

FLUOROPLASTIC PRODUCTS/ ULTRAHIGH-MOLECULAR-WEIGHT POLYETHYLENE PRODUCTS

NITOFLON®





Nitto Denko Corporation

26th Fl., Shinagawa Season Terrace, 1-2-70, Konan, Minato-ku, Tokyo 108-0075, Japan TEL: +81-3-6632-2101 FAX: +81-3-6632-2025 https://www.nitto.com/jp/en/Inquiry about Products: +81-3-6631-1637

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NITOFLON®

NITOFLON® is the registered trade name of Nitto's fluoroplastic products.

Fluoroplastic have many advantages including excellent chemical resistance, heat resistance and electrical properties. Until recently, however, these characteristics have made fluoroplastics difficult to process and restricted its applications. Nitto solved these problems by applying its own processing technology such as surface treatment techniques, precision engineering technology, and composite technology with different materials.

Nitto's technologies have opened up a host of new possibilities for fluoroplastics, including meeting UL anti-flammability standards in the United States.

NITOFLON is now used as a material in an extensive range of applications from electronics to household products.



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Features of Fluoroplastics

Excellent Heat Resistance



These materials offer outstanding heat and cold resistance. Continuous service temperature ranges from –100°C to +260°C with a melting point of 327°C.

Best Sliding Properties among All Solid Materials



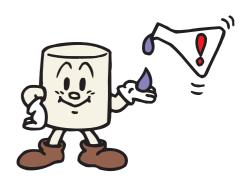
Fluoroplastics have the lowest friction coefficient among all solid matter, giving them excellent self-lubrication properties.

Outstanding Electrical Insulation Properties



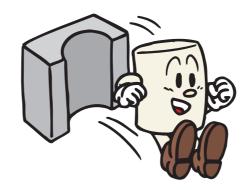
Fluoroplastics have the lowest dielectric constant and dissipation factors among all solid materials. They are stable in a wide range of frequencies and external environments, making them ideal as high-frequency insulation materials.

Excellent/Superior Chemical Resistance



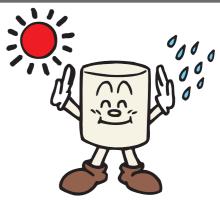
The stable molecular structure of NITOFLON means that fluoroplastics are unaffected by virtually all industrial chemicals and solvents.

Non-Adhesion Property



Adhesives do not stick easily to fluoroplastics, making them ideal for use in mold release applications.

Superior Weatherability



Fluoroplastics are virtually unaffected by visible and UV light as well as humidity, making them suitable for long-term outdoor use.

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General Properties of Fluoroplastics and Ultrahigh-Molecular-Weight Polyethylene

Resin prop	perties	PTFE	FEP	ETFE	PFA	Ultrahigh-molecular- weight polyethylene
Heat-resistance (norma	I temperature °C)	260	200	150	260	80
Electrical properties			0	0	0	\circ
Flame resistance (0.I. %)		95<	95<	95< 30		18
Mechanical properties		\triangle	0	0	\triangle	
Low friction		0	0	Δ	0	0
	Acid		0	0	0	0
Chemical resistance	Alkali	0	0	0	0	0
	Solvent	0	0	0	0	0
Non-adhesiveness		0	0	0	0	0
Weather resistance		0	0	0	0	\triangle
Transparency		\triangle	0	0	0	Δ
Formability		\triangle	0	0	0	\triangle
Specific gravity		2.17	2.15	1.73	2.15	0.94

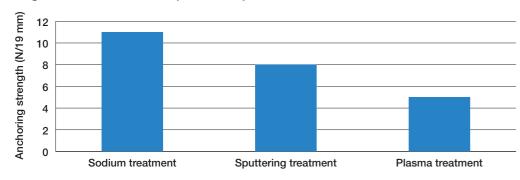
 $[\]bigcirc$ = Conforming (excellent) \bigcirc = Good \triangle = Defective

Surface Treatment Method

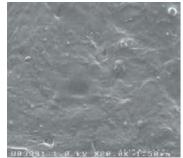
In general, PTFE sheds water, having low wettability. So it requires surface treatment that enhances its wettability in order to undergo adhesive processing or glueing processing. Nitto provides products such as adhesive tape to customers utilizing two methods: one is chemical treatment using sodium and the other is electrical sputtering treatment by vacuum discharge.

It is recommended to use sputtering treated products for the usage in the surface treatment of melting type fluoroplastic film or for the usage in outdoor-exposure.

Anchoring Strength at Each Treatment (PTFE Film)

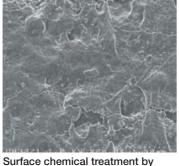


Comparison of Film Surface by SEM Images



Untreated

3



Surface chemical treatment by sodium



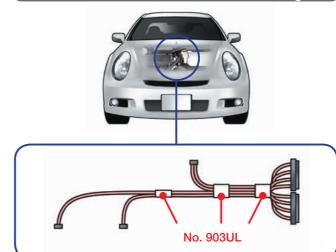
Surface raising treatment by sputtering treatment discharge

Major Applications of NITOFLON®

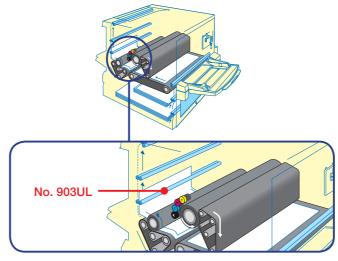




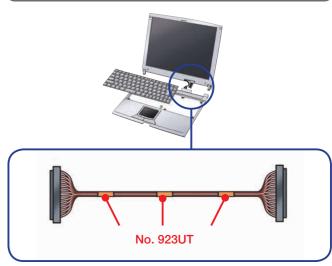
Binding & Electrical Insulation of Heat-Resistance Cables around Car Engine



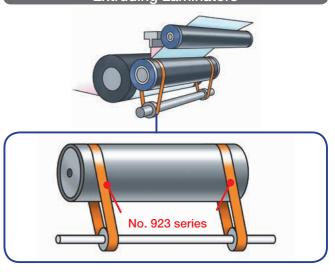
Sliding Assistance at Paper-Feeding Blade for Printers (LBP)



Wire Binding & Electrical Insulation inside Notebook PCs



Protection of Pressure Bonding Roll for **Extruding Laminators**



Sliding Assistance for Conveyor Guides



NITOFLON® Films No. 900 Series



Features

- Outstanding chemical resistance to acids, alkalis, etc.
- ●Offers high insulating performance and can be used in a wide temperature range (-100°C to 260°C).
- •Has an extremely low friction coefficient and strong non-adhesion (separating) property.

No. 900UL PTFE film No. 901UL PTFE film Surface glueing treatment PTFE film Surface glueing treatment PTFE film Surface glueing treatment Surface glueing treatment

Applications

- Thrust washers
- •Insulation for motor and transformer coils
- ●FRP and CFRP molding release agent
- Elastomer composites
- Compression release agent for anisotropically conductive films (ACF)
- Chain tensioners
- Elevator sliding guide shoes

Properties

	Item	Unit					stic values						
					N	o.900UL/No.9	01UL/No.902	JL					
1	hickness	mm	0.05	0.08	0.1	0.13	0.18	0.3	0.5	1.0			
Ten	sile strength	MPa	50	50	50	50	50	50	45	40			
E	longation	%	300	300	310	320	330	330	370	400			
Dielectric	breakdown voltage	kV	6.0	8.3	9.6	11.6	14.1	19.5	26.7	37.7			
Dielectric	constant (1MHz)	_	2.1										
Volu	me resistivity	Ω·cm	1×10 ¹⁷ ≤										
Arc	resistance	sec	180 ≤										
Wate	er absorption	%	0										
Heat resistance (weight loss upon heating)	%	0										
	Nitric acid (60%)	%				(0						
Chemical resistance	Sodium hydroxide (40%)	%				(0						
	Acetone	%				(0						
Spe	_				2.1 ~	~ 2.3							
Kine	_	0.1											
Flan	Flame resistance —				VTM-0	0.02 ~ 0.24m	imt) / V-0 (0.2	5mmt ≤)					
Me	elting point	°C	327										

^{*}The above values are sample observed values, not the guaranteed performance.

NITOFLON® Films No. 900 Series

Size

Product No.	Туре	Thickness (mm)						W	idth (m	m)						Length (m)	
		0.03	10 300	13 500	19	25	30	38	40	50	75	100	150	200	250	10.30	
			100	150	200	250	300	500								10	
		0.038	10	13	19	25	30	38	40	50	75					30	
			100	150	200	250	300	500	600	1,000						10	
		0.05	5	6	7	8	9	10	13	19	25	30	38	40	50	30	
			75	150	000	050	000	F00	000	1 000							
		0.08	100	150 6	200 7	250 8	300	500 10	13	1,000	25	30	38	40	50	10	
		0.00	75	100	150	200	250	300	500		1,000	30	30	40	50	30	
			100	150	200	250	300	500	600	1,000						10	
		0.1	5	6	7	8	9	10	13	19	25	30	38	40	50	30	
			75	100	150	200	250	300	500		1,000						
		0.40	100	150	200	250	300	500		1,000						10	
No 000III	Untreated	0.13	5 75	6 100	7 150	8 200	9 250	10 300	13 500	19 600	25 1,000	30	38	40	50	30	
No. 900UL	Uniteateu		100	150	200	250	300	500		1,000	1,000					10	
		0.18	5	6	7	8	9	10	13	19	25	30	38	40	50		
			75	100	150	200	250	300	500		1,000					30	
			100	150	200	250	300	500	600	1,000						10	
		0.2	5	6	7	8	9	10	13	19	25	30	38	40	50	30	
		0.25	75	100	150	200	250	300	500	600	1,000					10.30	
		0.23														10.20	
		0.4	100	150	200	250	300	500	600	1,000							
		0.5															
		0.7														10	
		0.8	300	500	600												
		1.0															
		1.5	100	200	300												
		0.05															
		0.08															
		0.1														10.30	
		0.13															
No 004III	Single surface	0.18	100	150	200	250	300	500									
No. 901UL	chemically etched	0.2															
		0.3															
		0.5														10	
		0.8															
		1.0	100	150	200	250	300	500									
No. 901W-UL	Single surface	0.05	250	E00												100	
NO. 90 IW-UL	electrically etched	0.1	250	500												100	
		0.05															
		0.08															
		0.1	10	13	19	25	30	38	40	50	100	150	200	250	300		
		0.13	500														
No. 902UL	Double surface treated	0.18														10	
	ueateu	0.2															
		0.3															
		0.4	300	500													
		0.8															
		0															

[◆]For longer items, other sizes or filler-added items, please consult a Nitto representative.

NITOFLON® High-Strength Films No. 920 Series



Features

- Higher in tensile strength and insulating performance compared to NITOFLON.
- The minimum product thickness is as small as 0.02 mm, contributing to the miniaturization of parts.
- •Has strong non-adhesion property and extremely low friction coefficient.

Applications

- •Insulation for motor and transformer coils
- •Insulation of heat resistance wires
- Insulation of capacitors

Structure	Э	
lo. 920UL		Special reinforcement film (PTFE)

Properties

lto		Unit	Characteristic value No. 920UL					
Ite	III	UIIIL						
Thick	ness	mm	0.02	0.05				
Tensile strength	Longitudinal	MPa	77	80				
Elongation	Longitudinal	%	111	120				
Dielectric breakdown voltage	Average	kV	5.4	11.3				

^{*}The above values are sample observed values, not the guaranteed performance.

Size

Product No.	Туре	Thickness (mm)		Width (mm)						Length (m)						
		0.02														
		0.025														
		0.03														
No. 920UL	Untreated	0.04	10	13	19	25	30	38	50	75	100	150	200	250	300	30 · 50
		0.05														
		0.06														
		0.10														

[◆]For single surface treated items, other sizes, please consult a Nitto representative.

NITOFLON® PTFE Impregnated Glass Cloth No. 970 Series



Features

•With a composite of polytetrafluoroethylene resin and high-strength glass cloth as its base material, has excellent heat resistance, chemical resistance, electrical characteristics, weather resistance, waterproof (water repellent) performance, strong non-adhesion properties and mechanical strength.

Applications

- ●Heat-resistant release agent for bag-making heat sealing
- Conveying belts for food processing
- •Heat-resistant lubrication of fixing belts for printers
- Compression release agent for anisotropically conductive films (ACF)
- Compression release agent for solar cell backsheets

Structure

No.970-2UL PTFE impregnated glass cloth

Properties

ltom	ltem Unit			Characteristic value											
Item			No. 970-2UL No. 970-4UL							No. 9700UL					
Substrate th	ickness	mm	0.05	0.1	0.13	0.05	0.1	0.13	0.05	0.1	0.13				
Total thicl	kness	mm	0.07	0.12	0.17	0.08	0.13	0.18	0.08	0.13	0.18				
Tensile strength	Longitudinal	N/15mm	200	400	420	200	320	340	200	300	350				
rensile strength	Lateral	N/ ISIIIII	160	370	370	160	330	340	160	300	320				
Friction coe	efficient	_	0.08	0.08	0.1	0.08	0.08	0.1	0.08	0.08	0.1				
Dielectric break	lown voltage	kV	_	_	_	1.3	1.4	1.9	1.3	1.5	1.6				
Volume res	istivity	$\Omega \cdot cm$	_	_	_	10 ¹⁶									

 $^{{}^\}star\mathsf{The}$ above values are sample observed values, not the guaranteed performance.

Size

Product No.	Туре	Substrate thickness (mm)	Total thickness (mm)	Width (mm)	Length (m)
		0.03	0.045		
		0.05	0.07		
		0.07	0.09		
No. 970-2UL	Standard	0.1	0.12	300 400 500 550 600 970 1,000	
		0.13	0.17		
	0.18 0.22				
		0.25*	0.34		
		0.05 0.08			
		0.07	0.1		
No. 970-4UL	High-impregnated type	0.1	0.13	300 500 600 1,000	10
NO. 970-40L	nigii-iiiipregilateu type	0.13	0.18	300 300 600 1,000	
		0.18	0.22		
		0.25	0.34		
		0.05	0.08		
		0.07	0.11		
No. 9700UL	High-impregnated and	0.1	0.13	300 500 600 1,000	
NU. 97000L	surface-smooth type	0.13	0.18	300 300 000 1,000	
		0.18	0.23		
		0.25	0.34		

[◆]For single surface or double surface treated films, other sizes, please consult a Nitto representative.

^{*} For No. 970-2UL thickness 0.25 mm products, 1,000 mm width does not correspond.

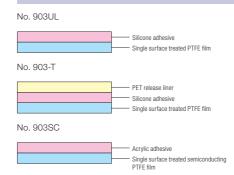
NITOFLON® Adhesive Tapes No. 903 Series



Features

- •With polytetrafluoroethylene resin film as its base material, has excellent heat resistance, chemical resistance, electrical characteristics, weather resistance, waterproof (water repellent) performance and strong non-adhesion properties.
- A silicone-based adhesive enables continuous use in a wide temperature range from – 60°C to 200°C (except No. 903SC).

Structure



Applications

- Insulation of electric wires, cables, and coils (for Class H electrical insulation)
- Friction control in the sliding section of a mobile phone or digital camera
- Battery insulation in storage devices such as secondary batteries
- ●Insulation and lubrication of linear-motor-driven systems
- Heat-resistant lubrication in the paper-feeding section of a printer (jamming control)
- Solder masking (heat-resistant masking)
- Friction noise control inside automobiles or friction control in sliding sections

Properties

Item	Unit	Unit Characteristic value										
item	UIIIL		No. 9	03UL			No. 903SC					
Thickness	mm	0.08	0.13	0.18	0.23	0.08	0.13	0.18	0.23	0.11		
Tensile strength	N/19mm	55	93	160	210	55	93	160	210	40		
Adhesive strength	N/19mm	5.6	7.1	7.4	8.7	5.6 7.1 7.4 8.7				12		
Unwinding force	N/19mm	4.4	5.8	7.1	8.9		-	-		3.5		
Dielectric breakdown voltage	kV	8	11	14	15	8	11	14	15	_		
Temperature range	°C	-60~200°C						0~80°C				

 $^{{}^{\}star}$ The above values are sample observed values, not the guaranteed performance.

Size

Product No.	Туре	Total thickness (mm)						Width	(mm)						Length (m)
No. 903UL	_	0.08/0.13/0.18/0.23	5 40	9 50	10 75	13 80	15 100	18 150	19 200	20 250	22 300	25 350	30 400	38 450	
No. 903-T	With PET release liner	0.08/0.13/0.18/0.23	25	50	75	100	150	200	250	500					10
No. 903SC	Semiconducting adhesive tape	0.11	10	13	19	25	38	50	75	100	200	300	450		

[◆]For other sizes, please consult a Nitto representative.

NITOFLON® Adhesive Tape Using High-Strength Film as Substrate No. 923 Series



Features

- •With polytetrafluoroethylene resin film as its base material, has excellent heat resistance, chemical resistance, electrical characteristics, weather resistance, waterproof (water repellent) performance and strong non-adhesion properties.
- Possesses high tensile strength.

Structure		
No. 923S		ne adhesive r high-strength film

Applications

- Wrapping of polyethylene laminated rolls (protection and adhesion prevention)
- Bundling of wires for mobile devices
- Insulation of electric wires, cables, and coils (for Class H electrical insulation)
- ●FRP and CFRP molding release agent

Properties

ltem	Unit	Characteristic value											
iteili	Ullit	No. 923UL	No. 923S	No. 923SL	No. 923UT								
Thickness	mm	0.1	0.1	0.17	0.04								
Tensile strength	N/19mm	100	120	280	65								
Adhesive strength	N/19mm	6.4	6.5	7.9	3.7								
Unwinding force	N/19mm	5.3	2.1	7.1	_								
Dielectric breakdown voltage	kV	11.2	11	19	5.3								
Temperature range	°C		-60~200°C										

^{*}The above values are sample observed values, not the guaranteed performance.

Size

Product No.	Туре	Thickness (mm)						Wid	lth (mm	1)					Length (m)
No. 923UL	High-strength adhesive	0.1													
No. 923S	Super high-strength	0.1	10	13	19	25	38	50	75	100	125	150	200		10 · 33
No. 923SL	- 10 10 -	0.17													
No. 923UT	Ultra-thin high-strength adhesive	0.04	10	13	19	25	30	38	50	75	100	125	150	200	5 · 10

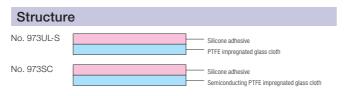
[◆]For other sizes, please consult a Nitto representative.

NITOFLON® Adhesive Tape Using PTFE Impregnated Glass Cloth as Substrate No. 973 Series



Features

- •With a composite of polytetrafluoroethylene resin and high-strength glass cloth as its base material, has excellent heat resistance, chemical resistance, electrical characteristics, weather resistance, waterproof (water repellent) performance, strong non-adhesion properties and mechanical strength.
- ●A silicone-based adhesive agent enables continuous use in a wide temperature range from – 60°C to 200°C.



Applications

- ●Heat-resistant release agent for bag-making heat sealing
- Conveying belts for food processing
- Heat-resistant lubrication in the heated portions of a printer
- •Lubrication of shooters or hoppers
- Conveying process of liquid crystal panels (No. 973SC)

Properties

Item		Unit	Characteristic value										
Item		Ullit	No. 973UL-S	No. 9	73UL	No. 973SC							
Thicknes	Thickness		0.13	0.15	0.18	0.18							
Tensile strei	Tensile strength		240	590	530	610							
	25°C		6.8	9.0	9.7	9.9							
Adhesive strength	100°C	N/19mm	3.2	3.9	4.7	_							
	150°C		2.2	2.6	3.0	_							
Unwinding f	Unwinding force		5.9	5.9	7.5	7.2							
Temperature range		°C	-60~200°C										

^{*}The above values are sample observed values, not the guaranteed performance.

Size

Product No.	Туре	Thickness (mm)		Width (mm)							Length (m)					
No. 973UL-S	_	0.13	10	12	13	14	15	19	20	25	30	35	38	40	50	10
No. 973UL	_	0.15	60	70	75	80	100	150	0 200	250	300	350	400	450		10
NO. 9730L		0.18														
No. 973SC	Semiconducting adhesive tape	0.18	10	13	19	25	38	50	75	100	200	300	450			10

[◆]For other sizes, please consult a Nitto representative.

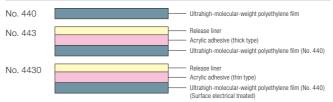
Ultrahigh-Molecular-Weight Polyethylene Adhesive Products No. 440/No. 443 Series



Features

- Extremely high impact resistance; particularly excellent among plastics.
- Excellent chemical resistance
- Excellent wear resistance.
- Excellent self-lubricating properties.

Structure



Applications

- Friction control in the sliding section of a mobile phone or digital camera
- Jamming control in the paper-feeding and sliding sections of a printer
- Friction noise control inside automobiles or friction control in sliding sections
- Cable protection in cable chains and friction control in sliding sections

Properties

		Fi	ilm	Adhesive tape								
Item	Unit	No.	440	No.	443	No. 4430						
		White	Black	White	Black	White	Black					
Substrate thickness	mm	0.5	0.5	0.13	0.13	0.13	0.13					
Total thickness	mm	0.5	0.5	0.3	0.3	0.16	0.16					
Tensile strength	MPa	50	44	55.3	51.3	55.3	51.3					
Elongation	%	430	410	400	380	400	380					
Peeling strength	N/20 mm width	_	-	17.1	14.5	10.9	10.6					
Surface resistance	Ω	10 ¹⁶	10 ⁶	10 ¹⁶	10 ⁶	10 ¹⁶	10 ⁶					

^{*}The above values are sample observed values, not the guaranteed performance.

Size

Product No.		Backing thickness (mm)									Wid	th (mm)	Length (m)		
No. 440 No. 440(Black)	0.1	0.13	0.2	0.25	0.3	0.4	0.5	0.8	1.0		300	350	10	30	
No. 443 No. 443(Black)	0.1	0.13	0.2	0.25	0.3	0.4	0.5				300	350	10	30	
No. 4430 No. 4430(Black)	0.13	0.2	0.25								300	350	10	30	

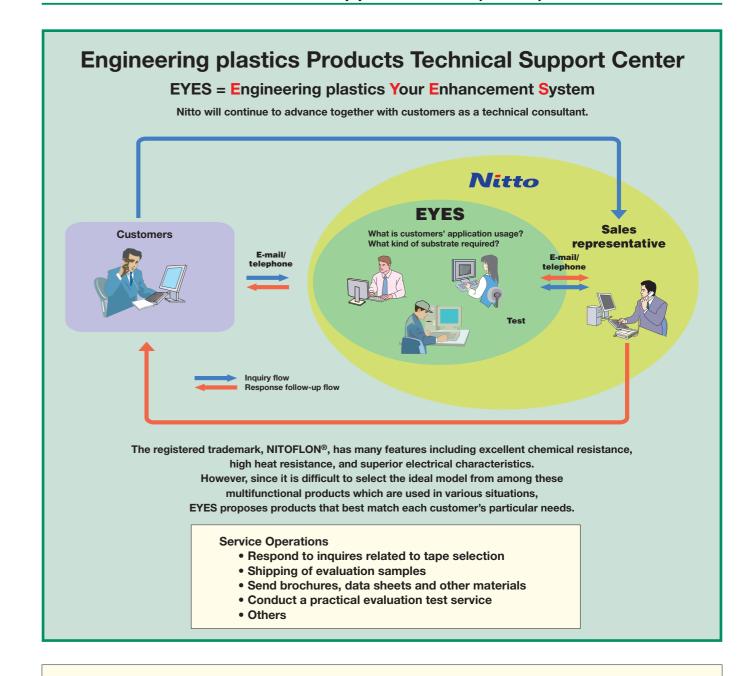
[◆]For other sizes, please consult a Nitto representative.

NITOFLON® List of Sizes

Product name	Product	No.	Total thickness (mm)						Width	n (mm)						Length (m)	Page
			0.03	10 250	13 300	19 500	25	30	38	40	50	75	100	150	200	10:30	5.6
				100	150	200	250	300	500							10	5.6
			0.038	10	13	19	25	30	38	40	50	75				30	5.6
				100	150	200	250	300	500	600	1,000					10	5.6
			0.05	5 50	6 75	7	8	9	10	13	19	25	30	38	40	30	5.6
	No. 900	OUL		100	150	200	250	300	500	600	1,000					10	5.6
NITOTI ON Glava			0.08, 0.1, 0.13, 0.18, 0.2	5 50	6 75	7 100	8 150	9 200	10 250	13 300	19 500	25 600	30 1,000	38	40	30	5.6
NITOFLON films			0.25	400	450	000	050	000	500	000	4 000					10-30	5.6
			0.3, 0.4, 0.5	100	150	200	250	300	500	600	1,000					10	5.6
			0.7, 0.8, 1.0	300	500	600										10	5.6
			1.5	100	200	300										10	5.6
	No. 901	4111	0.05, 0.08, 0.1, 0.13, 0.18, 0.2	100	150	200	250	300	500							10.30	5.6
	NO. 90	IOL	0.3, 0.4, 0.5, 0.8, 1.0	100	130	200	230	300	300							10	5.6
	No. 902	2UL	0.05, 0.08, 0.1, 0.13, 0.18, 0.2	10 300	13 500	19	25	30	38	40	50	100	150	200	250	10	5.6
			0.3, 0.4, 0.5, 0.8	300	500											10	5.6
NITOFLON high-strength films	No. 920UL		0.02, 0.025, 0.03, 0.04, 0.05, 0.06, 0.1	10 300	13	19	25	30	38	50	75	100	150	200	250	30-50	7
No. 970-2UL		-2UL	0.03, 0.05, 0.07, 0.1, 0.13, 0.18, 0.25	300	400	500	550	600	970	1,000						10	8
PTFE impregnated glass cloth	No. 970-	-4UL	0.05, 0.07, 0.1, 0.13, 0.18, 0.25	300	500	600	1,000									10	8
	No. 970	0UL	0.05, 0.07, 0.1, 0.13, 0.18, 0.25	300	500	600	1,000									10	8
NITOFLON	No. 903	3UL	0.08, 0.13, 0.18, 0.23	5 40	9 50	10 75	13 80	15 100	18 150	19 200	20 250	22 300	25 350	30 400	38 450	10	9
adhesive tapes	No. 90	3-T	0.08, 0.13, 0.18, 0.23	25	50	75	100	150	200	250	500					10	9
	No. 903	3SC	0.11	10	13	19	25	38	50	75	100	200	300	450		10	9
	No. 923	3UL	0.1	10	13	19	25	38	50	75	100	125	150	200		10-33	10
NITOFLON adhesive tape using	No. 92	23S	0.1	10	13	19	25	38	50	75	100	125	150	200		10-33	10
high-strength film as substrate	No. 92	3SL	0.17	10	13	19	25	38	50	75	100	125	150	200		10.33	10
สร รับมริบิสเซ	No. 923	3UT	0.04	10	13	19	25	30	38	50	75	100	125	150	200	5.10	10
NITOFLON	No. 973	UL-S	0.13	10 50 450	12 60	13 70	14 75	15 80	19 100	20 150	25 200	30 250	35 300	38 350	40 400	10	11
adhesive tape using PTFE impregnated glass cloth as substrate	No. 973	3UL	0.15, 0.18	10 50 450	12 60	13 70	14 75	15 80	19 100	20 150	25 200	30 250	35 300	38 350	40 400	10	11
	No. 973	3SC	0.18	10	13	19	25	38	50	75	100	200	300	450		10	11
	No. 440	(White)	0.1, 0.13, 0.2, 0.25, 0.3, 0.4, 0.5, 0.8, 1.0	300	050											40.00	12
	No. 440 (Black)	(Black)			350											10.30	12
Ultrahigh-molecular-	No. 443	(White)	0.1, 0.13, 0.2, 0.25, 0.3, 0.4, 0.5														12
weight polyethylene adhesive products	No. 443 (Black)	(Black)	0.1, 0.13, 0.2, 0.25, 0.3, 0.4, 0.5	300	350											10-30	12
	No. 4430	(White)	0.13, 0.2, 0.25														12
	No. 4430 (Black)	(Black)	0.13, 0.2, 0.25	300	350											10.30	12

 $Note: The \ thickness \ of \ impregnated \ glass \ cloth \ and \ ultrahigh-molecular-weight \ polyethylene \ products \ of \ NITOFLON \ is \ the \ backing \ thickness.$

Technical Support Center (EYES)



For inquiries:

Engineering plastics Products Technical Support Center (EYES)

1-8-5, Hatara-cho, Fukaya, Saitama, 366-8521, Japan Tel: 81-48-571-3340 Fax: 81-48-571-3325

Hours: 9:00 - 17:30 (excluding saturdays, sundays, public holidays, year-end and new-year period and summer holidays)
E-mail: eyes@nitto.co.jp

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