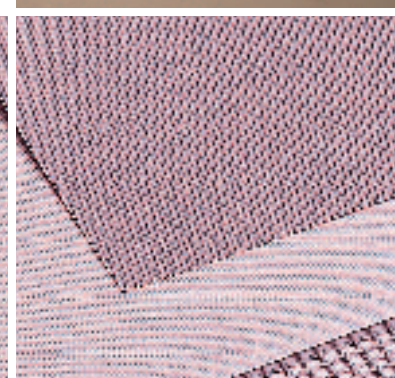
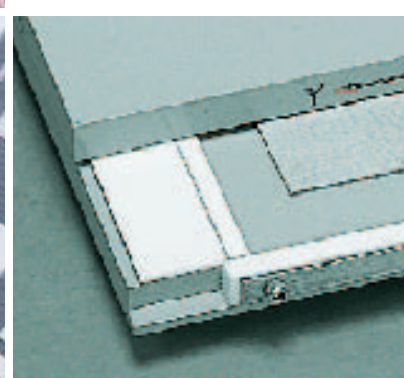
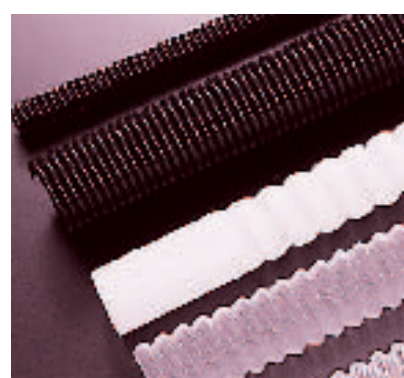
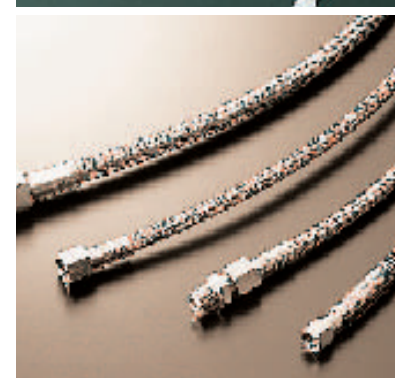
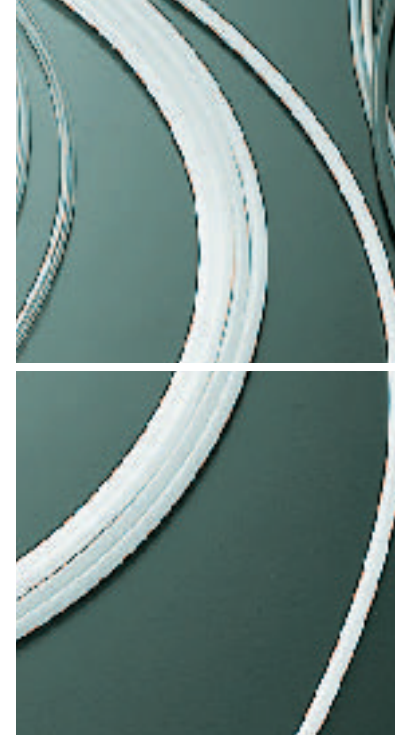




chukoh
CHUKOH CHEMICAL INDUSTRIES, LTD.



CHUKOH FLO® PRODUCTS GENERAL CATALOGUE



To Contact us:
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ISO 9001:2000
JSAQ 073



QMS Accreditation
JAB Certificate Number
R001

A certificate of compliance with the ISO 9001 international standard qualified and registered.

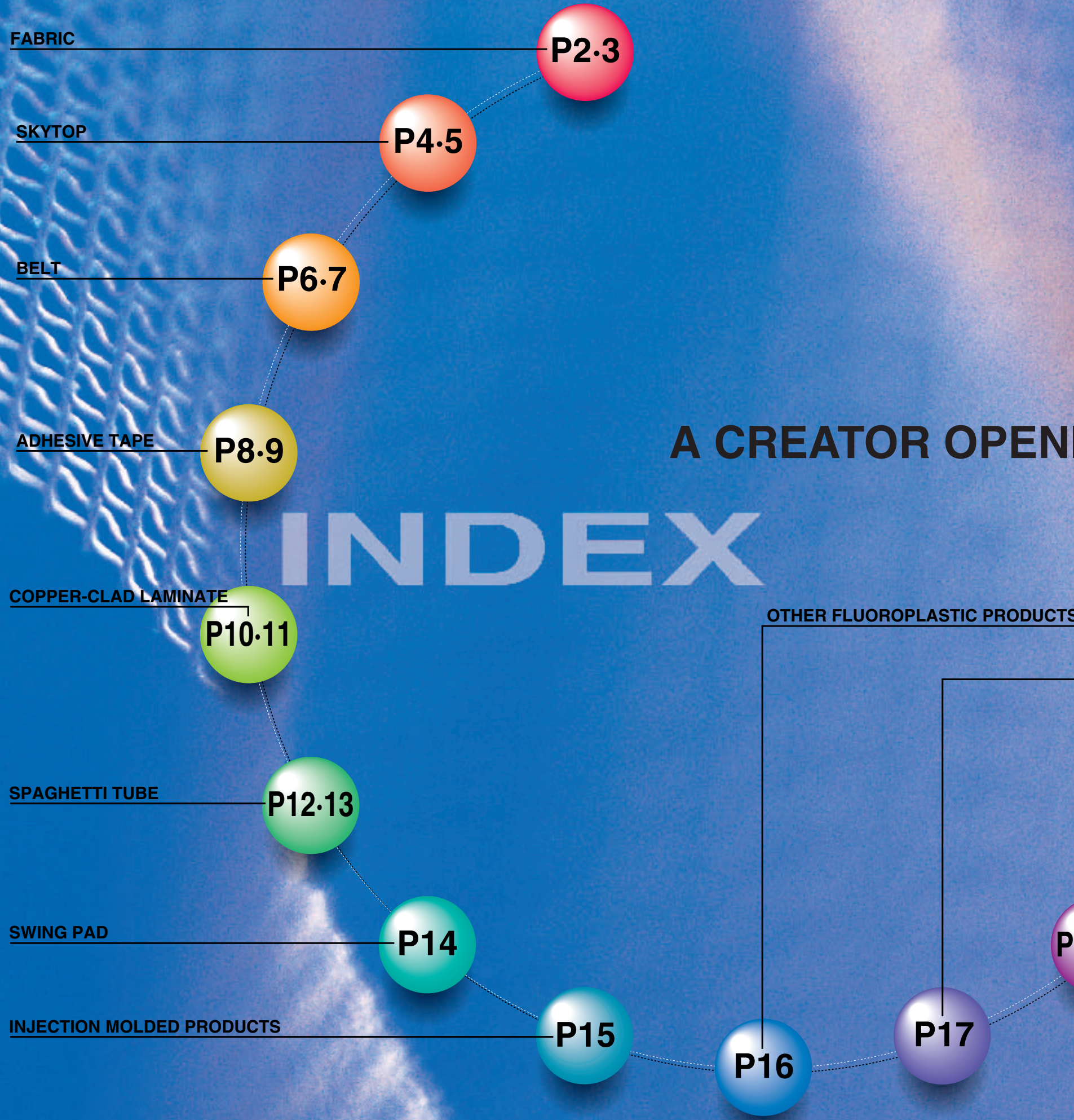
Our company was qualified and registered with ISO 9001:2000 for the manufacture of following products.

- Fabrics ●Architectural Fabrics ●Pressure-sensitive Adhesive Tapes
- Copper-clad Laminates ●Fluorocarbon Resin Tubes
- Injection Molding Products ●Belts ●Silicone Coating Products

⚠ Warnings

- Do not use in applications in contact with the human body such as medical care, etc.
- Dispose products in compliance with the related laws and regulations and absolutely do not incinerate them.
- Do not use the product where temperature exceeds 260°C except for soldering treatment.
- Carefully read the catalog, product safety data sheet (MSDS), and fluoroplastic instruction manual in order to maintain functions essential to products and use products safely.

HOME PAGE ADDRESS <http://www.chukoh.co.jp>



INDEX

A CREATOR OPENING THE FUTURE.

Fluoroplastic is a polymeric material that has unique characteristics such as water repellence, oil repellence and non-tackiness, in addition to excellent heat and chemical resistance.

Since our foundation, we have sought out fluoroplastics with the most outstanding properties of their kind and conducted fluoroplastics research and development. As a result, we have successfully combined fluoroplastics with other materials and put to practical use of highly value-added products.

Meanwhile, the possibilities offered by fluoroplastics have been growing by leaps and bounds. New industrial uses for fluoroplastics are anticipated including those in the fields of electricity, communication, machinery, foodstuffs and medical care. In keeping with our slogan "Developing new products, opening new fields", we will respond with all our power to the diverse, high level needs of industry. At the same time, we will push forward in joint product development with our customers.

CHUKOH FLO® FABRIC

This composite material consists of industrial cloth, including glass cloth, aramid cloth, coated with fluoroplastic with our own special processing technology. We further add secondary processing to this composite material and supply the products to various industries such as chemical, machine, electric, communication and construction industries.

Main uses

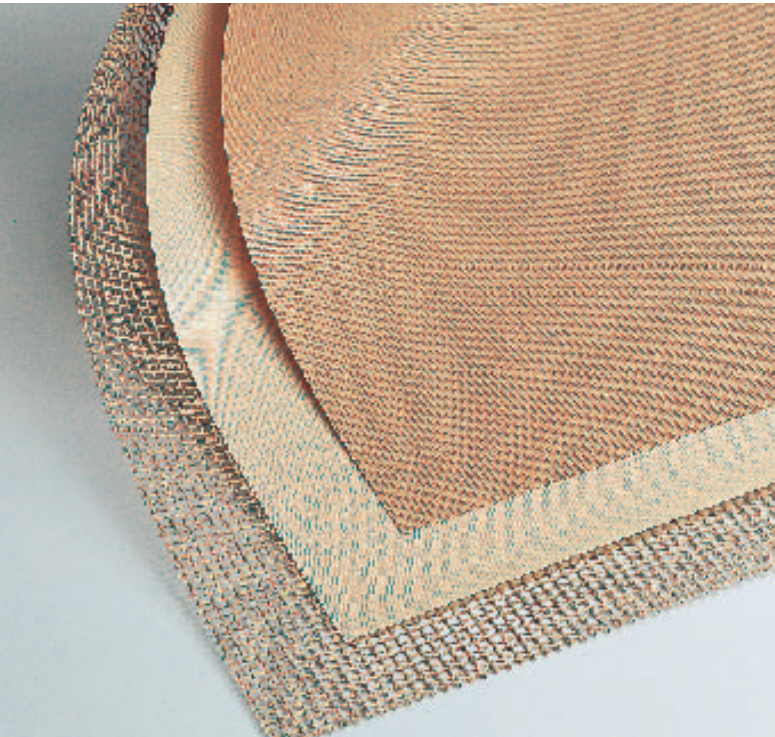
release material/insulating material/adiabatic material/conveyor belt/adhesive tape/copper-clad laminate/sliding material and others.

G-Type FABRIC

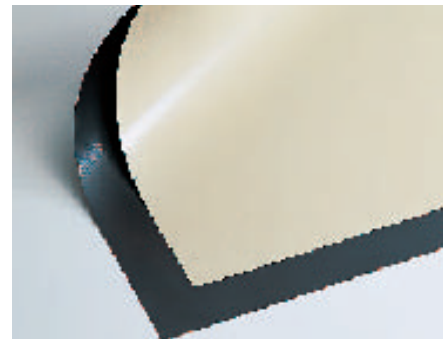
This is glass cloth coated with fluoroplastic. This material provides superior characteristics which are derived from mechanical strength of glass cloth combined with the excellent properties of fluoroplastic.

Characteristics

- Excellent anti-stick property and low friction coefficient.
- Continuous use possible in a wide range of temperatures: -180 °C to + 260°C
- Superior electrical properties, in particular, dielectric properties and dielectric strength.



■G-Type FABRIC



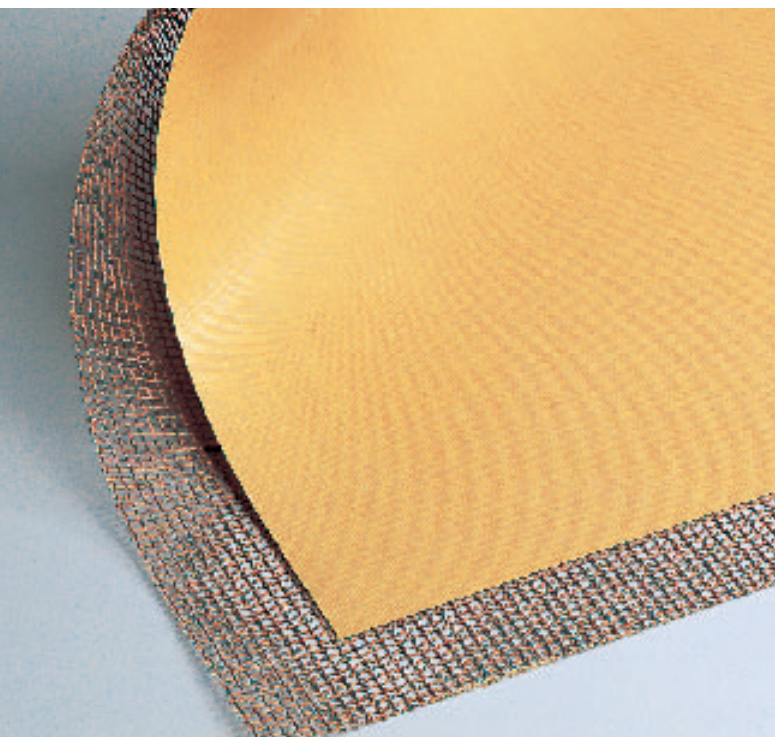
■Antistatic type

A-Type FABRIC

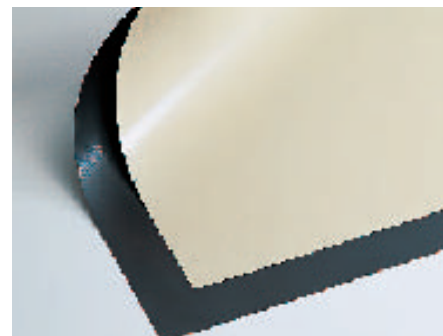
This is aramid cloth coated with fluoroplastic.

Characteristics

- Basic properties are similar to those of G-Type.
- Higher mechanical strength and steam resistance.
- Continuous use possible in a wide range of temperatures: -160°C to + 200°C



■A-Type FABRIC



■Antistatic type

Typical dimensions and properties of FABRICS

Product No.	Standard thickness (mm)	Standard width (mm)	Weight (g/m ²)	Tensile strength (N/cm)		Tear strength (N)		Dielectric strength (kV)	Volume Resistivity (Ω·cm)	Surface Resistivity (Ω)						
				Warp	Fill	Warp	Fill									
FGF-400-3	0.075	1000	130	150	90	7	5	3.8	>10 ¹⁵	>10 ¹⁴						
FGF-500-3	0.080		165	150	90	6	4	4.9								
FGF-400-4	0.095		175	290	160	13	5	4.3								
FGF-500-4	0.100		215	290	160	10	5	5.0								
FGF-400-6	0.115	1000,1500,1800	230	280	250	9	9	4.4			>10 ¹⁵	>10 ¹⁴				
FGF-500-6	0.125		265	280	250	9	9	4.5								
FGF-400-8	0.160	1000	265	330	310	20	20	3.5					>10 ¹⁵	>10 ¹⁴		
FGF-500-8	0.170		320	330	310	16	16	4.8								
FGF-400-10	0.220	1000,1300 1500,2100	425	500	410	35	31	5.9							>10 ¹⁵	>10 ¹⁴
FGF-500-10	0.240		500	500	440	30	30	6.2								
FGF-400-14	0.330		485	710	540	78	61	5.1								
FGF-500-14	0.350		580	710	540	62	51	5.3								
FGF-400-22	0.540		700	1180	750	210	150	6.7								
FGF-500-22	0.560		840	1180	750	165	120	7.1								
FGF-501-21	0.580	1500,1800,2000	1125	820	650	151	95	6.0	>10 ¹⁵	>10 ¹⁴						
FGF-521-24	0.650	1500,2100	1210	1380	1380	96	94	3.7								
FGF-400-35	0.915	1300,1500 2100,2300	1220	1040	820	220	190	7.1								
FGF-500-35	0.925		1490	1040	820	180	160	7.2								
FGF-410-18	0.550	1000,1300,1800	485	520	740	—	—	—			>10 ¹⁵	>10 ¹⁴				
FGF-410-20	0.750		630	840	570	—	—	—								
FGF-410-30	0.950	1000,1350,2000	470	350	440	—	—	—								
FGB-500-6	0.130	1000,1500,1800	255	300	250	12	12	—					>10 ⁸	>10 ⁸		
FGB-500-10	0.245	1000,1300 1500,2100	485	470	450	43	40	—								
FGB-500-14	0.385		745	860	660	65	60	—					>10 ¹⁵	>10 ¹⁴		
FAF-500-6	0.110	950	170	610	480	79	53	3.9								
FAF-500-8	0.155		220	840	700	179	168	4.5								
FAF-500-12	0.310		440	1800	1400	420	400	5.1								
FAF-500-14	0.350	1600,2000	575	1800	1300	370	520	5.5								
FAF-410-20	0.500	1300	240	1360	590	—	—	—	>10 ¹⁵	>10 ¹⁴						
FAF-410-30	1.100	2000	415	1100	1200	—	—	—								
FGC-500-6	0.130	1000,1500,1800	265	270	260	9	9	—								
FGC-500-10	0.240	1000,2100	500	490	410	26	25	—								
FNP-400-10	0.185	800	230	260	200	40	25	—								
Test method	—	—	—	JIS-L-1096 (Cut strip method)		JIS-L-1096 (Trapezoidal method)		JIS-K-6887			JIS-K-6911					

Dimensions of products are standard sizes, please contact us concerning sizes not mentioned above. Values of properties in the table are typical, and not guaranteed.

CHUKOH FLO® SKYTOP

A permanent architectural fabric developed by our company for membrane structures and being produced domestically for the first time. It is a composite material that is composed of fiber glass B yarn cloth coated with fluoroplastic, using our own method.

Characteristics

- SKYTOP for structural use is provided as the architectural material in Japanese Building Standard Law.
- It excels in incombustibility and durability.
- It excels in solar transmission, which allows ample sunlight indoors.
- It resists dust and dirt accumulation, which allows its appearance to be preserved for many years.

Main uses

stadium/gymnasium/swimming pool/tennis court/shopping center/
shopping mall arcade/exhibition center/assembly hall/
aquarium/terminal/factory/warehouse/others.

Grades of SKYTOP

(Structural Material)

FGT-1000 /Heavyweight grade mainly for large-scale applications

FGT-800 /Standard grade for medium- and large-scale applications

FGT-600 /Lightweight grade for small- and medium-scale applications

(Interior Material)

FGT-250 /Inner membrane material for double-layer membrane structure

Typical Properties of SKYTOP

Items	Unit	FGT-1000	FGT-800	FGT-600	FGT-250	Test Method	
Thickness	mm	1.00	0.80	0.60	0.37	ISO 2286-3	
Weight	g/m ²	1700	1300	1000	470	ISO 2286-2	
Tensile Strength	Warp	N/2.5cm	4650	3530	3150	2420	ASTM D 4851
	Fill		4000	3000	2630	1670	
Tensile Strength	Warp	N/5cm	10300	7830	7000	4830	ISO 1421 or DIN 53354
	Fill		8830	6670	5830	3330	
Elongation at break	Warp	%	6.0	5.0	5.0	4.0	ISO 1421 or DIN 53354
	Fill		12.0	10.0	10.0	5.0	
Tear Strength	Warp	N	500	350	300	180	ASTM D 4851
	Fill		600	400	300	150	
Tear Resistance	Warp	N	650	460	390	240	DIN 53363
	Fill		780	520	390	200	
Solar Transmission after bleaching	%	10	14	18	23	ASTM E 424	
Solar Reflectance after bleaching	%	76	75	72	68		
Sound Absorption Coefficient	NRC	—	—	—	0.45	JIS A 1409	

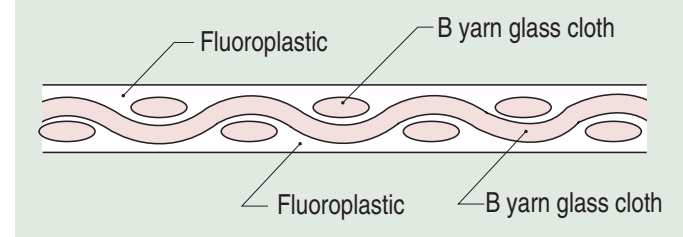
Values shown above are not standard values but measured values.



Comparison of typical properties between SKYTOP and Building Materials

Building material	Weight	Strength	Elongation	Bending strength	Weather resistance	Fire resistance	Heat resistance	Chemical resistance	Self-cleaning property	Solar transmission	Cost performance
SKYTOP	○	○	○	◎	◎	○	◎	◎	◎	○	△
Polycarbonate sheet	△	○	△	×	○	○	○	△	△	○	○
Colored steel sheet	△	◎	×	○	○	◎	◎	○	△	×	○
Sheet glass (float)	×	○	×	×	◎	○	○	◎	△	◎	△

Material configuration of SKYTOP(cross section)



■Applications of SKYTOP



CHUKOH FLO® BELT

A product which is made of our Fabrics and other materials in the shape of a belt using special splicing methods. It is used in a wide range of manufacturing processes, taking advantage of the characteristics of fluoroplastic.

Main uses

foodstuff manufacturing/plastic film manufacturing/rubber products manufacturing/ceramics manufacturing/heat seals/adhesive application process/UV drying/foodstuff thawing/steam oven conveyer belt/conveyer belts for warm water treatment/others.

The materials of Belts

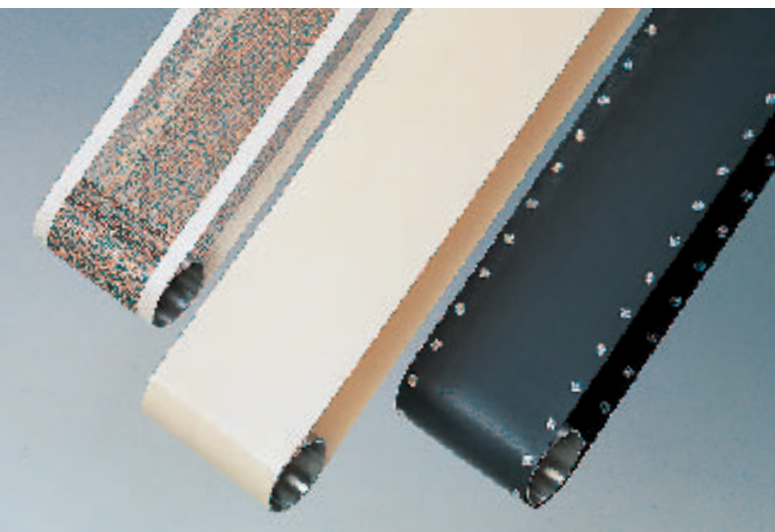
- G-type.....glass cloth coated with fluoroplastic
- A, N-type.....aramid cloth coated with fluoroplastic
- R-type.....heat-resistant rubber combined with fluoroplastic films or glass cloth coated with fluoroplastic

Continuous service temperature

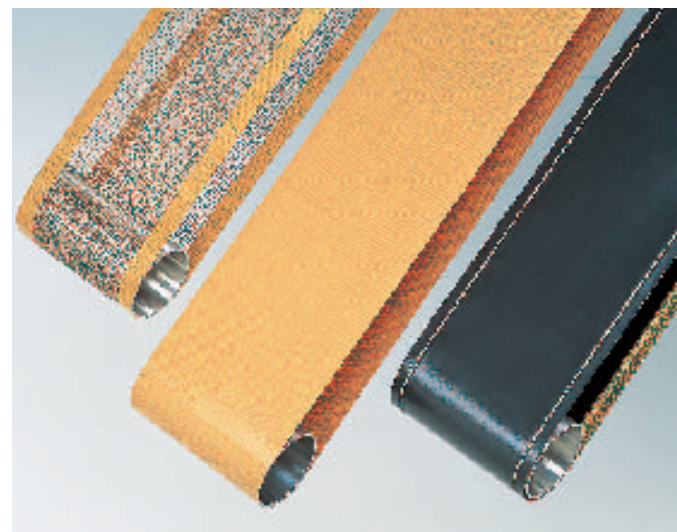
- G-type.....-180 to +260℃
- A-type.....-160 to +200℃
- N-type.....-160 to +200℃
- R-type.....-20 to +120℃

Characteristics

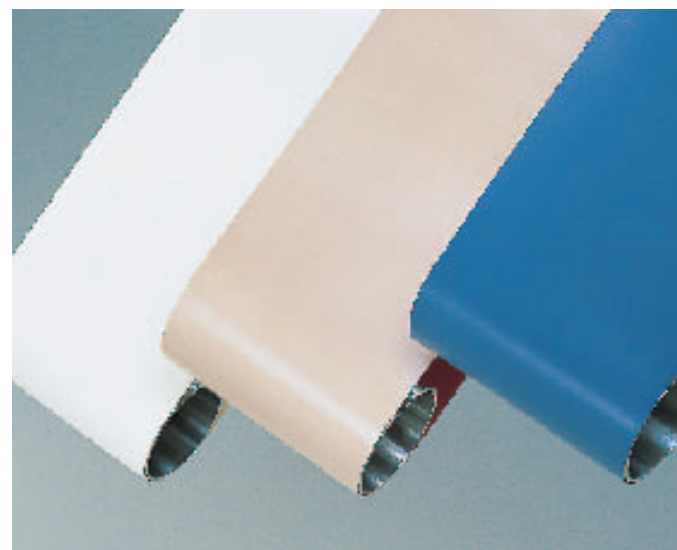
- Nothing sticks to the surface of the belt.
- Excellent dimensional stability and incombustibility.
- There are various splicing methods suited to a diversity of applications.
- We can supply methods to prevent belts from meandering.



■G-Type BELT



■A-Type BELT



■R-Type BELT

Typical dimensions and properties

	Product No.	Nominal Thickness (mm)	Maximum Width (mm)	Weight (g / m ²)	Tensile strength (N / cm)		
					Warp	Fill	
G-Type BELTS	Standard/ Plain weave	BGF-400-3	0.075	1000	130	150	90
		BGF-400-6	0.115	1000	230	280	250
		BGF-400-10	0.220	2100	425	500	410
		BGF-400-14	0.330	2300	485	710	540
		BGF-400-22	0.540	2300	700	1120	680
		BGF-400-35	0.915	2300	1220	1040	820
		BGF-500-6	0.125	1800	265	280	250
		BGF-500-10	0.240	2100	500	500	410
		BGF-500-14	0.350	2300	580	710	540
		BGF-501-21	0.580	2100	1125	820	650
	BGF-500-22	0.560	2300	840	1120	680	
	BGF-521-24	0.650	2100	1210	1380	1380	
	BGF-500-35	0.925	2300	1490	1040	820	
	Standard/ Mesh weave	BGF-410-18	0.550	2100	485	520	740
		BGF-410-20	0.750	2100	630	840	570
BGF-410-30		0.950	2100	470	350	440	
Antistatic (carbon-filled) /Plain weave	BGB-500-6	0.130	1000	255	300	250	
	BGB-500-10	0.245	2100	485	470	450	
	BGB-500-14	0.385	2300	745	860	660	
Multi-ply BELTS	BL-GF500-6/2	0.250	150	530	280	250	
A-Type BELTS	Standard/Plain weave	BAF-500-6	0.110	900	170	610	480
		BAF-500-8	0.155	900	220	840	700
		BAF-500-12	0.310	900	440	1800	1400
		BAF-500-14	0.350	1600	575	1800	1300
	Standard/Mesh weave	BAF-410-20	0.500	1300	240	1360	590
	BAF-410-30	1.100	2100	415	1100	1200	
N-Type BELTS	Standard/Plain weave	BNP-400-10	0.185	800	230	260	200

G-Type : Producible up to 5000mm width, please contact us concerning sizes not mentioned above. Values of properties in the table are typical, not guaranteed.

	Product No.	Nominal Thickness (mm)	Maximum Width (mm)	Length (mm)	Weight (g / m ²)	Tensile strength (N/cm)		
						Warp	Fill	
G-Type Seamless BELTS	Standard/Plain weave	BGF-409-10	0.250	1500	2450, 3200	510	390	340
		BGF-409-12	0.300		2240, 2450, 3200	570	440	390
	Antistatic(carbon-filled) /Plain weave	BGB-409-10	0.250		2450, 3200	470	390	340
		BGB-409-12	0.300		2240, 2450, 3200	500	440	390
	Antistatic(special antistatic agent-filled) /Plain weave	BGC-409-10	0.250		2450, 3200	620	390	340
		BGC-409-12	0.300		2240, 2450, 3200	670	440	390

Please contact us concerning sizes not mentioned above. Values of properties in the table are typical, not guaranteed.

	Product No.	Nominal thickness(mm)		Maximum Width (mm)	Maximum Length (m)	Weight (g / m ²)
		Total thickness	Film thickness			
BRP-Type	BRP-129-2	1.0	0.050	400	20	1500
	BRP-139-2	1.6		600		2100
	BRP-149-2	2.0		900		2700
BRG-Type	BRG-226-10	1.0	0.240	900	20	1250
	BRG-246-10	1.8		900		1900
BRT-Type	BRT-227-1	1.0	0.025	250	20	700
	BRT-247-1	1.8				1350
	BRT-229-4	1.0				750
	BRT-249-4	1.8	1000	1400		
	BRT-337-4	1.5	500	1800		
	BRT-347-4	1.8	1000	2500		
	BRT-73-TS-8R18	1.7	0.200	1000		2500

The belts listed above are typical ones of ours. Please contact us concerning sizes and detailed specifications not mentioned above.

ADHESIVE TAPE

CHUKOH FLO® ADHESIVE TAPE

A pressure sensitive tape. The basic materials consist of our Fabrics, fluoroplastic films and other materials.

The materials of Tapes

- AGF series.....glass cloth coated with fluoroplastic
- ASF series.....fluoroplastic film

Characteristics

- Its surface is anti-stick.
- It permits continuous use over a wide temperature range.
- It has excellent electrical insulation properties.

Main uses

lining of chutes and hoppers/covering of drier rolls used for non-woven cloth and paper/covering of heat sealing heater/insulating spacers/wrapping of wiring connections/others.

UL approval condition

CHUKOH FLO® ADHESIVE TAPES, ASF-110 and API-114 are UL-approved products. (UL File No.E105318)



The surface of the tapes are non-sticky.



Release paper, coming with this type of adhesive tapes, makes it easier to cover large diameter rolls with the tapes.

Typical dimensions of ADHESIVE TAPES

Product No.	Thickness (mm)	Width (mm)	Length (m)	Maximum continuous service temperature
AGF-100	0.13	13, 19, 25, 30, 38, 50, 100, 150, 200, 250, 300, 450	10	200°C
	0.15			
	0.18			
	0.30			
AGF-100A	0.13	13, 19, 25, 38, 50, 100, 150, 200, 250, 300, 450	10	250°C
	0.15			
	0.18			
	0.30			
ASF-110	0.08	13, 19, 25, 30, 38, 50, 100, 150, 200, 250, 300	10	200°C
	0.13			
	0.18			
	0.23			
AGF-400-3	0.12	1000 (Maximum)	10	200°C
AGF-500-3	0.13			
AGF-400-4	0.14			
AGF-500-4	0.15			
AGF-400-6	0.17			
AGF-500-6	0.18			
AGF-400-10	0.29			
AGF-500-10	0.30			
AGB-500-6	0.18			
API-114	0.06			
	0.08	100		
AUE-112B	0.18	300 (Maximum)	40	80°C
	0.30		20	
	0.55			

Please contact us concerning sizes not mentioned above.

Typical properties

Product No.	Thickness (mm)	Tensile strength (N/25mm)	Elongation (%)	Adhesive peel strength at peel direction of 180°	Dielectric strength of substrate (kV)
AGF-500-3	0.13	400	—	11	4.5
AGF-500-6	0.18	730	—	13	4.5
AGF-100	0.13	360	—	9	6.0
	0.18	540	—	11	5.5
AGF-100A	0.13	360	—	10	6.0
ASF-110	0.08	70	180	7	10.0
	0.13	160	180	8	14.5
	0.18	250	180	9	18.0
	0.23	340	180	10	21.0
API-114	0.06	150	70	6	6.5
	0.08	240	70	8	9.5
AUE-112B	0.30	400	360	10	25.0

Values of properties in the table are typical, not guaranteed.



API-114

The substrate of this type of tapes is the polyimide resin film.
Uses:electrical insulation materials for various kinds of equipment.



AUE-112B

The substrate of this type of tapes is the ultra-high molecular weight polyethylene resin film.
Uses:abrasion-preventing covering for hoppers of sand, sugar and grain as well as silos/slide-improving coverings for the sliding surface of skis and snow-boards as well as paper transferring parts of fax machines.

Test method

Product No.	Tensile strength	Elongation	Adhesive peel strength	Dielectric strength
AGF-500-3 AGF-500-6 AGF-100 AGF-100A	JIS-L-1096 (Cut strip method)		JIS-C-2107	
ASF-110 AUE-112B	JIS-K-6888			
API-114	JIS-C-2107			

COPPER-CLAD LAMINATE

CHUKOH FLO® COPPER-CLAD LAMINATE

A copper-clad laminate that is composed of our Fabrics, fluoroplastic films and electrodeposited copper foil which is fused on one or both sides. It is used as a printed circuit board for high frequency bands.

Characteristics

- Stable dielectric constant in the wide frequency band.
- Remarkably low dissipation factor in the high frequency band.
- Outstanding tracking resistance.
- Unrivaled low water absorption in all the substrate materials.
- Stable characteristics over a wide temperature range (continuous application results: 220°C)

Main uses

satellite communications / satellite broadcasting / various mobile telecom capabilities such as advanced mobile phones, etc. / non-stop automatic electronic toll collection (ETC) system or automatic cruise-assist highway system (AHS) / regional wireless local loop (WLL) networks / CPU / measuring instruments / artificial satellite mounted apparatus, etc.

Grades

CGP-500

Standard substrate with superb peel strength, water absorption, through-hole workability, etc. It possesses high dimensional stability and mechanical strength.

CGS-500

Substrate with still improved dielectric constant and dissipation factor as compared to CGP.

CGN-500

Substrate with dielectric loss reduced to less than one half and with excellent performance at 20 GHz or higher.

CGA-500

Substrate intended for mass-production with high-frequency characteristics of fluoroplastic substrate maintained.

CGH-500

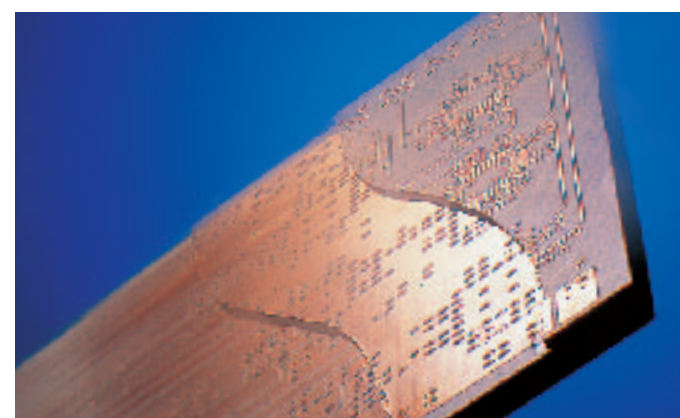
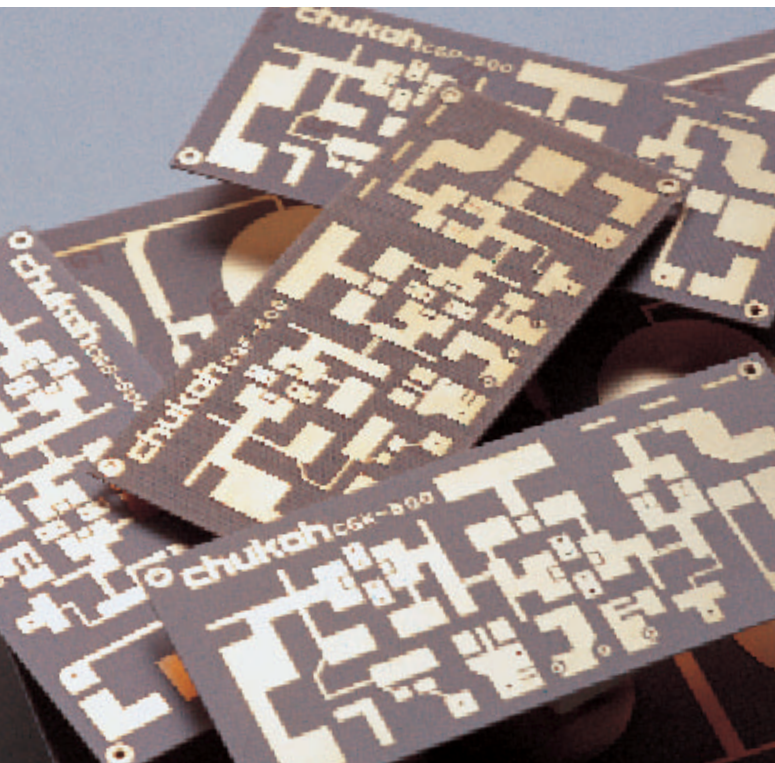
Because of dielectric constant equal to general substrates but lower dissipation factor, substrates with lower loss can be obtained by the same design.

CGK-500

The high dielectric constant achieves compact, lightweight, and low-loss high-performance substrates.

UL approval condition

CHUKOH FLO® COPPER-CLAD LAMINATES
CGP-500 and CGS-500 are UL-approved products.
(UL File No. E78936)



Typical Properties

Properties	Unit	Conditions	CGP	CGS	CGN	CGA	CGH	CGK	Remarks
Density	—	A	2.2	2.2	2.2	2.3	2.3	2.4	—
Thermal expansion	ppm/°C	-60~150°C	21	40	25	20	15	13	—
Peel strength	kN/m	A	3.0	1.0	1.0	1.5	1.5	1.5	JIS-C6481
		Environment of 200°C	1.5	0.5	0.5	1.0	1.0	1.2	—
Flexural strength	N/mm ²	A	120	50	100	60	120	240	JIS-C6481
Volume resistivity	Ω · cm	A	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹³	
		C-96/40/90	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹³	
Surface resistivity	Ω	A	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹²	
		C-96/40/90	10 ¹⁴	10 ¹³	10 ¹³	10 ¹⁴	10 ¹⁴	10 ¹²	
Insulation resistance	Ω	A	10 ¹³	10 ¹³	10 ¹⁴	10 ¹³	10 ¹³	10 ¹¹	Disk Resonator method
		D-2/100	10 ¹³	10 ¹³	10 ¹²	10 ¹⁰	10 ¹²	10 ¹⁰	
Dielectric constant	—	※	2.6	2.15	2.3	3.0	3.45	5.0	JIS-C6481
Dissipation factor	—	※	0.0018	0.0010	0.0008	0.003	0.0027	0.004	
Water absorption	%	—	0.01	0.01	0.01	0.02	0.02	0.04	JIS-C6481
Chemical resistance	—	—	excellent	excellent	excellent	excellent	excellent	excellent	
Flammability	—	—	incombustible	incombustible	incombustible	incombustible	incombustible	incombustible	

※ CGP, CGS, CGN, CGA: 12GHz, CGH: 9GHz, CGK: 8GHz
The above values are the measured values in 1.6mm thickness (CGS: 0.8mm, CGN: 0.6mm, CGA: 0.54mm) and not the specification.
The peel strength is a measured value of 1oz copper foil (35 μm).

Standard Marking System Chart

(Ex.)

CGP-500 BF-6012

- (1) Symbol indicating dielectric substance
- (2) Symbol indicating dielectric constant
- (3) Symbol indicating copper foil thickness
- (4) Symbol indicating the number of copper foil layers

(1) Symbols indicating dielectric substance

Symbol	Dielectric constant band
CGS-500 BP-	2.10~2.25
CGP-500 BF-	2.30~2.85
CGN-500 NF-	2.3
CGA-500 HF-	2.9~3.2
CGH-500 XF-	3.25~3.55
CGK-500 XP-	4.5~5.5

(2) Symbol indicating dielectric constant

● Indicates two decimal places of dielectric constant

(3) Symbol indicating copper foil thickness

Symbol	Kind
0	1/2 oz (18 μm)
1	1 oz (35 μm)
2	2 oz (70 μm)
6	1/3 oz (12 μm)

(4) Symbol indicating the number of copper foil layers

Symbol	Kind
1	One surface clad with electrodeposited copper foil
2	Both surfaces clad with electrodeposited copper foil
3	One surface clad with rolled copper foil
4	Both surface clad with rolled copper foil
5	One surface clad with low profile electrodeposited copper foil
6	Both surfaces clad with low profile electrodeposited copper foil

SPAGHETTI TUBE

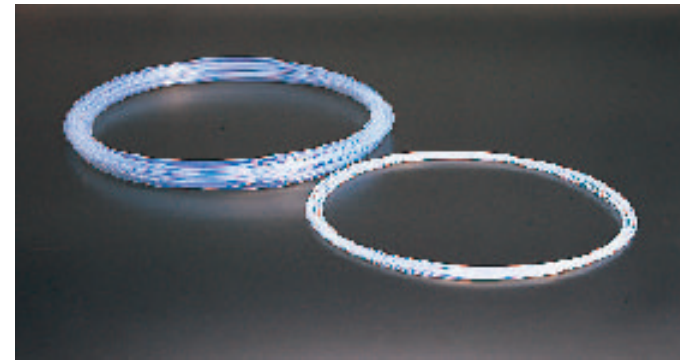
CHUKOH FLO® SPAGHETTI TUBE

These products are the tubing with thin wall which are made of various kinds of fluoroplastics. They provide a diversity of excellent properties such as heat resistance, anti-stick property, chemical resistance and electrical insulation property. As a result, these products have been used in a wide range of industrial fields.

●SPAGHETTI TUBES are certified to meet UL and JIS standard.

UL approval condition

CHUKOH FLO® SPAGHETTI TUBE (PTFE) is UL-approved products. (UL File No.E71017)



PTFE TUBE

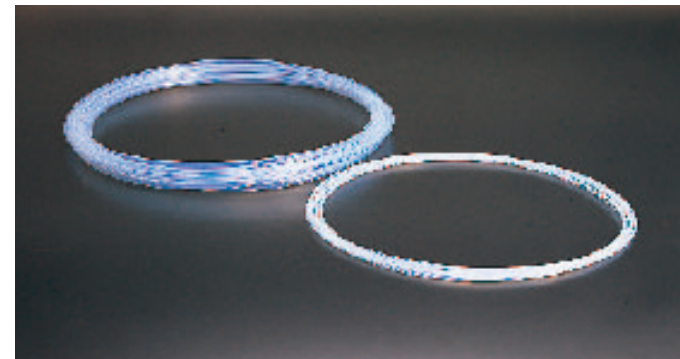
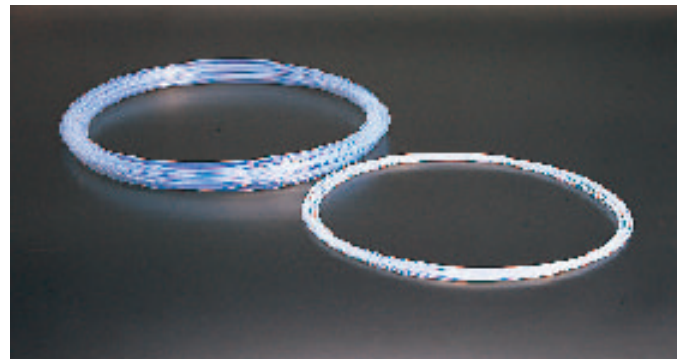
This grade is the paste-extruded tube of PTFE resin. We can also provide various kinds of filled and colored tubes on demand.

●maximum service temperature:260 °C

FEP TUBE

This grade is the transparent extruded tube of FEP resin which has basically almost the same properties as the tube of PFA resin.

●maximum service temperature:200 °C



PFA TUBE

This grade is the transparent extruded tube of PFA resin. Especially for semiconductor-manufacture equipment, we can also provide a special grade of PFA tube of high purity whose internal surface is smoother, and it is designed to control released ions.

●maximum service temperature:260 °C

ETFE TUBE

This grade is the transparent extruded tube of ETFE resin which is superior especially in mechanical properties to other grades.

●maximum service temperature:150 °C

Typical Dimensions of SPAGHETTI TUBE

AWG size

Product No.	Inside diameter (mm)	Outside diameter (mm)	Wall thickness (mm)	Length (m)
AWG-30	0.30	0.76	0.23	10 50 100
AWG-28	0.38	0.84		
AWG-26	0.46	0.92		
AWG-24	0.56	1.06	0.25	
AWG-22	0.68	1.18		
AWG-20	0.86	1.46	0.30	
AWG-19	0.96	1.56		
AWG-18	1.07	1.67		
AWG-17	1.19	1.79		
AWG-16	1.35	1.95		
AWG-15	1.50	2.10		
AWG-14	1.68	2.28		
AWG-13	1.93	2.53		
AWG-12	2.16	2.76		
AWG-11	2.41	3.01		0.36
AWG-10	2.69	3.29		
AWG-9	3.00	3.72		
AWG-8	3.38	4.10		
AWG-7	3.76	4.48		
AWG-6	4.22	4.94		
AWG-5	4.72	5.44		
AWG-4	5.28	6.00		
AWG-3	5.94	6.66		
AWG-2	6.68	7.40		
AWG-1	7.47	8.19	10 30	
AWG-0	8.38	9.10		

Please contact us concerning sizes not mentioned above and colored tubes.

Inch size

Nominal dimensions	Inside diameter (mm)	Outside diameter (mm)	Wall thickness (mm)	Length (m)	
1/8	2.18	3.18	0.5	10 50 100	
3/16	3.15	4.75	0.8		
1/4	3.95	6.35	1.2		
	4.35	6.35	1.0		
3/8	6.35	9.53	1.59		
	7.53	9.53	1.0		
1/2	9.53	12.7	1.59		
	10.7	12.7	1.0		
3/4	15.87	19.05	1.59		10
1	22.2	25.4	1.6		20

Please contact us concerning sizes not mentioned above.

Millimeter size

Nominal dimensions	Inside diameter (mm)	Outside diameter (mm)	Wall thickness (mm)	Length (m)
0.25×0.75	0.25	0.75	0.25	10 50 100
0.5×1.5	0.5	1.5	0.5	
0.8×1.8	0.8	1.8	0.5	
1×2	1.0	2.0	0.5	
		3.0	1.0	
1.5×2.5	1.5	2.5	0.5	
1.5×3.5		3.5	1.0	
2×3	2.0	3.0	0.5	
2×4		4.0	1.0	
2.5×3.5	2.5	3.5	0.5	
3×4	3.0	4.0	0.5	
3×5		5.0	1.0	
4×5	4.0	5.0	0.5	
4×6		6.0	1.0	
5×6	5.0	6.0	0.5	
5×7		7.0	1.0	
6×7	6.0	7.0	0.5	
6×8		8.0	1.0	
7×8	7.0	8.0	0.5	
7×9		9.0	1.0	
8×9	8.0	9.0	0.5	
8×10		10.0	1.0	
9×10	9.0	10.0	0.5	
9×11		11.0	1.0	
10×11	10.0	11.0	0.5	
10×12		12.0	1.0	
11×13	11.0	13.0	1.0	10 50
12×14	12.0	14.0		
13×15	13.0	15.0		
14×16	14.0	16.0		
15×18	15.0	18.0	1.5	10
16×19	16.0	19.0		
18×21	18.0	21.0		
20×23	20.0	23.0		
22×25	22.0	25.0	2.0	1 5
25×29	25.0	29.0		
30×34	30.0	34.0		
35×39	35.0	39.0		
40×44	40.0	44.0		
45×49	45.0	49.0		
50×54	50.0	54.0		

Please contact us concerning sizes not mentioned above and colored tubes.



CHUKOH FLO® SWING PAD

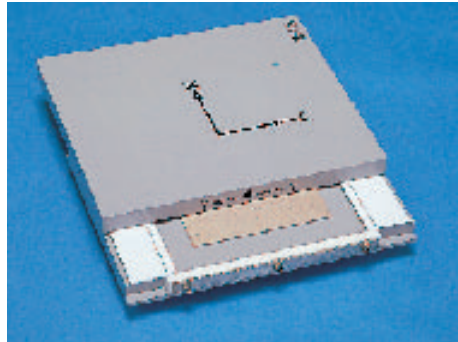
This product is a bearing pad for civil engineering and construction based on Fabric, fluoroplastic sheets and other products manufactured by our company.

Characteristics

- Low coefficient of friction at low speed and under high load
- Smooth sliding characteristics
- Full self-lubricity
- Superior weatherability

Main uses

supports for pipe lines and tanks/bearings of railway bridges/road bridges and side walk bridges/ship movable carriages/curtain walls/others.



■SWINGPAD GL-Type



Typical Properties

Properties	Test method (ASTM)	Unit	GL-Type	MF-Type	MV-Type	
Specific Gravity	D792	-	2.2	2.3	2.2	
Tensile Strength	D638	MPa	145	18	31	
Elongation	D638	%	0.05	200~300	300~400	
Compression Strength	D695	0.2% offset 20°C 1.0% deformation	MPa	45	12.5	7.5
				13	9.5	4.8
Hardness(Shore)	D2240	-	D60~75	D64~67	D50~55	
Thermal Conductivity	C177	W/(m·K)	0.46	0.33	0.24	
Linear Coefficient of Thermal Expansion	D696	10 ⁻⁵ /°C	1.8	6.3	12	
Water Absorption	D570	%	<0.02	<0.01	0.00	
Weather Resistance	-	-	Excellent	Excellent	Excellent	
Acid resistance	-	-	Excellent	Excellent	Excellent	
Alkali resistance	-	-	Excellent	Excellent	Excellent	

Values of properties in the table are typical, and not guaranteed.

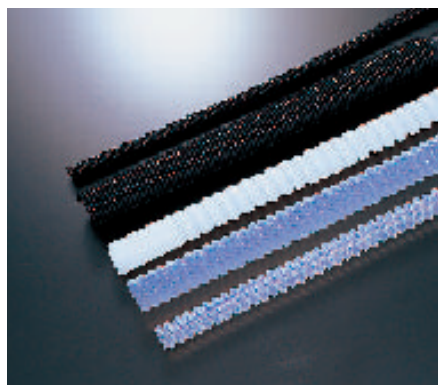
INJECTION MOLDED PRODUCTS

In addition to fluoroplastics, we have also been providing injection-molded products made of other advanced engineering plastics, which are used in a diversity of fields such as semiconductors, automobiles, office automation equipment and so on.



Typical Properties

Properties	Test method(ASTM)	Unit	PFA	ETFE	PVDF	PPS	PEEK	PAI	LCP	PEI
Specific gravity	D792	-	2.12~2.17	1.73~1.74	1.75~1.78	1.35	1.3	1.42	1.56	1.27
Water absorption	D570	%	0.01	0.03	0.04	0.02	0.14	0.33	-	0.25
Shrinkage after molded	-	%	5	2~5	2.5	1.5~1.6	2.0	0.6~0.8	0~1.0	0.5~0.7
Linear coefficient of thermal expansion	D696	10 ⁻⁵ /°C	12	6	14	2.6	5.0	3.1	-0.2	5.6
Heat distortion point	D648	°C	47	74	115	108	152	278	170	200
Continuous service temperature	-	°C	260	150	150		260	-	130	170
Tensile strength	D638	MPa	25~35	38~42	25~60	85	91.1	152	176	105
Elongation	D638	%	300~350	300~400	200~430	27	150	15	4.5	60
Tensile modulus	D638	GPa	0.31~0.35	0.70~0.85	0.8~2.48	-	-	4.5	-	3.0
Flexural modulus	D790	GPa	0.54~0.64	0.90~1.20	1.40~2.48	-	-	5.0	8.8	3.3
Impact strength (Izod)	D256A	J/m	Not broken	Not broken	160~375	18	45	140	284	49
Hardness(Rockwell)	D785	-	R50	R50	R80			E86	M42	M109
Volume resistivity	D257	Ω · cm	>10 ¹⁸	>10 ¹⁶	>10 ¹⁴	10 ¹⁶	10 ¹⁶	2×10 ¹⁵	4.5×10 ¹⁵	10 ¹⁷
Dielectric constant (10 ⁶ Hz)	D150	-	<2.1	2.6	6.4	3.6	3.3	3.9	3.1	3.15
Dissipation factor (10 ⁶ Hz)	D150	-	0.0003	0.005	0.017	0.0011	0.03	0.003	0.022	0.0013
Dielectric strength	D149	kV/mm	20	16	11	15	17	24	23	28
ARC resistance	D495	s	>300	75	60	115		-	94	128
UL temperature index	-	°C					240	220	130	170
Flammability	UL-94	-	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0



SNAKLE HOSE

Spirally molded flexible hoses that are applicable to uses in small bending radius.(PTFE, PFA, FEP, and ETFE)



BRAID HOSE

Pressure-proof flexible hoses that consist of PTFE hoses braided with stainless wires.



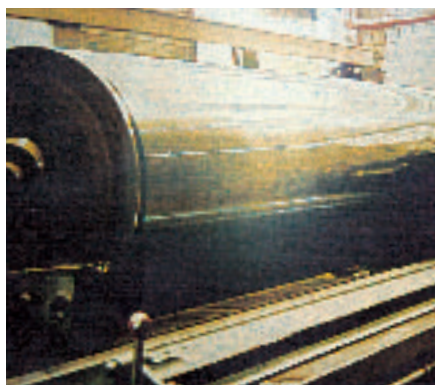
HEAT-SHRINKABLE TUBING

A variety of sizes, ranging from thin tubings to thick tubings, is available.(PTFE, PFA and FEP)



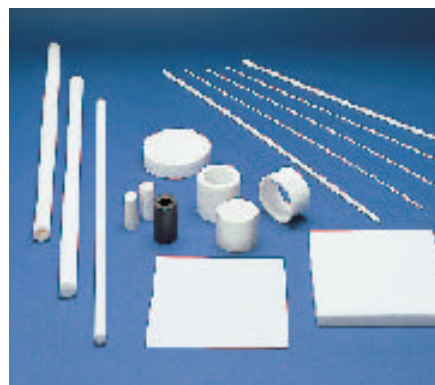
LINING

This is corrosion-resistant lining composed of fluoroplastic. Suitable types of resin and production method are selected to fit the use. We furnish appropriate linings applicable to pipes, large-sized tanks and reservoirs.



CYLINDER SLEEVE

A revolutionary FEP heat-shrinkable tube, which has never been produced before, and is capable of covering large rolls using our own method.



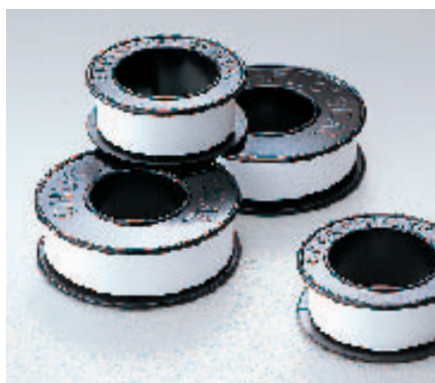
PROCESSING MATERIAL

These can be cut and used for mechanical parts, electrical parts, packing and gaskets. (PTFE)



MACHINED PRODUCTS

These products are used for mechanical parts, electrical parts, chemical fields and a wide range of industrial purposes.



SEALING TAPE

Non-combustible tape of non-sintered fluoroplastic PTFE, used as thread sealing material.



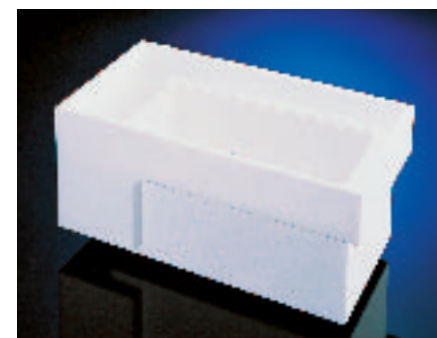
G-type LAMINATE

A laminate, which is composed of our G-type Fabrics, being shaped into various configurations, excelling in electrical and mechanical characteristics, and offering full-self lubricity. (UL-approved product)

CHUKOH FLO® SEMICONDUCTOR-RELATED PRODUCTS

We manufacture a diversity of fluoroplastic products for semiconductor-manufacturing processes which need a high level of chemical resistance and heat resistance.

In addition to our standard products, we can also provide custom-made ones that meet your special requirements on demand.



Tanks of PTFE



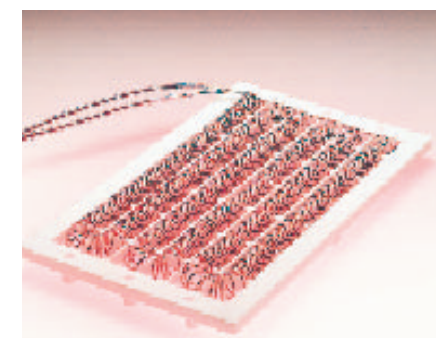
Miscellaneous containers of PTFE



Containers of PFA and ETFE



Bubbling Nozzle



Heater Units



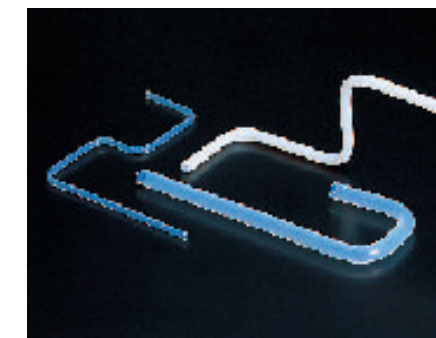
Wafer Carriers



Jig



Assemblies



Bent tubes



Tubes and Hoses



Solenoid Valves



Fitting

TYPICAL PROPERTIES OF FLUOROPLASTICS

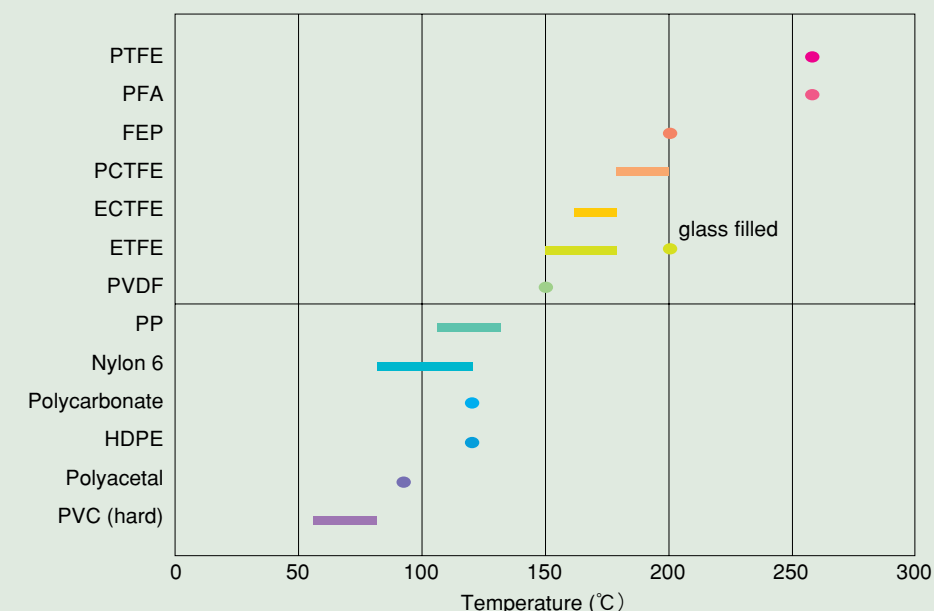
Typical Properties of Fluoroplastics

Properties		Unit	ASTM Test Method	PTFE	PFA	FEP	PCTFE	ETFE	ECTFE	PVDF	
Physical	Melting Point	°C	D4591	327	310	260	220	270	245	151-178	
	Specific Gravity	-	D792	2.13-2.20	2.12-2.17	2.15-2.17	2.10-2.20	1.73-1.74	1.68-1.69	1.75-1.78	
Mechanical	Tensile Strength	Mpa	D638	20-35	25-35	20-30	31-41	38-42	41-48	30-70	
	Elongation	%	D638	200-400	300-350	250-330	80-250	300-400	200-300	20-370	
	Compression Strength	Mpa	D695	10-15	15-20	14-19	31-51	40-50	35-40	32-74	
	Impact Strength(Isod)	J/m	D526	150-160	Not Broken	Not Broken	135-145	Not Broken	Not Broken	160-375	
	Hardness(Rockwell)	-	D785	R-20	R-50	R-50	R80	R50	R50	R93-116	
	Hardness(Shore)	-	D2240	D50-55	D62-66	D60-65	D75-80	D67-78	D53-57	D64-79	
	Flexural Modulus	GPa	D790	0.53-0.58	0.54-0.64	0.55-0.67	1.25-1.79	0.90-1.20	0.66-0.69	0.60-1.99	
	Tensile Modulus	GPa	D638	0.40-0.60	0.31-0.35	0.32-0.36	1.03-2.10	0.70-0.85	1.55-1.70	0.37-2.58	
	Coefficient of Kinetic Friction	0.69MPa 3m/min	D1894	0.1	0.2	0.3	0.4	0.4	0.4	0.4	
	Thermal	Thermal Conductivity	W/m·k	C177	0.23	0.19	0.2	0.22	0.24	0.16	0.17
Specific Heat		10 ³ J/kg·K	-	1.0	1.0	1.2	0.9	2.0	2.0	1.2	
Linear Coefficient of Thermal Expansion		10 ⁻⁵ /°C	D696	10	12	9	6	6	8	16	
Ball Pressure		°C	-	180	230	170	170	185	180	150	
Thermal Distortion Temperature		1.81Mpa	°C	D648	55	47	50	90	74	77	100
		0.45Mpa	°C		120	74	72	126	104	116	156
Maximum Service Temperature(continuous)		°C	(Not Loaded)		260	260	200	120	150	150	150
Electrical	Volume Resistivity	Ω·cm	D 257 (50% R.H. 23°C)	>10 ¹⁸	>10 ¹⁸	>10 ¹⁸	>10 ¹⁸	>10 ¹⁷	>10 ¹⁵	>10 ¹⁵	
	Dielectric Strength (at short time)	MV / m (3.2mm thickness)	D 149	19	20	22	22	16	20	11	
		Dielectric Constant	60Hz	D 150	2.1	2.1	2.1	2.6	2.6	2.6	8.4
	10 ³ Hz		D 150	2.1	2.1	2.1	2.6	2.6	2.6	7.7	
	10 ⁶ Hz		D 150	2.1	2.1	2.1	2.6	2.6	2.6	6.4	
	Dissipation Factor	60Hz	D 150	0.0002	0.0002	0.0002	0.0012	0.0006	0.0005	0.049	
		10 ³ Hz	D 150	0.0002	0.0002	0.0002	0.025	0.0008	0.0015	0.018	
10 ⁶ Hz		D 150	0.0002	0.0003	0.0005	0.020	0.005	0.015	0.017		
ARC Resistance	s	D495	>300	>300	>300	>360	75	18	60		
Chemical Resistance and Other Properties	Water Absorption(24h)	%	D570	0.01	0.01	0.01	0.01	0.03	0.01	0.03	
	Flammability(3.2mm thickness)	-	(UL-94)	V-0	V-0	V-0	V-0	V-0	V-0	V-0	
	Oxygen Index	-	D2863	>95	>95	>95	>95	32	60	43	
	Influence of Direct sunlight	-	-	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	
	Influence of Weak Acid	-	D543	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	
	Influence of Strong Acid	-	D543	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Affected By fuming sulfuric Acid	
	Influence of Weak Alkali	-	D543	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	
Influence of Strong Alkali	-	D543	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected		
Influence of Solvent	-	D543	Not Affected	Not Affected	Not Affected	Slightly Swelled by Halogenated Solvent	Not Affected	Serviceable	Not Affected By Most Solvents		

Comparison of Properties between Fluoroplastics and Other Plastics

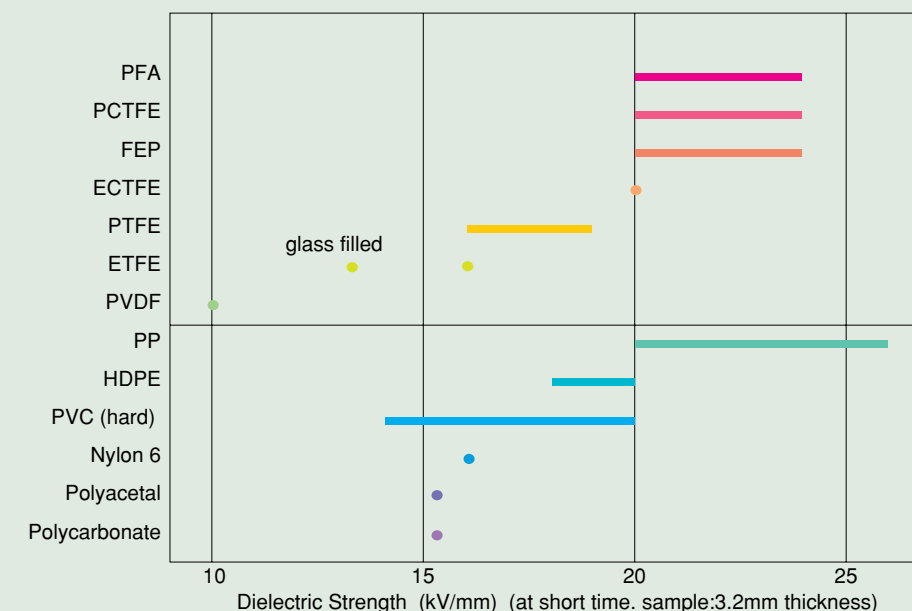
Continuous Service Temperature (not loaded)

- Fluoroplastics are in the top rank group among plastics on this property.
- PTFE and PFA resins are in particular the highest on this property. (260°C)



Dielectric Strength

- In general, fluoroplastics have high values and are excellent insulating materials.
- PVDF resin has less values.
- The addition of fillers proves to lower this property.



Chemical Resistance

	P T F E	P F A	F E P	P C T F E	E T F E	E C T F E	P V D F	N Y L O N 6	P P	P C A B O N A T E	P O L Y C A R B O N A T E
Acid	⊙	⊙	⊙	⊙	⊙	⊙	○	×	○	○	○
Alkali	⊙	⊙	⊙	⊙	⊙	⊙	○	×	○	○	○
Solvent	⊙	⊙	⊙	○	⊙	⊙	△	×	△	△	△

Note : marks have the meanings shown below.
 ⊙ Excellent ○ Good △ Serviceable × Unserviceable

Wetting of various plastics against water

Resins	Contact angle against water (degree)	Adhesive energy (N/m)
FEP	115	0.042
PTFE	114	0.043
Silicone resin	90~110	0.048~0.073
Paraffin	105~106	0.053~0.054
Polyethylene	88	0.075
Polyamido	77	0.098
Phenolic resin	60	0.109



■Matsuura Plant (Factory No.1)
[Fabric based products]
Belts, adhesive tapes, copper-clad laminates, etc.



■Matsuura Plant (Factory No.2)
Fabrics, SKYTOP



■SC Plant
[Silicone coating products]
Side curtain airbags for automobiles, etc.



■Utsunomiya Plant
[Tubes]
Tubes, flexible hoses, etc.
[Processed products]
Butt-welding, processing of various tubes, etc.
[Injection molded products]
PFA, PEEK, PPS, and others.

Offices & Plants

Head Office	No.16 KOWA BUILDING-SOUTH, 3F, 1-9-20, Akasaka, Minato-ku, Tokyo 107-0052 JAPAN TEL (03) 6230-4411 FAX (03) 6230-4412	Membrane Sales Dept.	No.16 KOWA BUILDING-SOUTH, 3F, 1-9-20, Akasaka, Minato-ku, Tokyo 107-0052 JAPAN TEL (03) 6230-4424 FAX (03) 6230-4446
Fukuoka Head Office	OTEMON PINE BUILDING, 5F, 1-1-12, Otemon, Chuo-ku, Fukuoka 810-0074 JAPAN TEL (092) 724-1411 FAX (092) 724-1412	Market Development Dept.	No.16 KOWA BUILDING-SOUTH, 3F, 1-9-20, Akasaka, Minato-ku, Tokyo 107-0052 JAPAN TEL (03) 6230-4415 FAX (03) 6230-4446
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