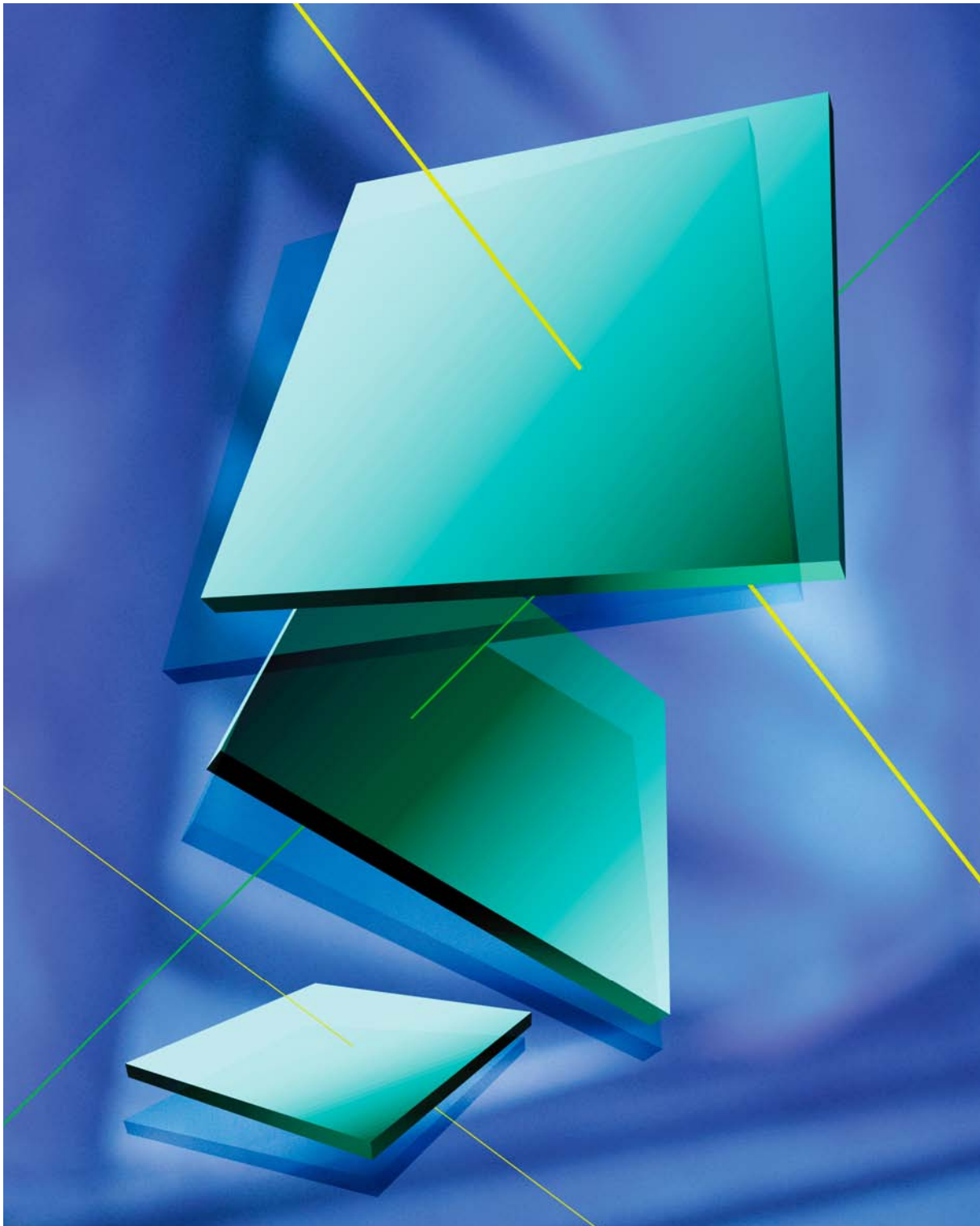
Shin-Etsu

Shin-Etsu Silicone

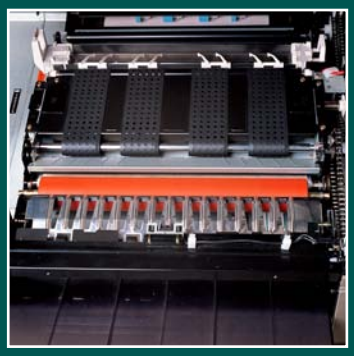
Electrically Conductive Silicone Rubber Products

EC Series



Advanced technologies to meet diverse user needs.

The products in our EC Series have the superior qualities of silicone rubber, plus electrical conductivity thanks to the addition of carbon and other conductive materials. They are available in many forms, including sheets, tapes, O-rings and other desired shapes; and are ideal for electromagnetic shielding for office equipment and medical equipment, and as antistatic rubber for electric and electronic equipment.



Features

The products in our EC Series offer electrical conductivity in addition to the many characteristic features of silicone rubber.

They are superior to electrically conductive synthetic rubbers in a number of ways, especially:

- high electrical conductivity
- high thermal conductivity (excellent radiative properties)
- heat resistance
- cold resistance
- weatherability.

And compared to metallic conductors, the products in our EC Series offer

- Ease of fabrication and suitability for mass production
- Low density and high elasticity, with excellent flexibility and resistance to corrosion
- Many degrees of conductivity to choose from.

Primary Applications

The products in our EC Series can be used for electromagnetic shielding, antistatic rubber, contact points, connectors, and an array of other applications.

- Electromagnetic shielding:
  Packing for computer housings, radios, medical equipment, video signal converters; construction gaskets; computer room window seals
- Electrodes:
  polarizing electrodes of ceramic oscillators, medical equipment electrodes
- Heat transfer medium: holding & cooling of compound semiconductor wafers
- Connections: spring contacts, alternative to soldering
- For changing electrical resistance: sensor components
- Conductive & semiconductive rolls: office equipment

Typical Properties

■ Material properties

Parameter \ Grade		EC-A	EC-BL	EC-BM	EC-BH	EC-TC
Appearance		tan	black	black	black	black
Specific gravity at 23°C		1.92	1.11	1.20	1.17	1.28
Hardness*1 Durometer A		74	66	70	65	75
Tensile strength*1	MPa	2.5	5.7	7.0	5.2	4.4
Elongation at break*1	%	160	300	170	250	120
Tear strength*1	kN/m	8.0	9.2	15	7.0	9.5
Resilience	%	45	42	50	54	40
Compression set at 150°C/22h	%	30	27	24	20	40
Volume resistivity	Ω·m	8×10^{-5}	0.009	0.025	0.05	0.007
Thermal conductivity	W/m·°C	1.0	0.38	0.63	0.57	0.72
Flame retardancy	UL94	—	—	V-0*2	V-0*2	V-1*2
Special features		High conductivity type	General purpose (conductivity: BL>BM>BH)			High thermal conductivity type
Molding methods	Molded products	Available	Available	Available	Available	Available
	Extrusion molded products	Not available	Available	Available	Available	Available
	Sheet products	Available	Available	Available	Available	Not available

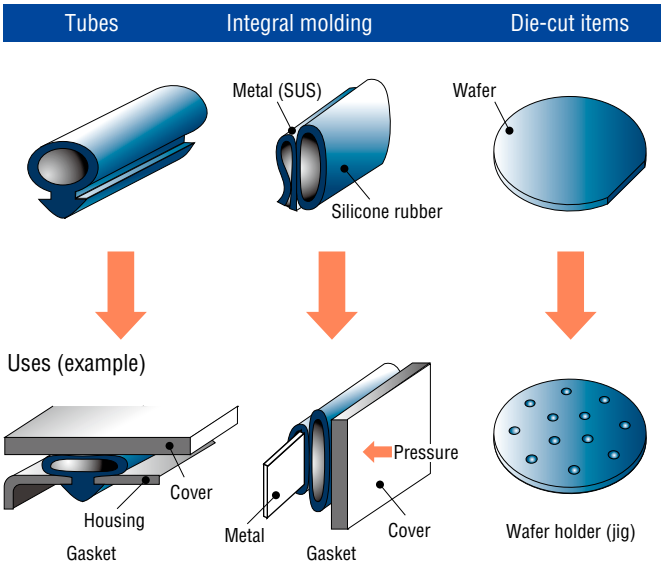
*1: 2-mm thick sheet, measured in accordance with JIS K 6249
*2: material thickness=0.15 mm minimum

(Not specified values)

■ Shapes

Shin-Etsu EC series products can be fabricated into irregular, complex items; items die-cut from sheets; O-rings; and others as your needs require.

Shapes (example)



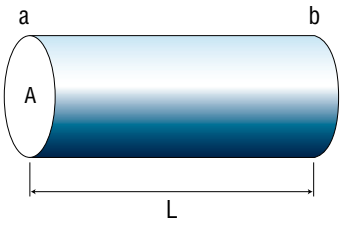
■ Measuring volume resistivity

For a homogeneous conductor, like that shown in the illustration below, resistance R between a and b can be expressed by the following formula:

$$R = \rho \frac{L}{A}$$

(L: length between a and b
A: cross section of conductor)

Volume resistivity (specific resistance) is represented by ρ. At a constant temperature, ρ will be a specific value, regardless of the shape of the conductor.
The volume resistivity of all EC Series conductive silicone rubber products was measured in accordance with SRIS-2301 (SRIS: Society of Rubber Industry Standard).

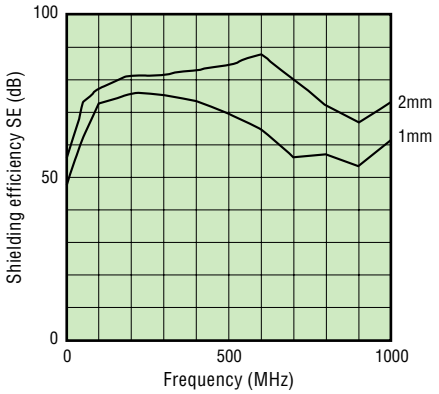


Data

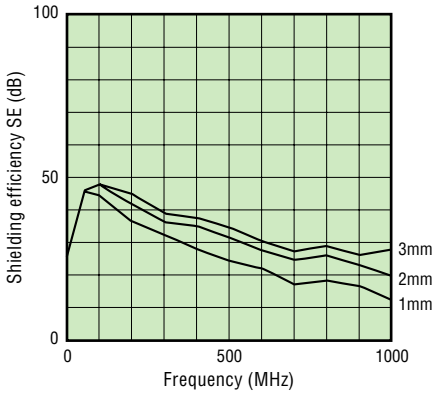
■ EMI shielding efficiency

Shown to have a shielding effect in high impedance fields (E waves). (Measured using an Advantest system.)

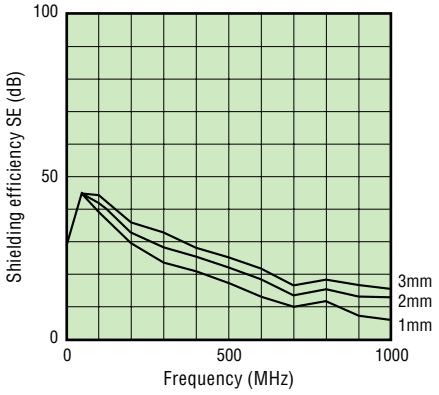
EC-A



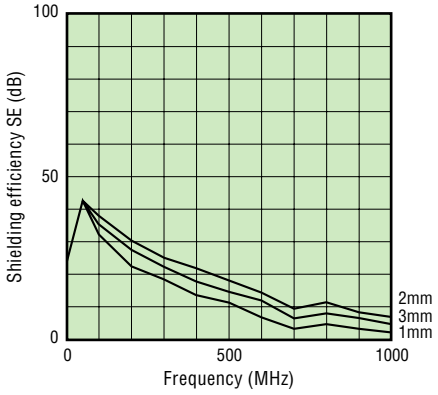
EC-BL



EC-BM



EC-BH

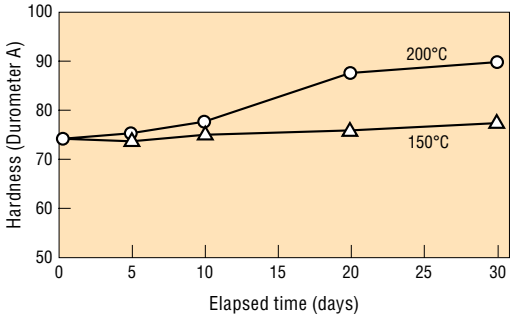


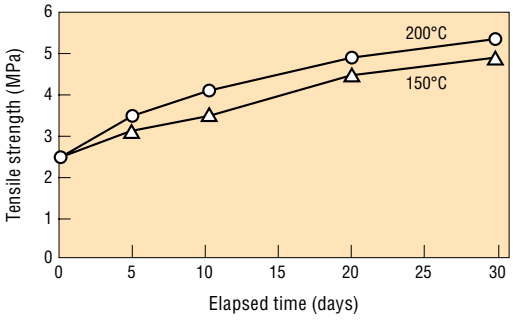
✻ None of the data represents specified values.

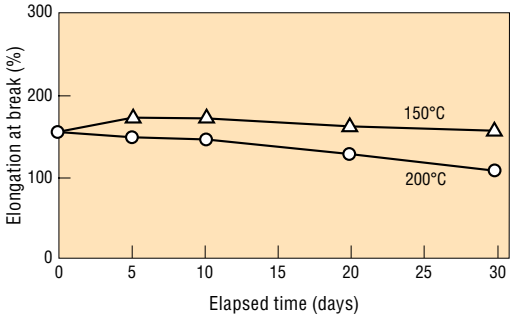
■ Heat resistance

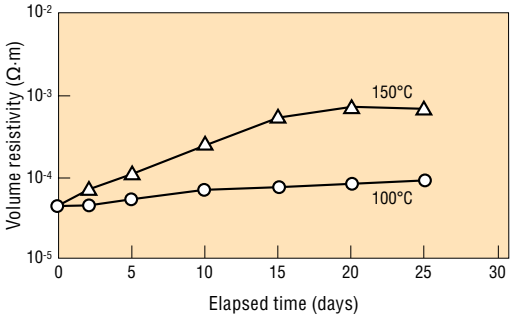
Measured using test strip, in accordance with JIS K 6249

EC-A









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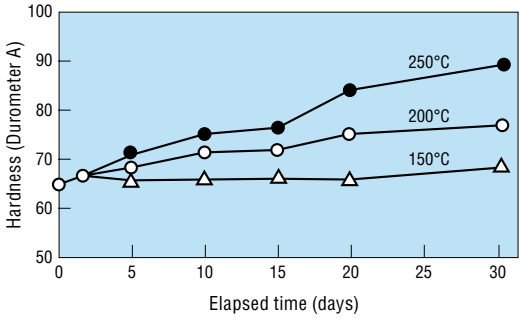
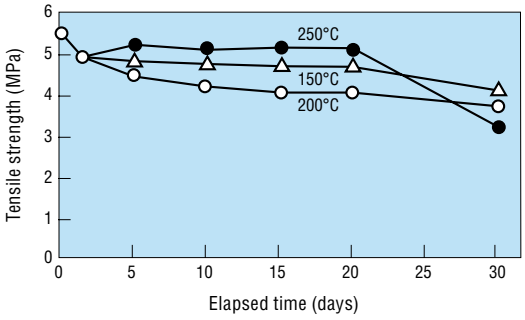
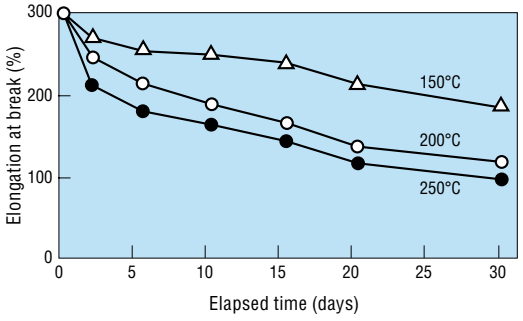
■ Heat resistance

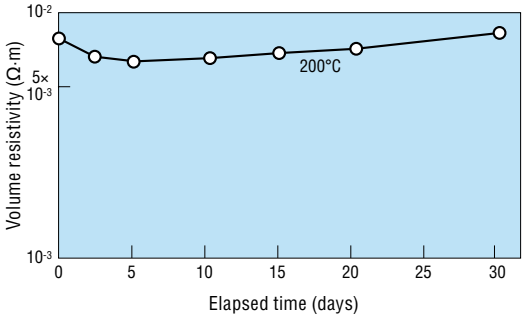
Measured using test strip, in accordance with JIS K 6249

EC-BL









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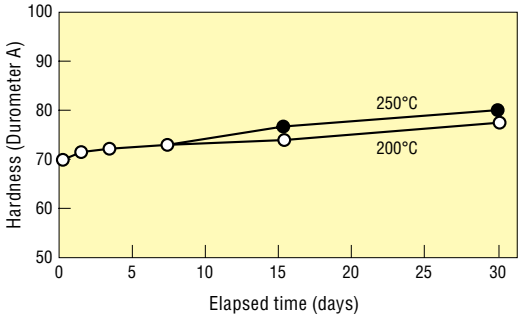
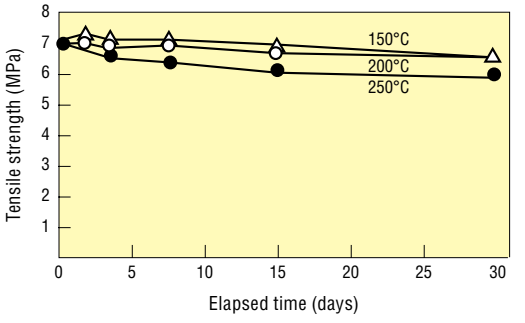
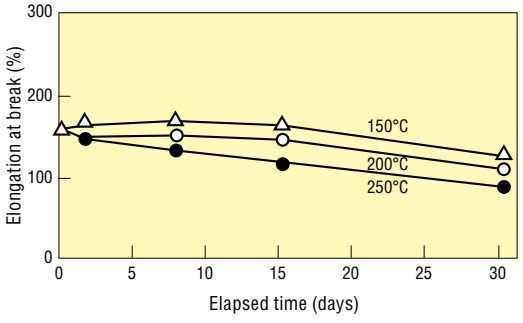
■ Heat resistance

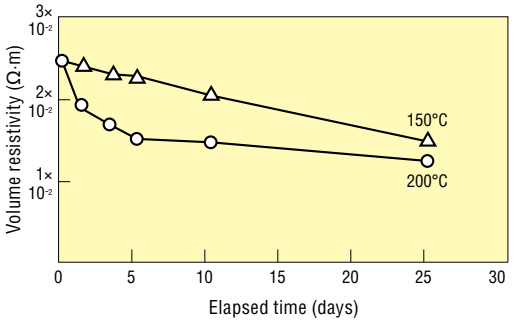
Measured using test strip, in accordance with JIS K 6249

EC-BM









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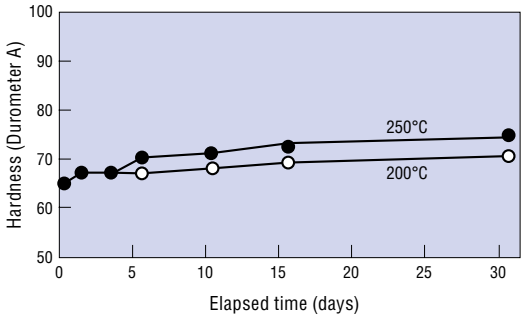
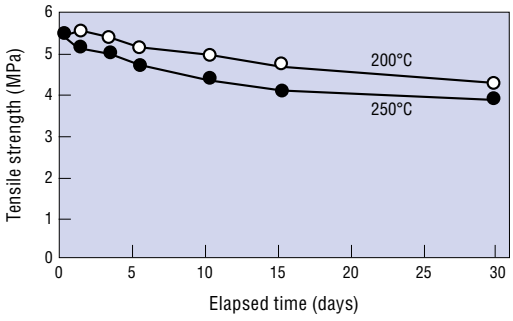
Data

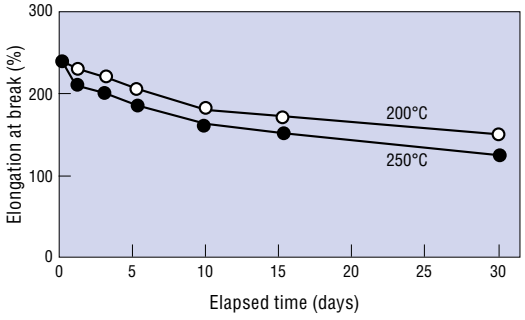
■ Heat resistance

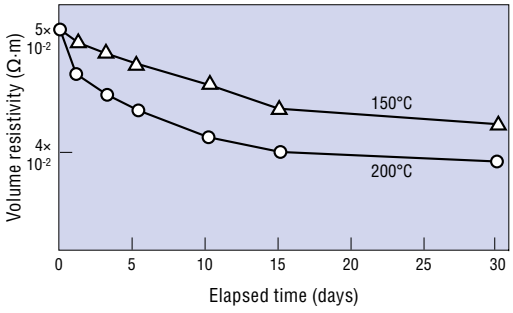
Measured using test strip, in accordance with JIS K 6249

EC-BH









✻ None of the data represents specified values.

■ Chemical resistance

ΔW: weight change (%) ΔV: volume change (%)

Chemical \ Change	EC-A		EC-BL		EC-BM		EC-BH	
	ΔW	ΔV	ΔW	ΔV	ΔW	ΔV	ΔW	ΔV
Ethanol	0.8	1.2	12	15	6.9	9.8	7.2	7.9
Toluene	47	103	155	197	97	135	120	157
n-hexane	47	134	148	207	90	154	113	185
Methyl ethyl ketone	24	56	84	125	56	80	66	105
Water	1.0	2.1	2.0	1.9	1.4	1.5	1.8	1.9
1% HCl solution	3.4	2.7	2.0	-1.2	1.4	-4.2	1.8	-1.9
3% H_2SO_4 solution	0.6	2.4	1.0	0.7	0.7	1.0	0.8	-1.4
10% NaCl solution	2.8	4.2	1.7	-0.4	1.2	-0.3	1.6	0.3
10% NaOH solution	0.2	2.7	0.8	1.0	0.2	2.7	1.1	2.0
ASTM No.1*	0.3	7.2	23	28	8.5	12	7.8	10
Dimethyl silicone fluid (Viscosity 100 mm^2/s)*	15	30	37	42	28	34	33	41

✻Test strips (1-mm thickness) were immersed in the chemicals for three days at room temperature, after which changes in weight and volume were measured. (Not specified values)

✻For oils marked with an asterisk (*), measurements were taken after 70 hours at 150°C.

Packaging

■ Sheet products

Type	Grade	Thickness (mm)	Dimensions (mm)	Minimum order
EC-A	EC-30A (W200)	$0.3\pm^{0.15}_{0.1}$	200×200	5
	EC-60A (W200)	0.6±0.15	200×200	5
	EC-100A (W200)	1.0±0.15	200×200	1
	EC-150A (W200)	1.5±0.2	200×200	1
	EC-200A (W200)	2.0±0.2	200×200	1
	EC-300A (W200)	3.0±0.25	200×200	1
EC-BL	EC-60BL (W300)	0.6±0.1	300×300	20
	EC-80BL (W300)	0.8±0.15	300×300	20
	EC-100BL (W300)	1.0±0.15	300×300	10
	EC-150BL (W300)	1.5±0.15	300×300	10
	EC-200BL (W300)	2.0±0.2	300×300	5
	EC-300BL (W300)	3.0±0.25	300×300	5
EC-BM	EC-20BM (W300)	0.2±0.05	300×300	50
	EC-40BM (W300)	0.4±0.05	300×300	50
	EC-60BM (W300)	0.6±0.1	300×300	20
	EC-80BM (W300)	0.8±0.15	300×300	20
	EC-100BM (W300)	1.0±0.15	300×300	10
	EC-150BM (W300)	1.5±0.15	300×300	10
	EC-200BM (W300)	2.0±0.2	300×300	5
	EC-300BM (W300)	3.0±0.25	300×300	5
EC-BH	EC-20BH (W300)	0.2±0.05	300×300	50
	EC-40BH (W300)	0.4±0.05	300×300	50
	EC-60BH (W300)	0.6±0.1	300×300	20
	EC-80BH (W300)	0.8±0.15	300×300	20
	EC-100BH (W300)	1.0±0.15	300×300	10
	EC-150BH (W300)	1.5±0.15	300×300	10
	EC-200BH (W300)	2.0±0.2	300×300	5
	EC-300BH (W300)	3.0±0.25	300×300	5

•For sizes not shown here, talk to a Shin-Etsu representative.
•Dimension tolerances for all products are $\pm^{10}_{0}$.

Handling Precautions

■ Storage and handling

•Store in a cool, dry place, avoiding exposure to direct sunlight.
•Note: contact with solvents and oils may cause deterioration and adversely affect product properties.
•Clean surfaces to which products will be applied, to remove dirt, grime, moisture, oil, etc.

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Gunma Complex	ISO 9001	ISO 14001
Naoetsu Plant	ISO 9001	ISO 14001
Takefu Plant	ISO 9001	ISO 14001

http://www.silicone.jp/