Transparent Plastic Plate Characteristics

Characteristics of PET, Antistatic PVC, Acrylic and Polycarbonate

Provides four types of clear plates with superior transparency. In addition to the standard grade, antistatic grade with antistatic function is available, 4 colors, transparent, smoke brown, smoke gray and orange, are available.

It has approx. 4 times stronger impact resistance than that of acrylic. Moreover it is an environment-friendly material, which generates no poisonous gas when burned. It is also cost effective.

· Antistatic PVC

Excels in chemical resistance and flame resistance, and superior in cost-effectiveness among anti-static materials.

Excels in transparency, weather resistance and machinability, and is used widely for indoor and outdoor purposes, such as covers for industrial machinery, art display cases and signboards.

The level of impact strength is ranked as the highest among the transparent resin materials (approx. 30 times higher than that of acrylic plates), It excels in resistance against high and low temperatures, and is widely used.

					Representative Products											
					PI	ET	PVC	Acrylic				Extrusion)	Pol	vcarbon	ate	
			JIS		Standard Antistatic		Antistatic		Antistatic		dard	Antistatic	Standard Antistatic Abrasion-resistant			
	Item		Testing	Unit	P.957		P.961	* * * * * * * * * * * * * * * * * * * *	P.963		P.967		P.969			
		Method		PYA PYBA PYDA	PYTA PYBTA	ENBT ENBBT	ACA ACBA ACDA	ACTA ACBTA	ACAE	ACBAE	ACTAE ACBTAE	PCTA PCTBA PCTGA	PCTTA PCTBTA	PCTSP		
Transmittance	Light Transmittance (Top: Transparent) (Middle: Smo (Bottom: Smoke Gray)		-	%	PYA:87 PYBA:28 PYDA:45	PYTA:80 PYBTA:30	ENBT:80 ENBBT:29	ACA:93 ACBA:25 ACDA:43	ACRTA:79	ACAE:92	ACBAE:34	ACTAE:87 ACBTAE:25	PCTA:90 PCTBA:35 PCTGA:33	PCTTA:86 PCTBTA:35	PCTSP:91	
	Tensile Strength		K-7113	MPa {kgf/cm²}	62 {630}	52 {530}	63 {640}	75 {760}	75 {760}	67 {682}	76 {774}	73 {754}	65 {663}	65 {663}	65 {663}	
es	Elongation*		K-7113	%	15	-	50	2~7	5	4	5	5	83	83	83	
Properties	Bending Strength K		K-7203	MPa {kgf/cm²}	83 {850}	71 {730}	98 {1000}	117 {1200}	106 {1080}	111	125 {1274}	122 {1244}	90 {918}	90 {918}	93 {948}	
<u>8</u>	Flexural Modulus	Flexural Modulus K-		MPa	2.4×10 ³	2.0×10 ³	3.4×10 ³	3.2×10 ³	3.3×10 ³	3400	3500	3300	2300	2300	2300	
Mechan	Compression		K-7181	MPa {kgf/cm²}	-	60 {610}	83 {850}	124 {1270}	-	120 {1200}	-	-	78 {795}	78 {795}	-	
	Izod Impact Strength		K-7110	kJ/m²	10	-	2.9	2.7	-	2.5	1.5	2	15	15	-	
	Rockwell Hardness M Scale		-	-	59	46	-	100	100	100	99	97	67	70	-	
stics	Continuous Use		-	°C	-15~55	-15~55	-30~60	-30~80	-30~80	-30~70	-30~70	-30~60	-30~100	-30~100	-30~100	
cteris	Deflection Temp. Under Load 0.4	Deflection Temp. Under Load 0.45MPa		°C	70	69	-	100	85	90	110	92	135	135	135	
Chara	Linear Expansion Coe	efficient	K-7140	°C-1	6.8x10 ⁻⁵	7.5x10 ⁻⁵	7.0x10 ⁻⁵	7.0x10 ⁻⁵	5.9x10 ⁻⁵	7.0x10 ⁻⁵	7.0x10 ⁻⁵	7.0x10 ⁻⁵	6.5x10 ⁻⁵	5.2x10 ⁻⁵	6.5x10 ⁻⁵	
Thermal Characteristics	Thermal Conductivit	ty	-	W/m • K	-	-	0.16	0.21	-	0.21	0.21	-	0.24	-	-	
Ther	Specific Heat		-	J/g • K	1.3	1.35	1.12	1.46	1.46	1.46	1.47	1.5	1.3	1.2	-	
stics	Surface Resistivity		K-6911	Ω	>1010	10 ⁶ ~10 ⁸	10 ⁷ ~10 ⁸	>1015	10 ⁶ ~10 ⁸	>1015	>1016	10 ⁷ ~10 ⁸	>2.0x10 ¹⁶	10 ⁶ ~10 ⁸	>2.0x10 ¹⁶	
Characteristics	Specific Volume Res	sistivity	K-6911	Ω·cm	>1011	>1017	-	>1015	>1017	>1015	>1015	>1015	>1017	>1017	>1017	
hara	Insulation Breakdown	Voltage	K-6911	kV/mm	-	-	-	20	-	20	20	-	20	-	20	
Electric (Dielectric Constant 1	0 ⁶ Hz	K-6911	-	3.2	-	-	3.2	2.9	3.1	4	-	3	3	3	
음	Dissipation Factor 1	0 ⁶ Hz	K-6911	-	-	-	-	0.06	0.032	0.06	0.06	-	0.009	0.06	-	
	Specific Gravity		-	-	1.27	1.27	1.4	1.2	1.2	1.2	1.19	1.19	1.2	1.2	1.2	
	Water Absorption Ra	atio	K-7209	%	-	-	0.03	0.4	0.18	0.4	0.3	0.4	0.24	0.15	-	
လ	Flame Resistance	Flame Resistance		-	-	-	Self-extinguishing	×	×	-	-	-	Self-extinguishing	-	-	
Others		0il	-	-	0	0	0	0	0	0	0	0	0	×	0	
٥	- i i	Acid	-	-	×	×	0	0	0	0	0	X~△	Δ	×	Δ	
		Alkali	-	-	X~△	X~△	0	0	0	0	0	0	×	×	×	
	Organic Solvent		-	-	×	×	X~△	X~△	X~△	X~△	X~△	X~△	×	×	×	

Listed values are for reference, not guaranteed.

Characteristics of Acrylic Cast Plates and Extruded Plates

As for Acrylic Plates, cast plates made by cell-cast method and extruded plates are available.

Cast plates have better heat resistance and stronger mechanical strength than extruded plates. Extruded plates are more inexpensive than cast plates.

When extruded plates have contact with vaporizing liquid such as methanol and methylene chloride after they are thermal-processed such as laser machining, they may have cracks. Also, extruded plates may have deflection at high temperature.

Transparent Plastic Plates



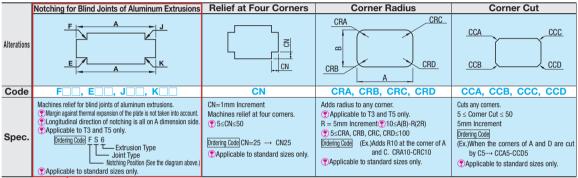
MISUMI provides clear plate of four materials superior in transparency.

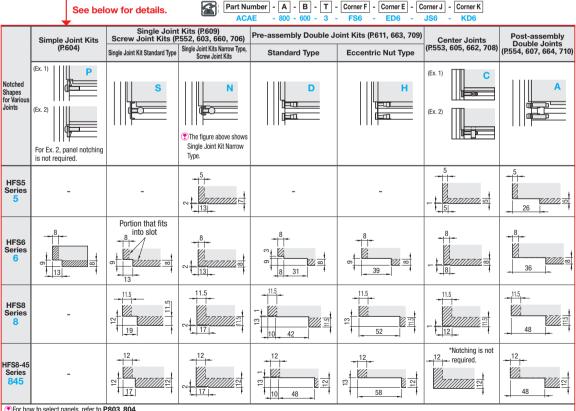
In addition to the standard grade, antistatic grade with antistatic function is available. 4 colors, transparent, smoke brown, smoke gray and orange, are available.

Often used as a cover, and variety of options for mounting hole alterations are available. Use MISHMI Transparent Plastic Plates

Mat	erial	PI	Τ	Vinyl Chloride (Antistatic)	Acrylic	(Cast)	Acrylic Economy (Extrusion)	Polycarbonate		
Pa	ige	P.973	P.957~	P.961	P.973	P.963~	P.967	P.973	P.969~	
	Width (B)	20~300	20~1000	100~ 900	20~300	20~300 20~1000		20~300	20~1000	
Size	Length (A)	20~300	20~2000	100~1100	20~300	20~2000	300~1100	20~300	20~2000	
Size	Plate	0.5, 1.5 1, 2, 3, 4, 5, 8		3, 5	0.5, 1, 1.5, 2	3, 4, 5, 6, 8	3, 5, 8	0.5, 1, 1.5, 2	3, 4, 5, 6, 8, 10	
	Thickness (T)	· ·			1 1 1	10, 15, 20, 25		1 1 1		
Drilling	Method	Circular	Sawing	Circular Sawing	Circular Sawing	- 4-side Milling	Circular Sawing	Circular Sawing		
Dril	lling				Through Hole, Counte	ersink, Keyhole, Threa	ded Insert			
Dill	iiiig				miougii noic, count	biolik, Keyhole, Illica	ucu moort			

Alterations





For how to select panels, refer to P.803, 804.

Dimensions above include a margin of 1mm at the groove part.

Make the margin larger for engineered plastic plates and etc., because it expands or shrinks largely by the temperature fluctuation.

Ex) When the temperature rises or falls by 10°C, the Acrylic Plate Economy Type (Extruded) with 1m length expands or shrinks by 0.7mm. The margin of approx. 2mm is necessary in the case of temperature difference of 30°C.

^{*} Values of elongation of polycarbonate and PET are % values measured by JIS K-7162-1B/50.

Engineered Plastics Guide

Line-ups and Characteristics of Engineered Plastics

						I Liigineered Flastic					
Page	Material	Color Sample	Grade	Color	Generic Name	Electric Properties	Prop Continuous Use	Dimension Stability	_	Sliding Properties	Features
			Standard	Blue	MC901	Insulation	-40°C 120°C	Δ	0	0	[Features]MC Nylon® of Nippon Polypenco Ltd. is the most general material in engineered plastics and used for various industrial purposes. Excels in mechanical strength and abrasion resistance, but not in dimension stability due to high water absorption. [Appearance]Stripes on upper and lower surfaces of materials are developed from production process. Colors may have
			Standard	lvory	MC900NC	Insulation	-40°C 120°C	Δ	0	0	popular aniezyonipea din ulway suntaes or interialisa ale uerelopea non production process, couns may have lot variations but it does not affect the physical properties. [Machinability]Machinability is good but harder to machine than that of Polyacetal due to special stickiness.
			Sliding	Purple	MC703HL	Insulation	-40°C 120°C	Δ	0	0	[Features]Dynamic Friction Coefficient is low. Excels in sliding properties, abrasion resistance and mechanical strength. [Appearance]Stripes on upper and lower surfaces of materials are developed from production process. Feel rough due to the special additive. [Machinability]Same as Standard Type. [Caution]D not use for processing of food oils and fats:
P.993	MC Nylon®		High Strength	Dark Brown	MC602ST	Insulation	Normal Temperature 150°C	Δ	0	0	[Features]Upper temperature limit is higher than that of Standard Type and excels in mechanical strength. [Appearance]Stripes on upper and lower surfaces of materials are developed from production process. [Machinability]Same as Standard Type. Material is harder than that of Standard Type.
			Weather Resistance	Dark Gray	MC801	Insulation	Normal Temperature 120°C	Δ	0	0	[Features]Excels in weather resistance and abrasion resistance. Can be used outdoors over a long period of time. [Appearance]Stripes on upper and lower surfaces of materials are developed from production process. [Machinability]Same as Standard Type.
		201	Conductivity CDR2	Black	MC501CDR2	Conductive	Normal Temperature 120°C	Δ	Δ	0	[Features]Conductivity CDR2: Has the highest conductivity in the MC Nylon® conductive grades. Suitable where quick conductivity is required. Conductivity CDR6: Electrical property is between conductive and antistatic. The most general and economical in the MC Nylon® conductive orades.
			Conductivity CDR6	Black	MC501CDR6	Antistatic	Normal Temperature 120°C	Δ	Δ	0	Conductivity CDR9: Electric property is antistatic. Has the highest heat resistance in MC Nylon® of conductive grade. [Appearance]Marks are printed with "R2" (white), "R6" (yellow) and "R9" (green) markers on upper and lower surfaces of the material to distinguish the conductive grades. Stripes on upper and lower surfaces of materials are
			Conductivity CDR9	Black	MC501CDR9	Antistatic	Normal Temperature 150°C	Δ	0	0	developed from production process. [MachinabilitySame as Standard Type. Material contains carbons and is harder than that of Standard Type. [Caution]Do not use as heating elements or electric parts such as contact points or terminals.
	Polyacetal		Standard	White	POM Duracon	Insulation	-45°C 95°C	0	Δ	0	[Features]General Engineered Plastics for various industrial purposes. Equal to Duracon®. Has low water absorption and excels in dimension stability. Inferior to MC Nylon® in heat resistance and abrasion resistance. [Appearance Upper and lower surfaces look and feel smooth. Weld line (resin flow mark) is developed from production
P.997			Standard	Black	POM Duracon	Insulation	-45°C 95°C	0	Δ	0	process. [Machinability Good machinability.
			Antistatic	Ocher	-	Antistatic	Normal Temperature 80°C	Δ	0	0	[Features]No-carbon antistatic material is used and effective for antistatic. [Appearance]Unlike Standard Type, weld line (resin flow mark) is not highly visible. [Machinability]Same as Standard Type.
			Paper Bakelite	Natural Color	Laminated phenol formaldehyde resin w/paper base	Insulation	-50°C 100°C	0	× .	× ≀	[Features]General material for various purposes such as insulation and heat resistance. Paper-based materials are more inexpensive than cloth-based materials. [Appearance]Upper and lower surfaces are glossy and smooth. Natural color tone vary per production lot. Color becomes
P.1001	Bakelite		Paper Bakelite	Black	Laminated phenol formaldehyde resin w/paper base	Insulation	-50°C 100°C	0	× .	× .	darker due to oxidation over time. However, it does not affect properties. Paper-based black color does not change. [Machinability Good machinability but dust scatters when machined.
			Cloth Bakelite	Natural Color	Laminated phenol formaldehyde resin w/cloth base	Insulation	-50°C 100°C	0	× .	× .	Features Seneral material for various purposes such as insulation and heat resistance. Cloth-based materials have higher strength than paper-based materials. Appearance Upper and lower surfaces are smooth and have grains. Machinality Good machinability but dust scatters when machined. Cloth-based materials have less machinability than paper-based materials due to lamination.
P.1007	Epoxy		Standard	Green	Glass Epoxy	Insulation	Normal Temperature 155°C	o~ ©	× ∴	× ∴	[Features]Excels in heat resistance, heat insulation and electrical insulation. [Appearance]Upper and lower surfaces are glossy and smooth. Cut surfaces appear whitish. [Machinability]Because made of laminated glass fiber and epoxy resin, drilling or cutting in the direction of lamination may cause cracks.
	Glass		High Temperature	Black	-	Antistatic	Normal Temperature 260°C	○ ◎	× .	× .	[Features]Excels in heat resistance, heat insulation and antistatic effect. [Appearance]Unlike Standard Type, upper and lower surfaces are not glossy but smooth. [Machinability]Same as Standard Type.
P.1009	Ultra High- Molecular- weight Polyethylene		Standard	Milky White	UHPE UHMWPE New Lite®	Insulation	-100°C 80°C	Δ	0	0	[Features]Standard:Has low specific gravity and is lightweight. Excels in abrasion resistance and sliding properties. New Lite* of Saxin Corporation is used for the standard type of ultra-high-molecular-weight polyethylene. Electrical Conductivity. Excels in sliding property and abrasion resistance at ambient temperature with low load. Also excels in conductivity.
			Electrical Conductivity	Black	-	Conductive	-100°C 80°C	Δ	0	0	[Appearance]Clear white for Standard Type. Pullout marks are left at the extruded direction. Surfaces feel smooth. [Machinability]Mart or machine as they are soft. Be careful of the way to fix. [Caution]Storing them against the wall causes warpage. Be sure to lay them out flat. Do not use Conductive Type as heating elements or electric parts such as contact points or terminals.
P.1011	Fluorine		Standard	White	Teflon PTFE	Insulation	-40°C 250°C	× ^	0	0	[Features]Excels in heat resistance and chemical resistance. Fluororesin is Polytetrafluoroethylene resin (equal to Teflon®). [Appearance]Upper and lower surfaces look and feel very smooth. (Machinability]Hard to machine as they are soft and become swollen. [Caution]Storing them against the wall causes warpage. Be sure to lay them out flat.

							Prop	pertie	s								
Page	Material	Color Sample	Grade	Color	Generic Name	Electric Properties	Continuous Use	Dimension Stability	Abrasion Resistance		Features						
			Standard	Ash Brown	PEEK	Insulation	-50°C 250°C	0	0	0	[Features]Standard:Well balanced in heat resistance, insulation, dimension stability, chemical resistance, abrasion resistance and machinability. Sliding: In addition to the features of Standard Type, it excels in mechanical characteristics and sliding property at high temperature.						
P.1013	PEEK		Sliding	Black	-	Insulation and Conductive Mixed: Not measurable.	Normal Temperature 250°C	0	0	0	Conductivity: In addition to the features of Standard Type, has very low Specific Volume Resistivity and excels in conductivity. [Appearance]Upper and lower surfaces of the material are glossy, Weld line (resin flow mark) is developed from production process. It can be removed by milled surface finishing.						
			Electrical Conductivity	Black	-	Conductive	Normal Temperature 250°C	0	0	0	[Machinability]Machinability is good, however, they may tend to chip in the direction of the milling path because they are narder than Mc Nylon®. Beware of the milling speed. When drilling a hole, the reference feeding speed when going through is 0.1mm per rotation. [Caution]Do not use Sliding Type and Conductive Type as heating elements or electric parts such as contact points or terminal						
04047	PPS		Standard	Natural Color	PPS	Insulation	Normal Temperature 190°C	0	Δ	Δ	[Features]Standard: Excels in heat resistance, chemical resistance and dimensional stability. More economical than PEEK. Abrasion Resistance: Superior in abrasion resistance and sliding property, especially in dimensional stability to Standard Typ [Appearance]Upper and lower surfaces of the material are glossy, Weld line (resin flow mark) is developed from production process. It can be removed by milled surface finishing. [MachinabilityMachinability is cook, however, they may tend to chip in the direction of the milling path because they are harder than MC Nylor						
P.1017			Abrasion Resistance	Blue	-	Antistatic	Normal Temperature 220°C	0	0	0	Beware of the milling speed. When drilling a hole, the reference feeding speed when going through is 0.1 mm per rotation. [Caution]PPS generates an oxide film on the surface and the color turns to brown when it is exposed to light and heat (direct sunlight, fluorescent light, mercury larny and high-temperature atmosphere) for long hours. However, it changes little in mechanical properties and physical properties. * Unlike Standard Type, discoloration doesn't occur due to the addition of color.						
P.1019	Unilate®		Standard	Natural Brown	Unilate®	Insulation	Normal Temperature 120°C	0	Δ	Δ	[Features]Unilate* excels in heat resistance, voltage resistance, strength and machinability. Unilate* of Unitica Ltd., not annealed material, is used. [Appearance]Upper and lower surfaces are very smooth. [Machinability]						
P.1019	PET		Antistatic	Black	PET300ESD	Antistatic	Normal Temperature 100°C	0	0	0	[Features]Electric property is antistatic. Uses PET whose Water Absorption Ratio. Linear Expansion Coefficient is at low level, and thus, excels in Dimensional Stability. [Appearance]Stripes on upper and lower surfaces of materials are developed from production process. Frequency of cold staining is less than MC Nylon® Conductivity CDR6. [Machinability] Uses PET material, and thus, is superior to MC Nylon, etc. in machinability.						
?1021	PBT		Standard	White	PBT	Insulation	Normal Temperature 120°C	0	Δ	~	[Features]Excels in heat resistance, electric property, dimension stability and insulation. [Appearance]Marks of machining on upper and lower surfaces are developed from production process. [Machinability]Good machinability.						
1021	ABS		Standard	Natural Color	ABS	Insulation	Normal Temperature 30°C	0	Δ	Δ	[Features]Excels in machinability and adhesion is possible. The material is often used for prototypes. [Appearance]Upper and lower surfaces are glossy and smooth by the size up to 10mm. [Machinability]Good machinability.						
R	eferer	nce Valu	ues of	Spe	ecific V	olum	e Re	sis	tivi	ty a	nd Heat Resistance (For physical properties, see P.953-9						
								5	Spec	ific \	Volume Resistivity (Unit: Ω · cm)						
Item		~10 ²		10	4	10 ⁶			10 ⁸	3	10 ¹⁰ 10 ¹² 10 ¹⁴ 10 ¹⁶ 10 ¹⁸						
Electr	ic Propert	Co Co	nductive				Anti	istatio	;		Insulation						
	300																
mperature °C	250				PEEKElectrical	Conductivity			Glass	ure	PEEK Standard Standard						
mpe	200										Atration Resistance						

150 MCNylon Standard Unilate (Free-cutting Resin) 100

About Shape / Dimension Change of Resin

Resin, unlike metals, can be easily distorted, expanded or contracted due to temperature and humidity. See note below for designing.

1)Shape Distortion

Avoid long and thin shapes when possible. These shapes cause more distortion. It is recommended to split the dimension or place bolts to fasten.

A200 A200

1°C change of the temperature may expand or contract the product by approx. 0.1mm. Be sure to store purchased parts at room temperature (20°C). MC Nylon® especially tends to expand or contract by water or humidify due to its water-absorbing property. / Pay extra attention to the dimension designing and storing. Go north <Before Shipping> Go south 010.0

Distorted parts can be fixed to a certain extent by applying weight on them for 24 hours or so.

© Dimension changed parts will be bought back to their original state to a certain extent by leaving them in room temperature.

Engineered Plastic Characteristics I

General-purpose Engineered Plastic Plates

Characteristics of MC Nylon®, Polyacetal, Ultra High-Molecular-weight Polyethylene, Fluororesin, PEEK, PPS, Free-cutting Resin, PET, PBT and ABS

MISUMI's general-purpose Engineered Plastic Plates have superior properties of lightweight, noise reduction and corrosion resistance and can be used as a replacement for metal plates.

Selectable from nine types of materials and several grades for various purposes.

• MC Nylon® : Having better abrasion resistance than that of polyacetal plates, MC nylon is generally used for slide guide plates. The product lineup are as follows: Sliding Grade with highly-improved sliding performance; High Strength Grade with excellent strength; three types of Conductive Grade effective for antistatic purposes; and Weather Resistance Grade superior in strength deterioration resistance.

· Polyacetal : Widely used in wheels, rollers and gears, because of its excellent mechanical strength. Antistatic Grade is also available.

• Ultra High-Molecular-weight Polyethylene : It excels in abrasion resistance and sliding properties, and is used for carrier rollers and guide rails. In addition to Standard Type, Conductive Grade for antistatic is also available.

* For material colors or features, see P.951.

									<u> </u>	entative P	roducts				
								MC Nylon					acetal	Ultra High-Molecular-weight Polyethylen	
					Standard	Sliding	High Strength	Weather Resistance	Conductivity CDR2	Conductivity CDR6	Conductivity CDR9	Standard	Antistatic	Standard	Electrical Conductivit
				Plate	P.993 P.1023	P.993	P.993	P.993	P.993	P.993	P.993	P.997	P.997	P.1009	P.1009
	Item		Testing Method	Circular Plate	P.1023	P.1023	-	P.1023	P.1023	P.1023	P.1023	P.1023	P.1023	P.1023	P.1023
	iteii		ASTM	Unit	MCA MCAW MCAB	MCAS	MCAY	MCAPS	MCCA	MCDA MCDB	MCEA	PAA PABA PAAB	PACA	UPA	UPACA
		Ambient		MPa	96	66	98	83	68	74	88	61	42	45	35
	Tensile	Temperature	D 000	{kgf/cm ² }	{980}	{670}	{1000}	{850}	{700}	{760}	{900}	{620}	{430}	{460}	{360}
Mechanical Properties	Strength	Continuous Use at High Temperature	D-638	MPa {kgf/cm²}	39(120°C) {400(120°C)}	-	-	-	-	-	-	29(95°C) {300(95°C)}	-	-	-
	Elongation		D-638	%	30	19	20	40	10	7	7	40	30	400	300
	Bending Streng	nth	D-790	MPa	110	92	152	110	117	117	132	89	49	25	25
			D 700	{kgf/cm ² }	{1120}	{940}	{1550}	{1120}	{1200}	{1200}	{1350}	{910}	{500}	{250}	{250}
	Flexural Modul	us	D-790	MPa	3530	2599	4609	-	4110	4020	4160	2589	1370	900	1103
/echanic	Compression Strength	Yield Point	D-695	MPa {kgf/cm²}	103 {1050}	-	-	101 {1030}	-	-	-	-	-	20 {200}	-
_		5%	D-033	MPa	95	75	118	93	98	93		103	44	_	25
		Deformation		{kgf/cm ² }	{970}	{760}	{1200}	{948}	{1000}	{950}	-	{1050}	{450}	-	{250}
	Izod Impact Str	rength	D-256	J/m	50	39	50	50	35	35	35	74	77	Does not break	Does not break
	Rockwell	R Scale	D 70F	-	120	110	120	120	119	117	119	119	111	56	52
	Hardness	M Scale	D-785	-	-	-	-	-	-	-	-	78	-	-	-
iss	Continuous Use	е	-	°C	-40~120	-40~120	Ambient Temp. ~ 150	Ambient Temp. ~ 120	Ambient Temp. ~ 120	Ambient Temp. ~ 120	Ambient Temp. ~ 150	-45~95	Ambient Temp. ~ 80	-100~80	-100~80
eris	Melting Point		-	°C	222	221	222	222	215	215	218	165	-	136	-
ıract	Deflection Temp	0.45Mpa	D 040	°C	215	215	215	215	215	215	-	158	-	80	108
Cha	Under Load	1.82Mpa	D-648	°C	200	115	200	200	200	200	200	110	106	-	55
ma	Linear Expansi	on Coefficient	D-696	°C-1	9.0x10 ⁻⁵	9.0x10 ⁻⁵	6.5x10 ⁻⁵	9.0x10 ⁻⁵	8.0x10 ⁻⁵	7.5x10 ⁻⁵	8.6x10 ⁻⁵	9.0x10 ⁻⁵	16.7x10 ⁻⁵	1.7x10 ⁻⁴	19x10 ⁻⁵
Thermal Characteristics	Thermal Condu	ıctivity	D-177	W/m·K	0.233	0.233	-	0.23	0.512	0.709	-	0.233	-	0.42	-
	Surface Resisti		D-257	-	-	-	-	-	-	-	-	-	-	10 ¹³	-
4	3	,	D-257	Ω·cm	4.2×10 ¹⁵	-	-	-	10 ² ~10 ⁴	10 ⁶ ~10 ⁸	108~10 ¹⁰	>1014	10 ¹⁰ ~10 ¹²	1017	104
Electric	Insulation Brea		D-149	kV/mm	20	-	-	18	-	-	-	20	-	68	-
e e	Dielectric Constan	· · ·	D-150	-	3.7	-	-	3.7	-	-	-	3.7	-	2.3	-
ξ	Dissipation Facto		D-150	-	0.02	-	-	0.02	-	-	-	0.007	-	-	-
	Specific Gravity		D-792	-	1.16	1.11	1.27	1.16	1.2	1.23	1.19	1.41	1.33	0.94	0.95
	Water	In water, Level	D-570	%	6	-	-	6.0	-	-	-	0.7	-	<0.01	-
		In water, 24hs	D-570	%	0.8	0.5	-	0.8	-	-	-	0.22	2	0.8	-
	Abrasion Resis			-	0	0	0	0			0	Δ	0	0	0
	Sliding Propert		-	-	0	0	0	0	0	0	0	0	0	0	0
	Dynamic Friction		-	-	-	0.05~0.1	-	-	-	-	-	-	0.18	0.07~0.22	0.17~0.19
	Dimension Stal					□ 0.00 · 0.1		Δ	Δ			0	Δ	○.01 · 0.22	Δ
Others	Impact Resista				0	0	0		0	0	0	0	0	0	0
₹	Flame Resistar		[UL94]	-	(HB Equivalent)	(HB Equivalent)		(HB Equivalent)			(HB Equivalent)	(HB Equivalent)		(HB Equivalent)	
	Food Sanitation		-	-	Suitable*	Suitable*	Suitable*	Suitable (After Boiling)	Suitable*	Suitable*	Suitable*	Suitable	Suitable	Suitable	Suitable
	FDA Registration			-	Juliable	Juliable	Juitable	- Curano Frioi Dolling	Juliable	Juliable	Juitable	Juitabie	Juitabie	Finished	Juliabit
	DA negistratio	Oil			0	0	0	0	0	0	0	0	0	Fillistieu	0
	Ob and	Acid	-	-	×	×	×	×	×	×	×		△~X	0	0
	Chemical Resistance	Alkali			X 	× ○~△	× ○~△	× ○~△	× ○~△	× ○~△	× ○~△	Δ~X	Δ~X	_	0
		Organic Solvent			0~4	0~4	0~4	0~4	0~4	0~4	0~4	0	0	0	0
organic Solveni		- (NAO N				l'ala Obsessad		l O	- 1 5hm 6			0 1 0000	_		

^{*} Comply with Food Sanitation Laws (MC Nylon, Standard, Sliding Grade and High Strength Grade: After boiling for 1.5hrs; Conductive CDR2, CDR6 and CDR9: After boiling for 2hrs)

© Listed values are for reference, not guaranteed.

• Fluororesin : It can be used for sheet packing and electric insulator since it has excellent impact strength as well as chemical stability and electric

•PEEK : Super Engineered Plastic with high heat and chemical resistance. It excels in mechanical characteristics under high temperature. In addition to Standard Type, Conductive Grade for antistatic is also available.

•PPS : It excels in heat resistance, rigidity, flame resistance and dimension stability. It also excels in chemical resistance at ambient

temperature and is used for parts of semiconductor and liquid crystal manufacturing equipment and inspection device.

•Free-cutting Resin (Unitate®) : It excels in insulation, low water absorption and rigidity, and is easy to machine and cut.

- Antistatic PET : Excellent in workability and dimensional stability, and is used as fixtures for semiconductor components / electronic components. Various options of thick plate are offered.

•PBT : It excels in insulation, machinability, low water absorption and long term heat stability, and is used for auto electric parts.

-ABS : Excels in machinability and coating. Widely used as a material with which coating on plastic body is enabled.

* For material colors or features, see P.951.

						Representative Products											
								PEEK		PI	PS	Free-cutting	PET	-	4.00		
						Standard	Standard	Sliding	Electrical Conductivity	Standard	Abrasion Resistance	Resin (Unilate®)	Antistatic	PBT	ABS		
					Plate	P.1011	P.1011	P.1013	P.1013	P.1017	P.1017	P.1019	P.1019	P.1021	P.1021		
	item			Testing	Circular Plate	P.1023	P.1023	-	P.1023	P.1023	P.1023	-	-	P.1023	P.1023		
				Method ASTM	Unit	PTFE	РКА	РКАН	PKCA	NPPS	NPMS	YCA	PYCA	NPBT	NABS		
			Ambient Temperature		MPa	13.7~34.3 {140~350}	98	75	130	85	75	110 (Vertical), 65 (Horizontal) {1120 (Vertical), 660 (Horizontal)}	82	49	39		
		Tensile Strength	· ·	D-638	{kgf/cm²}	{140~330}	{1000}	{765}	{1330}	{870}		(1120 (valucal), 000 (nonzonial))	{836}	{500}	{400}		
			Continuous Use at High Temperature		MPa {kgf/cm²}	-	20(250°C) {200(250°C)}	-	-	-	220	-	-	-	-		
9		Elongation		D-638	%	200~400	20	5	5	27	5	2.4	10	200	-		
4		Bending Strengt	th	D-790	MPa	-	170	97	227	142	72	220 (Vertical), 125 (Horizontal)	127	93	64		
å	2			D ==00	{kgf/cm ² }		{1730}	{990}	{2320}	{1450}		{2240 (Vertical), 1270 (Horizontal)}	{1295}	{950}	{650}		
	3	Flexural Modulu	S	D-790	MPa	550	4021	5001	-	3900	3689	110 (Vertical), 7000 (Horizontal) 135	3294	2550 100	2500		
Colton Control Control	Jecilai	Compression	Yield Point	D-695	MPa {kgf/cm²}	-	-	-	-	-	-	135 {1370}	-	{1020}	-		
•	-	Strength	5% Deformation	D 000	MPa {kgf/cm²}	11.8 {120}	119 {1210}	107 {1090}	144 {1470}	-	100 {1020}	-	-	80 {820}	-		
	Ī	Izod Impact Stre	ength	D-256	J/m	160	77	35	55	18	75	64	29	49	314		
	Ì	Rockwell	R Scale	D 705	-	-	120	120	-	100	-	120	125	75	105		
		Hardness	M Scale	D-785	-	-	105	-	-	-	84	-	-	-	-		
9	S	Continuous Use		-	°C	-40~250	-50~250	Ambient Temp. ~ 250	Ambient Temp. ~ 250	Ambient Temp. ~ 190	Ambient Temp. ~ 220	Ambient Temp. ~ 120	Ambient Temp. ~ 100	Ambient Temp. ~ 120	Ambient Temp. ~ 50		
130		Melting Point		-	°C	327	340	340	340	275	280	252	-	225	-		
The state of the s	9	Deflection Temp.	0.45Mpa	D-648	°C	121	-	-	-	-	-	235	195	-	-		
5	5	Under Load	1.82Mpa		°C	55	155	195	230	108	116	-	-	68	85		
8	Ĕ	Linear Expansio		D-696	°C-1	1.0x10 ⁻⁴	5.0x10 ⁻⁵	5.0x10 ⁻⁵	2.5x10 ⁻⁵	2.6x10 ⁻⁵	5x10 ⁻⁵	4.0x10 ⁻⁵ (Vertical), 7.4x10 ⁻⁵ (Horizontal)	5.5x10 ⁻⁵	10.0x10 ⁻⁵	9.5x10 ⁻⁵		
Ē	\rightarrow	Thermal Conduc		D-177	W/m·K	0.25	0.25	0.92	0.24	-	-	0.51	-	-	-		
	231	Surface Resistiv	_	D-257	-	>1018	-	-	-	-	-	1015	-	-	-		
읈	eristi	Specific Volume		D-257	Ω·cm	>1018	1016	-	10 ⁵ ~10 ⁶	2.0×10 ¹⁶	1014	1015	10 ⁶ ~10 ⁹	5.0×10 ¹⁶	9.0×10 ¹⁵		
Electric	ract	Insulation Break		D-149	kV/mm	19 2.1	19	-	-	15	-	-	-	14	24		
	影	Dielectric Constant Dissipation Factor	10 ⁶ Hz 10 ⁶ Hz	D-150 D-150	-	<2x10 ⁻⁴	3.3 3x10 ⁻³	-	-	3.6 1.1x10 ⁻³	-	3.8 0.025	-	3.3	-		
	\rightarrow	Specific Gravity	TO TIZ	D-150 D-792	-	2.14~2.2	1.32	1.45	1.41	1.1810	1.43	1.63	1.39	1.31	1.05		
	- 1	Water	In water, Level	D-732 D-570	%	<0.01	0.5	-		-	-	-	-	-	0.3		
		Absorption Ratio		D-570	%	<0.01	0.14	0.06	-	0.02	0.01	0.1	0.03	0.09	-		
	- 1	Abrasion Resista		-	-	0	0	0	0	Δ	0	Δ	0	Δ	Δ		
		Sliding Propertie	es	-	-	0	Ö	0	Ö	Δ	0	Δ	0	0	Δ		
		Dynamic Friction	n Coefficient	-	-	0.04~0.25	-	0.24	0.21	-	-	-	-	-	-		
	,	Dimension Stab	ility	-	-	X~△	0	0	0	0	0	0	0	0	0		
Othors		Impact Resistan	ice	-	-	0	Δ	0	0	Δ	Δ	0	0	0	0		
-] ر	Flame Resistance	ce	[UL94]	-	(V-0 Equivalent)	(V-0 Equivalent)	(V-0 Equivalent)	(V-0 Equivalent)	(V-0 Equivalent)	(V-0 Equivalent)	НВ	(HB Equivalent)	(HB Equivalent)	-		
	- 1	Food Sanitation		-	-	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable		
		FDA Registration		-	-	Finished	Finished	-	-	-	-	-	-	-	-		
			Oil	-	-	0	0	0	0	0	0	0	0	0	O~A		
		Chemical Resistance	Acid	-	-	0	0	0	0	0	0	0	0	0	O~A		
			Alkali	-	-	0	0	0	0	0	0	×	×	O~A	0~△		
			Organic Solvent	-	-	0	0	0	0	0	0	0	○~△	○~△	×		

Listed values are for reference, not guaranteed.

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