



Shin-Etsu Film

OPP Capacitor Film

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Shin-Etsu Capacitor film is hazy polypropylene film for capacitor use that was first developed globally for commercial purposes. With our unified management system, encompassing all steps from raw material procurement through to production and shipping, we offer stable supply to our customers. We use carefully selected high-purity polypropylene resin and an inflation process in the simultaneous biaxial orientation production method. It has excellent characteristics for dielectric film. One major feature is the network structure of evenly distributed irregularities on film surface. This structure facilitates oil penetration of film surface and improves efficiency of insulating oil impregnation of capacitor elements. This

network structure was created with proprietary Shin-Etsu technology that makes use of the crystalline transformation behavior of polypropylene, unlike products manufactured with processing additives or secondary surface processing. Our film offers consistent quality and the high reliability required of capacitor materials.

Thanks to its superior oil-impregnability, Shin-Etsu Capacitor film enables the production of today's all-film type capacitors that do not use capacitor paper. Shin-Etsu has also earned high acclaim for its contribution to greater reliability, higher capacity, and miniaturization of power capacitors.



■ Features

1. Diverse variety

The physical and electrical properties of polypropylene film after impregnation with insulating oil vary according to the type of insulating oil used and the impregnation conditions and other conditions of the capacitor production process. Therefore, the required properties of PP film will differ according to the capacitor production conditions and design concept.

Shin-Etsu Film's product lineup includes the standard R Type, and RH Type and LR Type, whose properties differ from those of R Type. We have a system in place to offer the optimum products tailored to diverse customer needs.

2. A comprehensive evaluation system

We have facilities to evaluate various properties of capacitor film.

In order to maintain the highest standard of quality, results of evaluation have been reflected promptly to production.

■ Product Type

Type	Feature	Application	Voltage
R	Standard type	For all-PP capacitors	high- and extra-high-voltage
RH	Low heat-shrink type		
LR	Low space factor type		
S	Plain type	For PP-CP capacitors	high- and extra-high-voltage
CRA	Hazy surface corona treatment	Metallized film capacitors	low- and high-voltage
CRB	Smooth surface corona treatment		

■ Thickness

Item	Nominal Thickness (μm)									
	7.4W	9.0W	10.0W	11.0W	11.8W	12.7W	13.6W	14.5W	16.3W	27.3W
tw										

tw: thickness by weight method

If you need thicknesses not listed above, please send your message from "Contact Us" section of our website.

■ Roll Dimensions

Item	Dimension	
I.D.*1	76.0±1.0 mm	
O.D.*2	210 mm, 250 mm, 300 mm, max 500 mm	
Film width (tolerance)	30–200 mm (±0.3 mm)	202–1400 mm (-0, +1.0 mm)

*1 I.D.: inner diameter of core

*2 O.D.: outer diameter of roll

■ Shin-Etsu Capacitor FILM R-TYPE (Typical Properties)

Thickness	Weight Method	μm	7.4W	9.0W	10.0W	11.0W	11.8W
Haze	AVE.	%	10	13	18	23	26
Space Factor	AVE.	%	8	9	9	9	10
Surface Roughness (Ra)		μm	0.20	0.18	0.27	0.23	0.29
Tensile Strength	MD	MPa	170	172	169	169	171
	CMD	MPa	230	230	214	215	225
Elongation at break	MD	%	138	144	149	156	152
	CMD	%	74	82	84	87	84
Heat Shrinkage (100°C×10 min)	MD	%	2.6	2.7	1.8	2.2	1.8
	CMD	%	1.4	1.7	1.6	1.8	1.9
Heat Shrinkage (120°C×15 min)	MD	%	5.0	5.1	4.6	4.2	4.4
	CMD	%	6.4	6.8	6.7	6.8	6.9
Electric Strength	AVE.	VDC/μm	515	595	597	608	611
	Min.	VDC/μm	444	549	545	560	564
Electrical weak spots (300 VDC /μm)		count/m ²	0.144	0.054	0.017	0.002	0.002
Permittivity (Dielectric Constant)		—	2.20	2.20	2.20	2.20	2.20
Volume Resistivity		Ω·cm	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶
Dissipation Factor (tanδ)		%	<0.01	<0.01	<0.01	<0.01	<0.01
Density		g/cm ³	0.905	0.905	0.905	0.905	0.905
Ash Content		ppm	<30	<30	<30	<30	<30
Chlorine Content		ppm	<2.5	<2.5	<2.5	<2.5	<2.5

(The above values are measured values, not standard values.)

■ Shin-Etsu Capacitor FILM R-TYPE (Typical Properties)


Thickness	Weight Method	μm	12.7W	13.6W	14.5W	16.3W	27.3W
Haze	AVE.	%	29	30	34	35	43
Space Factor	AVE.	%	10	10	10	10	10
Surface Roughness (Ra)		μm	0.24	0.32	0.35	0.48	0.93
Tensile Strength	MD	MPa	171	168	172	163	152
	CMD	MPa	223	217	218	208	177
Elongation at break	MD	%	158	154	156	159	151
	CMD	%	88	83	89	89	88
Heat Shrinkage (100°C×10 min)	MD	%	1.9	1.9	2.0	1.5	2.7
	CMD	%	1.8	2.0	1.7	1.8	1.6
Heat Shrinkage (120°C×15 min)	MD	%	4.4	4.1	4.4	4.1	4.1
	CMD	%	6.9	6.8	6.7	6.4	6.7
Electric Strength	AVE.	VDC/μm	618	622	625	624	589
	Min.	VDC/μm	574	574	578	576	560
Electrical weak spots (300 VDC /μm)		count/m ²	0.002	0.002	0.002	0.002	0.001
Permittivity (Dielectric Constant)		—	2.20	2.20	2.20	2.20	2.20
Volume Resistivity		Ω·cm	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶	5×10 ¹⁶
Dissipation Factor (tanδ)		%	<0.01	<0.01	<0.01	<0.01	<0.01
Density		g/cm ³	0.905	0.905	0.905	0.905	0.905
Ash Content		ppm	<30	<30	<30	<30	<30
Chlorine Content		ppm	<25	<25	<25	<25	<25

(The above values are measured values, not standard values.)

■ Measurement Method

Properties	Item	Unit	Measurement method
Surface Properties	Haze	%	ISO 14782
	Space Factor	%	IEC 60674-3-1
	Surface Roughness	μm	ISO 4287
Mechanical Properties	Tensile Strength	MPa	IEC 60674-3-1
	Elongation at break	%	IEC 60674-3-1
	Heat Shrinkage	%	IEC 60674-3-1
Electrical Properties	Electric Strength	V _{DC} /μm	IEC 60674-3-1
	Electrical Weak Spots	count/m ²	Contact electrode Method
	Permittivity (Dielectric Constant)	—	IEC 60674-3-1
	Volume Resistivity	Ω·cm	IEC 60674-3-1
	Dissipation Factor (tanδ)	%	IEC 60674-3-1
General Properties	Density	g/cm ³	ISO 1183
Chemical Properties	Ash Content	ppm	ISO 2114
	Chlorine Content	ppm	Ion Chromatography

■ Slit roll label

 Shin-Etsu POLYPROPYLENE FILM			
Type	R	LotNo.	31820111-E12345
Thickness (μm)	15.0W	Length (m)	2,450
Width (mm)	165	Net Weight (kg)	5.5
01		43-2-1	
Made in Japan			

■ Storage and Handling Precautions

- Store out of direct sunlight in a cool place with low humidity.
 - Do not use film more than six months after delivery date.
- The film may deteriorate, causing problems in use.

Quality and Environment

Shin-Etsu Film Takefu plant acquired certification of ISO 9001 in 2003 and ISO 14001 in 2007.

We serve and contribute to customers all over the world.



ISO 9001, ISO 14001
Shin-Etsu Film Takefu plant
JCQA-1313
JCQA-E-0812



MS
CM003

Contact Shin-Etsu Film for information about our OPP Capacitor films.

Shin-Etsu Film Co., Ltd.

Stage Uchikanda, 3-8, Uchikanda 1-chome, Chiyoda-ku, Tokyo, 101-0047, Japan

TEL +81-3-3259-1061 FAX +81-3-3259-1064

<https://www.shinetsu-film.co.jp>

● The data presented in this catalog may not be relied upon to represent standard values. Shin-Etsu Film reserves the right to change the data and information in this catalog without notice.