

FORTRON® Grade Series

PPS(Polyphenylene Sulfide)
FORTRON®

Grade Compositions
(ISO)

Polyplastics

**A PBT Resin with
Outstanding Heat Resistance and Electrical Property**
PPS(Polyphenylene Sulfide)
FORTRON[®]

NOTES TO USERS

- All property values shown in this brochure are the typical values obtained under varying conditions prescribed by applicable standards and test method.
- This brochure has been prepared based on our own experiences and laboratory test data, and therefore all data shown here are not always applicable to parts used under different conditions. We do not guarantee that these data are directly applicable to the application conditions of users and we ask each user to make his own decision on the application.
- It is the users' responsibility to investigate patent rights, service life and potentiality of applications introduced in this brochure. Materials we supply are not intended for the implant applications in the medical and dental fields, and therefore are not recommended for such uses.
- For all works done properly, it is advised to refer to the appropriate **“Technical Catalog”** for specific material processing.
- For safe handling of materials we supply, it is advised to refer to the Material Safety Data Sheet **“MSDS”** of the proper material.
- This brochure is edited based on reference literatures, information and data currently available to us. So the contents of this brochure are subject to change without notice due to new data.
- Please contact our office for any questions about products we supply, descriptive literatures or any description in this brochure.

* “FORTRON[®]” is a registered trademark of Kureha Chemical Industry in Japan and other countries, and is a trademark used by Polyplastics Co with the owner's consent

FORTRON® is supplied in a variety of grades, for example , a reinforced grade which is reinforced by glass fibers to exhibit excellent characteristics, a self-extinguishing grade which is filled with a flame retardant and the one that has combined all these excellent characteristics.

FORTRON® not only has such excellent characteristics as low moisture absorption, high hert

distortion temperature, chemicals resistance, electrical properties and dimensional stability, but also has excellent processability which is an inherent characteristic of all thermoplastic polymers.

Taking advantages of these excellent characteristics, **FORTRON®** is finding increasing applications in electric and electronic appliances, automotive parts and many other industrial parts.

Property	Characteristic	UL94	Grade	Content of filler (%)
Unreinforced	Toughness	V-0	0220A9	Unfilled
Glass fibers filled	Standard, Low flash	V-0	1130A64	GF30%
			1140A64	GF40%
	Low warp, Low flash	V-0	1150A64	G50%
	Ultrahigh flow, Low flash	V-0	1140A7	GF40%
	High strength	V-0	1140A6	GF40%
	High toughness	V-0	1130A1	GF30%
			1140A1	GF40%
Glass fibers and Inorganic fillers filled	Dimensionally precise , Standard	V-0	6165A4/6165A6	GF/M65%
	Dimensionally precise , Low flash	V-0	6165A7	GF/M60%
	Low Warp, Higher gloss, Cosmetic	V-0	6465A62	GF/M60%
	Enhanced cosmetic, Low anisotropy	V-0	6660A42	GF/M60%
	Low temperature mold, Adhesion-enhanced	V-0	6565A6	GF/M65%
			6565A7	GF/M60%
Special	High impact	–	0220U9	Unfilled
		V-2	1130T6	GF30%
		–	6150T6	GF/M50%
	Low wear	V-0	6935A4	GF/M20% PTFE
			6345A4	GF30% PTFE
	Low wear	V-0	3130A1	Whiskers 30%
	Conductive, Low wear	V-0	2130A1	CF30%
	Conductive, Low wear	V-0	7140A4	CF30% PTFE
	Conductive	V-1	7340A4	GF/M40%

Item	Unit	Testing Method	Unreinforced
			V-0
			0220A9
			Toughness
Density	g/cm ³	ISO 1183	1.35
Water absorption (23°C, 24hrs)	%	ISO 62	0.02
Melt viscosity (310°C, 1,000/sec)	Pa • s	ISO 11443	500
Mold Shrinkage (80×80×2mmt)	Parallel	%	1.1
	Transverse	%	1.4
Stress at yield	MPa	ISO 527-1,2	90
Strain at break	%	ISO 527-1,2	15*
Flexural strength	MPa	ISO 178	140
Flexural modulus	MPa	ISO 178	3,800
Charpy notched impact strength	kJ/m ²	ISO 179/1eU	3.3
Temperature of deflection under load (1.80MPa)	°C	ISO '75-1	100
Coefficient of linear thermal expansion	Parallel	×10 ⁻⁵ /°C	4
	Transverse	×10 ⁻⁵ /°C	6
Flammability	—	UL94	V-0
Dielectric constant (1KHz)		IEC 60250	3.6
Dielectric constant (1MHz)		IEC 60250	3.6
Dielectric loss tangent (1KHz)		IEC 60250	0.0004
Dielectric loss tangent (1MHz)		IEC 60250	0.001
Dielectric breakdown strength (Short-time test: 3mm)	kV/mm	IEC 60243-1	19
Volume resistivity	Ω • cm	IEC 60093	2×10 ¹⁶
Surface resistivity	Ω	IEC 60093	7×10 ¹⁶
Tracking resistance	V	IEC 60112	125

* Nominal strain at break

- All figures in the table are the typical values of the material and not the minimum values of the material specifications.
- For qualified values of UL (Underwriters Laboratories Inc.) refer to the yellow card (File No.E 109088) issued by UL.

Item		Unit	Testing Method	Glass fibers filled						
				V-0						
				1130A64	1140A64	1150A64	1140A7	1140A6	1130A1	1140A1
				Standard, Low flash		Low warp, Low flash	Ultrahigh flow, Low flash	High strength	High toughness	
Density		g/cm ³	ISO 1183	1.57	1.66	1.75	1.66	1.66	1.57	1.66
Water absorption (23°C, 24hrs)		%	ISO 62	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Melt viscosity (310°C, 1,000/sec)		Pa • s	ISO 11443	240	240	260	160	260	350	380
Mold Shrinkage (80×80×2mmt)	Parallel	%		0.4	0.3	0.4	0.3	0.3	0.3	0.3
	Transverse	%		0.7	0.7	0.6	0.7	0.7	0.6	0.7
Stress at yield		MPa	ISO 527-1,2	170	200	145	170	210	170	185
Strain at break		%	ISO 527-1,2	1.9	1.8	1.2	1.4	1.9	2.0	1.8
Flexural strength		MPa	ISO 178	230	280	215	240	290	245	260
Flexural modulus		MPa	ISO 178	10,500	14,000	16,000	14,000	14,000	10,000	13,000
Charpy notched impact strength		kJ/m ²	ISO 179/1eU	7.0	9.5	5.0	9.0	11.0	10.0	10.0
Temperature of deflection under load (1.80MPa)		°C	ISO '75-1	265	270	270	275	270	260	265
Coefficient of linear thermal expansion	Parallel	×10 ⁻⁵ /°C	ISO 11359-2	2	2	2	2	2	2	2
	Transverse	×10 ⁻⁵ /°C		4	4	3	4	4	4	4
Flammability		—	UL94	V-0	V-0	V-0	V-0	V-0	V-0	V-0
Dielectric constant (1KHz)			IEC 60250	4.2	4.5	4.6	4.3	4.2		4.6
Dielectric constant (1MHz)			IEC 60250	4.2	4.5	4.7	4.3	4.2		4.6
Dielectric loss tangent (1KHz)			IEC 60250	0.001	0.001	0.002	0.001	0.001		0.002
Dielectric loss tangent (1MHz)			IEC 60250	0.002	0.002	0.003	0.002	0.002		0.002
Dielectric breakdown strength (Short-time test: 3mm)		kV/mm	IEC 60243-1	15	16	16	15	16	16	15
Volume resistivity		Ω • cm	IEC 60093	8×10 ¹⁵	4×10 ¹⁶	2×10 ¹⁶	4×10 ¹⁵	4×10 ¹⁶	3×10 ¹⁶	1×10 ¹⁶
Surface resistivity		Ω	IEC 60093	8×10 ¹⁶	3×10 ¹⁷	3×10 ¹⁷	1×10 ¹⁵	3×10 ¹⁷	2×10 ¹⁷	8×10 ¹⁶
Tracking resistance		V	IEC 60112	125	150	125	125	150	150	150

* Nominal strain at break

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Item		Unit	Testing Method	Glass fibers and Inorganic fillers filled					
				V-0					
				6165A4 6165A6	6165A7	6465A62	6660A42	6565A6	6565A7
				Dimensionally precise, Standard, Low flash	Dimensionally precise, Low flash	Low warp, Higher gloss, Cosmetic	Enhanced cosmetic, Low anisotropy	Low temperature mold, Adhesion-enhanced	
Density		g/cm ³	ISO 1183	1.98	1.89	1.87	1.86	1.96	1.89
Water absorption (23°C, 24hrs)		%	ISO 62	0.01	0.01	0.01	0.01	0.01	0.01
Melt viscosity (310°C, 1,000/sec)		Pa • s	ISO 11443	400/300	300	200	320	280	200
Mold Shrinkage (80×80×2mmt)	Parallel	%		0.2	0.2	0.4	0.7	0.3	0.3
	Transverse	%		0.5	0.6	0.7	0.7	0.5	0.5
Stress at yield		MPa	ISO 527-1,2	130	155	140	90	125	130
Strain at break		%	ISO 527-1,2	1.1	1.2	1.5	1.1	1.0	1.1
Flexural strength		MPa	ISO 178	190	220	215	140	165	180
Flexural modulus		MPa	ISO 178	18,300	17,300	14,400	13,200	18,200	17,800
Charpy notched impact strength		kJ/m ²	ISO 179/1eU	4.5	5.5	6.0	2.8	4.5	5.0
Temperature of deflection under load (1.80MPa)		°C	ISO '75-1	270	270	270	260	275	275
Coefficient of linear thermal expansion	Parallel	×10 ⁻⁵ /°C	ISO 11359-2	1	1	2	2	1	1
	Transverse	×10 ⁻⁵ /°C		2	3	3	2	3	3
Flammability		—	UL94	V-0	V-0	V-0	V-0	V-0	V-0
Dielectric constant (1KHz)			IEC 60250	5.8	5.3	5.2	5.3	5.4	4.9
Dielectric constant (1MHz)			IEC 60250	5.8	5.4	5.2	5.2	5.4	4.7
Dielectric loss tangent (1KHz)			IEC 60250	0.002	0.001	0.002	0.006	0.013	0.014
Dielectric loss tangent (1MHz)			IEC 60250	0.002	0.002	0.002	0.004	0.005	0.006
Dielectric breakdown strength (Short-time test: 3mm)		kV/mm	IEC 60243-1	14	14	20	13	19	14
Volume resistivity		Ω • cm	IEC 60093	8×10 ¹⁵	2×10 ¹⁵	3×10 ¹⁶		2×10 ¹⁶	7×10 ¹⁵
Surface resistivity		Ω	IEC 60093	9×10 ¹⁵	8×10 ¹⁶	1×10 ¹⁶		2×10 ¹⁶	1×10 ¹⁷
Tracking resistance		V	IEC 60112	200	175	125	175	225	175

* Nominal strain at break

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Item		Unit	Testing Method	Special				
					V-2		V-0	
				0220U9	1130T6	6150T6	6935A4	6345A4
				High impact			Low wear	
Density		g/cm ³	ISO 1183	1.31	1.52	1.71	1.59	1.68
Water absorption (23°C, 24hrs)		%	ISO 62	0.01	0.01	0.01	0.02	0.02
Melt viscosity (310°C, 1,000/sec)		Pa • s	ISO 11443	500	400	240	260	220
Mold Shrinkage (80×80×2mmt)	Parallel	%		1.1	0.3	0.2	0.6	0.3
	Transverse	%		1.6	0.7	0.6	0.7	0.7
Stress at yield		MPa	ISO 527-1,2	75	155	155	120	155
Strain at break		%	ISO 527-1,2	21*	2.3	1.7	2.1	1.8
Flexural strength		MPa	ISO 178	120	220	205	175	215
Flexural modulus		MPa	ISO 178	3,400	8,800	11,200	7,500	10,300
Charpy notched impact strength		kJ/m ²	ISO 179/1eU	7.0	12.0	8.0	4.5	8.5
Temperature of deflection under load (1.80MPa)		°C	ISO '75-1	95	255	265	250	265
Coefficient of linear thermal expansion	Parallel	×10 ⁻⁵ /°C	ISO 11359-2	4	2	2	2	2
	Transverse	×10 ⁻⁵ /°C		6	4	4	5	4
Flammability		—	UL94	—	V-2	—	V-0	V-0
Dielectric constant (1KHz)			IEC 60250	3.5	3.9		3.7	4.2
Dielectric constant (1MHz)			IEC 60250	3.5	3.9		3.7	4.2
Dielectric loss tangent (1KHz)			IEC 60250	0.001	0.003		0.004	0.001
Dielectric loss tangent (1MHz)			IEC 60250	0.002	0.004		0.002	0.002
Dielectric breakdown strength (Short-time test: 3mm)		kV/mm	IEC 60243-1	18	18		18	20
Volume resistivity		Ω • cm	IEC 60093	2×10 ¹⁶				4×10 ¹⁵
Surface resistivity		Ω	IEC 60093	8×10 ¹⁵				8×10 ¹⁵
Tracking resistance		V	IEC 60112	125	125		125	125

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Item		Unit	Testing Method	Special			
				V-0			V-1
				3130A1	2130A1	7140A4	7340A4
				Low Wear	Conductive, Low wear	Conductive, Low wear	Conductive
Density		g/cm ³	ISO 1183	1.62	1.44	1.49	1.69
Water absorption (23°C, 24hrs)		%	ISO 62	0.02	0.02	0.01	0.03
Melt viscosity (310°C, 1,000/sec)		Pa • s	ISO 11443	200	380	280	340
Mold Shrinkage (80×80×2mmt)	Parallel	%		0.4	0.1	0.1	0.3
	Transverse	%		1.0	0.6	0.5	0.7
Stress at yield		MPa	ISO 527-1,2	125	215	180	135
Strain at break		%	ISO 527-1,2	1.7	1.3	1.0	1.5
Flexural strength		MPa	ISO 178	230	300	270	195
Flexural modulus		MPa	ISO 178	11,500	21,200	22,800	12,000
Charpy notched impact strength		kJ/m ²	ISO 179/1eU	2.5	5.5	4.5	5.0
Temperature of deflection under load (1.80MPa)		°C	ISO '75-1	210	265	270	265
Coefficient of linear thermal expansion	Parallel	×10 ⁻⁵ /°C	ISO 11359-2	2	1	1	2
	Transverse	×10 ⁻⁵ /°C		4	4	4	4
Flammability		—	UL94	V-0	V-0	V-0	V-1
Dielectric constant (1KHz)			IEC 60250	7.6			
Dielectric constant (1MHz)			IEC 60250	6.4			
Dielectric loss tangent (1KHz)			IEC 60250	0.021			
Dielectric loss tangent (1MHz)			IEC 60250	0.096			
Dielectric breakdown strength (Short-time test: 3mm)		kV/mm	IEC 60243-1	9			
Volume resistivity		Ω • cm	IEC 60093	9×10 ¹⁵	2000	800	100
Surface resistivity		Ω	IEC 60093	1×10 ¹⁶	200	200	90
Tracking resistance		V	IEC 60112	150			

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ISO 9001:2000
Certified
JQA-1283



ISO14001 Certified
JQA-EM0337 Research & Development Div.
JQA-EM0414 Fuji Plant

* This registered mark does not guarantee
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