

SUPERIOTM UT

SUPERIO UT is a high heat-resistant engineering plastic films developed with Mitsubishi Plastics' film-forming technology using ULTEM (Polyether-imide resin) of GE Plastics (USA).

There are two types of product, conventionally 'E-type', and new product 'F-type'. F-type is superior to E-type in solvent and heat resistance under the stress. It is a heat-resistant insulation material that lends itself to use for the applications that are required solvent resistance.

We have an assortment of SUPERIO UT that developed and commercialized for the market for customer needs such as heat resistant labels, self-adhesive tapes.

■ Characteristics

1. Mechanical properties

- Excellent mechanical properties as an engineering plastics. (High tensile strength, crack-resistant)

2. Electrical properties

- Stable electrical properties (good low frequency characteristic and low temperature dependence)

3. Heat resistance

- Superior Glass transition temperature among the thermoplastic resin which is 200°C or more.
- When heated up to 210°C, change in dimension is small.

4. Chemical resistance

- Excellent chemical resistance against aliphatic hydrocarbons, acid and dilute alkali.
- Especially, F-type has high chemical resistance against Polar solvent.

5. Weathering resistance

- Good ultraviolet resisting property

6. Combustion resistance

– Acquired UL-94VTM-0 (Thickness: 25 μm ~ 250 μm)

– Low smoking value (The smaller level than the smoking value of other plastics films for general use)

7. Heat moldability

– Capable of forming by heating.

■ Applications

1. Diaphragm for Speaker

Since this product has a good acoustic properties came from its specific modulus and $\tan \delta$, and also has excellent heat resistance, it is used for portable telephones and car audio sets. Black color coated, aluminum and titanium spattering films are also available.

2. Insulating material

– Motors

– Motors for refrigerators

– Transformers

– Generators

– Wire sheathes

3. Circuit Board

– Membrane switches,

– Flat Heater

– Connectors

4. Heat resistant label and tapes

As this product has a good dimensional stability under heat and solvent, and is acid and alkali resistance, it is used for heat-resistant labels for anode coating, electronics material and heat-resistant tape of TAB.

■ Specifications

Type Grade	Thickness (μm)		Standard width (mm)		Standard length (m)	
	E	F	E	F	E	F
7	—	7	—	480	—	1000
10	—	10	—	530	—	2200
15	—	15	—	530	—	2100
20	—	20	—	530	—	2000
25	—	25	—	530	—	2200
38	38	38	530	550	850	850
50	50	50	530	530	850	850
75	75	75	530	540	850	500
100	100	100	530	570	450	500
125	125	125	530	570	300	300
150	—	150	—	580	—	200
188	—	188	—	550	—	220
250	—	250	—	550	—	250
300	—	300	—	580	—	200

Physical Properties (Thickness:50 μm)

Items		Units	E- type	F- type	Polyester	Polyimide	Test method
Thermal Properties	Glass transition temperature	°C	216	226	69	—	DSC
	Electrically	°C	—	180	105	220	UL-746B
	Mechanically	°C	—	160	105	220	UL-746B
	Coefficient of liner thermal expansion	cm/cm/°C	4.9×10^{-5}	5.2×10^{-5}	2.0×10^{-5}	2.0×10^{-5}	ASTM D-696
	Thermal shrinkage	%	0.2	0.2			200°C × 30min
Mechanical Properties	Tensile Strength	Kpa	117	122	215	235	JIS C-2318
		(kgf/mm ²)	(12)	(12.5)	(22)	(24)	
	Elongation At break	%	120	100	120	70	JIS C-2318
	Coefficient of Elasticity	Mpa	3138	2844	4903	3923	ASTM D-638
		(kgf/mm ²)	(320)	(290)	(500)	(400)	

Electrical Characteristics	Dielectric Breakdown Voltage	KV	10.0	10.5	9.0	10.8	JIS C-2318
	Volume resistivity	$\Omega \cdot \text{cm}$	10^{17}	10^{17}	10^{17}	10^{18}	JIS C-2318
	Dielectric Constant	—	3.5	3.0	3.4	3.5	JIS C-2318
	Dielectric Dissipation Factor	—	1.3×10^{-3}	1.8×10^{-3}	4.0×10^{-2}	3.0×10^{-3}	JIS C-2318
Other Properties	Density	g/cm^3	1.27	1.27	1.40	1.42	ASTM D-1505
	Water Absorption	%	0.4	0.6	0.3	2.9	ASTM D-570
	Flammability		VTM-O	VTM-O	—	V-O	UL-94

* Upper test report is not a guarantee value, but a typical value.

Thickness: 50 μm

■ Solvent resistance test (stress relaxation)

Items		Ruptured time and status							
		58Kpa (Stress)				215Kpa (Stress)			
Solvent		E-type (Rare material)		F-type (Rare material)		E-type (Rare material)		F-type (Rare material)	
Hydrocarbon	Toluene	6min	rupture	100hr	16.7%	3min	rupture	3min	rupture
	Xylene	15min	rupture	100hr	57.9%	78sec	rupture	100hr	28.5%
	Ethylbenzene	100hr	53.2%	100hr	56.5%	5.3hr	rupture	100hr	24.6%
	Toluene(50)/ Xylene(50)	5hr	rupture	100hr	32.8%	30sec	rupture	1hr	rupture
Ketone	MEK (Methyl ethyl ketone)	15min	rupture	50hr	6.7%	15sec	rupture	20hr	1.5%
	Acetone	20hr	30.5%	50hr	6.5%	2hr	5.6%	5hr	3.4%
	Isophorne	3.4hr	rupture	1hr	rupture	48sec	rupture	23min	rupture
Alcohol	Methanol	20hr	5.3%	10hr	13%	20hr	16.9%	20hr	17%
Ester	Ethyl acetate	100hr	13.6%	100hr	41.1%	50hr	4.7%	20hr	1.9%
Others	In the air	100hr	60.2%	100hr	62.2%	100hr	62.9%	100hr	65.9%

*Above test report is not a guarantee value but a result of a immersion test under static condition. At the occasion of using, test and evaluate with actual solvent.

■ Important Safeguards

Directions for safe use are prepared for the purpose of maintaining the safety of customers and your clients and property. The products carrying warning and caution, please read following details.



If this product is mishandled in defiance of this sign, you may have a risk of death or serious injury.

- Absolutely do not implant, insert in the body.
- Never use for any applications for which the material will be left in the body.
- In case of using for medical devices, foodstuff, other special purpose applications, please test and make certain that you can do so safely.



If this product is mishandled in defiance of this sign, you may have a risk of serious injury and property damage.

- During forming and carrying, wear proper protective gear to prevent possible injury to hands and fingers.
- Decomposition product, low molecular, residual solvent will form on heat forming process. Please provide local ventilation facility to exhaust them.
- Prior to disposal, confirm the law about waste-disposal and cleaning work. If you dispose of the material, entrust recognized industrial waste-disposal service or city's Sanitation Bureau.
- The burning of waste needs a refuse incinerator and confirm the law about an anti-pollution.