000 m / s
Electromechanical coupling coefficient k_{33}	10-14%
Volume resistivity p	10^{13} Ω.cm
Thermal pyroelectric coefficient p	40 c / $cm^{2.}$ k
Detection sensitivity (4HZ)	^{1011} m.$HZ^{1/2}$ / W
Working temperature T	-40 80 □

Piezo Sensor Type Applications

Accelerometer/Vibration Sensors	Washing machine load balance, pacemaker, pedometer, motion and vibration sensors, medical vital signs and cardiac monitors, motional feedback for speakers
Acoustic	Musical instrument pickup, electronic stethoscope, coin validation, bone conduction microphone, perimeter security cable, acoustic speakers

Anti-tamper panel	Security - electronic chip protection
Hydrophone	Sonar
Hypersonic speaker	Ultrasonic directional speakers
Load/impact	Stamping machine load cells, passenger safety systems, target impact
Traffic Sensor	Traffic counters, speed, toll and red light enforcement
Flexible switch	Water meter cam counter, CMOS wake-up switch, door operation detection
Piezo Cable	Buried or fence-mounted sensor for perimeter security
Ultrasonic digitizer	Electronic pen input
Ultrasonic transducer	Fluid level sensing, process flow meter, medical imaging, subsea acoustic camera, non-destructive testing

Specification

term	figure	Mena
length	≤270	0□15%
Width	≤200	0□15
thickness	≥0.020 ≤0.050	±5%
	≥0.050 ≤0.100	±5%
	≥0.100 ≤0.200	±5%
	≥0. 200 ≤0.500	±3.5%

FUEL CELL FILM

Perfluorinated ion exchange membrane
N-211□212
Introduction :
N Series perfluorinated ion exchange membrane is made from SiO2 and Perfluorinated ion exchange Resin by method of New tape-casting.The film has very strong tensile strength,high conductive ratio,good chemical properties etc. It can be used in hight temperature fuel cells and self-humidifying fuel cells.
Package:
N Series film is packed by plastic bucket .Special package please indicate.
Thickness and weight:

Type	Thickness □ μM□	Weight□G/M^2□
N-211	25	50
N-212	51	100

The thickness and weight are only approximate numbers. Not the absolute accuracy.
Size:
Length x width =600mm x 600mm
Special size:
We can offer special size film,if MOQ gets to 20Sqm, we won't collect the extra charges, if less than 20Sqm,we will collect suitable labor cost and other cost .Special thickness please contact

market2@prochema.cn 1mil =25.4um

N performance

Performance	Test Data	Test Method
Tensile Strength	40MPa (23□,50% RH,Isotropy)	ASTMD882
Tensile Modulus	630MPa (23□,50% RH,Isotropy)	ASTMD882
Linear expansion	6±1%((23□,from 50% RH,to water soaked)	ASTM756
Water uptake	50%±5% (100□,1h)	ASTMD570
Conductivity	0.1S/cm	25□ ZAWODZINSKI
Acid capacity	1.0meq/g	titrimetry

FUEL CELL FILM

Perfluorinated ion exchange membrane
N-115□117,1110
Introduction :
N Series Perfluorinated ion exchange membrane is made from SiO2 and Perfluorinated ion exchange Resin by method of New tape-casting.The film has very strong tensile strength,high conductive ratio,good chemical properties etc. It can be used in hight temperature fuel cells and self-humidifying fuel cells.
Package:
N Series film is packed by plastic bucket .Special package please indicate.
Thickness and weight:

Type	Thickness □ μM□	Weight□G/M^2□
N-115	25	50
N-117	51	100
N-1110	254	500

The thickness and weight are only approximate numbers. Not the absolute accuracy.
Size:
Sheet size: 600MM X 600MM□800MM X 800MM,500MM X 500MM,300MM X 300MM
Special size:
We can offer special size film,if MOQ gets to 20Sqm, we won't collect the extra charges, if less than 20Sqm,we will collect suitable labor cost and other cost .Special thickness please contact
market2@prochema.cn 1mil =25.4um

N performance

Performance	Test Data	Test Method
Tensile Strength	40MPa (23□,50% RH,Isotropy)	ASTMD882
Tensile Modulus	630MPa (23□,50% RH,Isotropy)	ASTMD882
Linear expansion	6±1%((23□,from 50% RH,to water soaked)	ASTM756
Water uptake	50%±5% (100□,1h)	ASTMD570
Conductivity	0.1S/cm	25□ ZAWODZINSKI
Acid capacity	1.0meq/g	titrimetry

FULELCELL N-31X □SiO_2□
Perfluorinated Ion exchange Film

Introduction :
N-31x(SiO2) is hybrided by SiO2 and Perfluorinated ion exchange Resin . It can be used in hight temperature fuel cells and self-humidifying fuel cells.
Package:
N N-31x(SiO2) is packed by plastic bucket .Special package please indicate.
Thickness and weight:

Type	Thickness (um)	Weight (g/m^2)
N-312(SiO2)	50	110
N-314(SiO2)	100	220

X can be 1-10mil,Special thickness please contact market2@prochema.cn 1mil =25.4um
Size:
Length x width =600mm x 600mm

N performance

Performance	Test Data	Test Method
Tensile Strength	40MPa (23□,50% RH,Isotropy)	ASTMD882
Tensile Modulus	630MPa (23□,50% RH,Isotropy)	ASTMD882
Linear expansion	6±1%((23□,from 50% RH,to water soaked)	ASTM756
Water uptake	50%±5% (100□,1h)	ASTMD570
Conductivity	0.1S/cm	25□ ZAWODZINSKI
Equivalent Weight	1000meq/g	
Permeability	OCA□1.3V over 300h	

FUEL CELL FILM

Reinforced perfluorinated ion exchange membrane
N-417□4110
Introduction :
N -41(PTFE)Series perfluorinated ion exchange membrane is made from SiO2 and Perfluorinated ion exchange Resin by method of New tape-casting.The film has very strong tensile strength,high conductive ratio,good chemical properties etc. After composited PTFE reinforced net,the strength improved much and lower swelling ration .It can be used in high temperature fuel cells and self-humidifying fuel cells.
Package:
N Series film is packed by plastic bucket .Special package please indicate.
Thickness and weight:

Type	Thickness □ μM□	Weight□G/M^2□
N-417	175	
N-4110	250	

The thickness and weight are only approximate numbers. Not the absolute accuracy.
Size:
Sheet size: 600MM X 600MM
N performance

Performance	Test Data	Test Method
Linear expansion	2%((23□,from 50% RH,to water soaked)	ASTM756
Water uptake	30%±5% (100□,1h)	ASTMD570
Conductivity	0.1S/cm	25□ ZAWODZINSKI
Acid capacity	1.0meq/g	titrimetry

Our product is used for a wide range of alkali conditions of use

Current density 1000-5000A/m2 best 3500-4200A

Temperature 50-100 degree Celsius best 80 degree Celsius

NaOH 10%-32% best28%

PH 0-14 best PH>2□

Sodium Chloride concentration in inlet 200-350g/L best 300g/L-310g/L

Sodium Chloride concentration in outlet 150-250g/L best 190g/L-210g/L

Ni<10ppb

Uniform tempura, concentrations and current throughout the cell