



EVERSUN Compatibilizer

Eversun Products

|
Silicone Type
Flame Retardant (FR)



Company Introduction



Eversun Polycarbonate Technology Co., Ltd. is a subsidiary of Eversun Global Group Co., Ltd. We participated in PC, PC alloy industry for more than 10 years. We provide technical data, application and formulation to our customer for different solution and application in order to meet product requirement.

Our company's products are mainly used in the communications electronics industry, the automotive industry and the home / office appliances industry. We believe that keeping keen on research and development can maximize the contribution to the engineering plastic market and also can facilitate the development progress in the industry.

We believe "Conglomerate elites around the world, promoting science and technology of the country"

Create, share and win together!



*Sincere cooperation •
Create Value*

Silicone type FR

Long lasting flame retardant function, prevent FR migration effect



Halogen-free flame retardant with good dispersion property, low dosage to achieve high performance

Change to charcoal quickly, improve performance

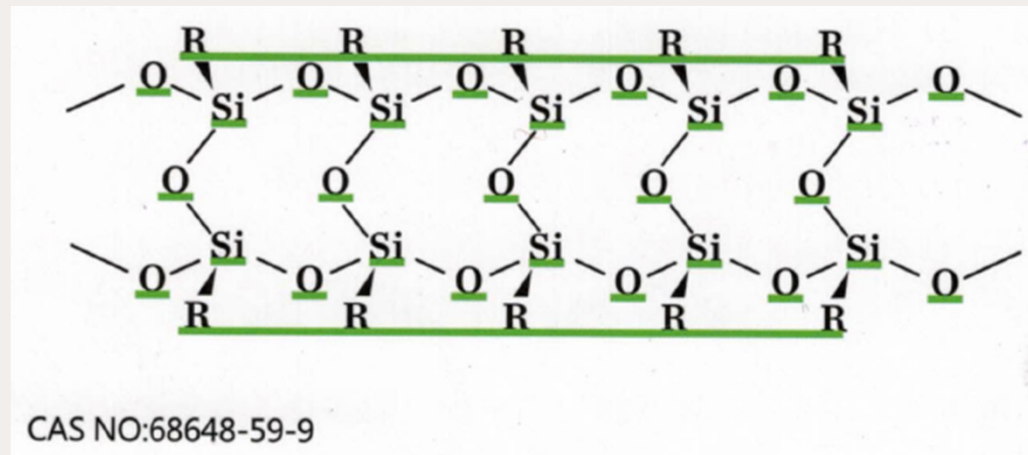


Excellent weather resistance and hydrolysis resistance

Silicone Type FR Structure

Silicones are flame-retardant by nature, silicones exposed to elevated temperatures under oxygen will leave behind an inorganic silica residue. It form a shielding effects, which acts as a mass transport barrier delaying the volatilization of decomposition products. Therefore, it reduces the amount of volatiles available for burning in the gas phase and the amount of heat that feeds back to the polymer surface. Then cut the source of fire.

Silicone Type
FR



Structure of the new type Silicone FR

Silicone Type FR Specification



**Stable
White powder form**

Appearance	white powder
Silicone content (%)	30-70
pH	6.5-7.0
Effective Content (w/w%)	99.6%
Melting point	95-115°C
Decompose temperature (1%)	450°C
Solubility	partially soluble
Storage and Stability	Dry & Room Temperature

Si FR series PC application data

PC application data - Dosage

Item	FR-SI9501	FR-SI9805		FR-SI-XF		
FR (UL 94V-0)	1.6mm	1.6mm	1.0mm	1.6mm	1.0mm	0.43mm
Dosage%	0.2-0.25%	0.1-0.12%	0.2-0.3%	0.10%	0.2-0.3%	0.6-1%
Dosage% Anti-dripping Agent	0.20%	0.20%	0.25%	0.20%	0.25%	0.3-0.4%
PC Type			MI: 8-10		MI: 8-10	MI: 5-7

Silicone Type
FR

Low dosage
Good performance

Product
FR-SI
Series

Si FR series PC application data

PC application data – FR performance

		SI9501				SI9805				SI-XF			
Dosage (w/w)%		0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.4
Testing Strip (x2, t max) (2.0mm)		10	10	9	8	9	8	6	9	8	8	7	7
vertical dripping		No	No	No	No	No	No	No	No	No	No	No	No
FR Class	1.6 mm	55	45	46	40	34	38	34	32	35	24	35	37
	2.0 mm	39	38	40	37	39	27	27	29	32	32	28	29
	3.2 mm	39	47	45	39	49	48	37	39	26	38	22	40
Burning Process		Charcoal				Charcoal				Charcoal			

Formulation: PC (1250Y) + SI FR (0.2%) + PT202 (0.2%)

Silicone Type
FR

Product
FR-SI
Series

Good
FR performance

Si FR series PC application data

PC application data – Physical properties

	MI (Melt Flow Rate)	IZOD Impact Strength Charpy	Flexural Strength	Flexural Modulus	Tensile Strength	Elongation at Break
Unit	g/10 min	KJ/m ² (23°C)	MPA	MPA	MPA	%
PC (blank)	9.3	83	91.8	2198	66.9	128
PC+FR-SI9501	9.7	78.7	91.5	2163	64.9	115

Silicone Type
FR

Product
FR-SI
Series

Maintain
Physical Properties

PC: PC110
FR-SI9501, 0.25%
PTFE: 0.2%

40 mm co-rotated twin screw extruder (L/D=40)

Temperature: 260-280°C

Screw rotation speed: 260 rpm

80 ton injection molding machine

Drying temperature: 120°C Drying time: 4h

Cylinder temperature: 290-300 °C Mold temperature: 90 °C

Si FR series PC/ABS application data

PC/ABS application data – Example formulation 2.0mm UL94 V-0

Item	Content%	Material used
PC	80%	WM:20000
ABS	20%	15A1
TPP series w/w%	8-10%	PX-200
FR-SI series w/w%	0.2-0.3%	
FR-PT203 (anti-dripping) w/w%	0.30%	PTFE=60%

Silicone Type
FR

Product
FR-SI
Series

Excellent
performance

- **FR-SI series need only 0.2-0.3%**
- **Reduce dosage of BDP/RDP/PX-200 up to 30-35%**
- **Improve HDT and IZOD impact**
- **When ABS is less than 10%, improvement is more outstanding**
- **If FR-SI series make into masterbatch, performance will be facilitated**

Si FR series PC application data

PC application data – Performance SI vs Non-halogen FR With aging test

UL94 V-0 @1.6mm

	SI Series						Other halogen-free FR					
	water bath (70°C)			oven (90°C)			water bath (70°C)			oven (90°C)		
Time (h)	T1	T2	Dripping	T1	T2	Dripping (strip count)	T1	T2	Dripping	T1	T2	Dripping (strip count)
6	16	25	-	20	21	-	21	18	-	24	18	-
12	17	21	-	27	16	-	31	14	5	34	23	4
18	18	17	-	28	19	-	21	15	5	24	36	4
24	13	28	1	15	25	1	47	24	5	27	11	4

PC (WM:20000) + FR-SI series (0.2%) + PTFE (0.2%)

Silicone Type
FR

Product
FR-SI
Series

Excellent
performance
even after aging

Si FR series summary

Silicone Type
FR

- High temperature resistant
- Long lasting FR properties
- Charcoal residue, good shielding effect
- Low dosage, little effect to physical properties
- Non halogen and no Phosphorus content, environmental friendly
- Can be used with other FR to improve performance and reduce dosage, reduce cost

Long lasting flame
retardant function,
prevent FR migration
effect

Change to charcoal
quickly, improve
performance

Halogen-free flame retardant
with good dispersion property,
low dosage to achieve high
performance

Excellent weather resistance
and hydrolysis resistance

Product
FR-SI
Series

Excellent
performance

Eversun Partners



Eversun Global Contact Information





Thanks

Service from the heart