



Shin-Etsu Silicone

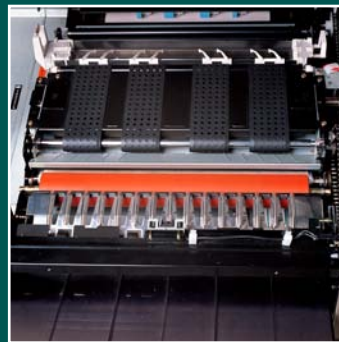
Electrically Conductive Silicone Rubber Products

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

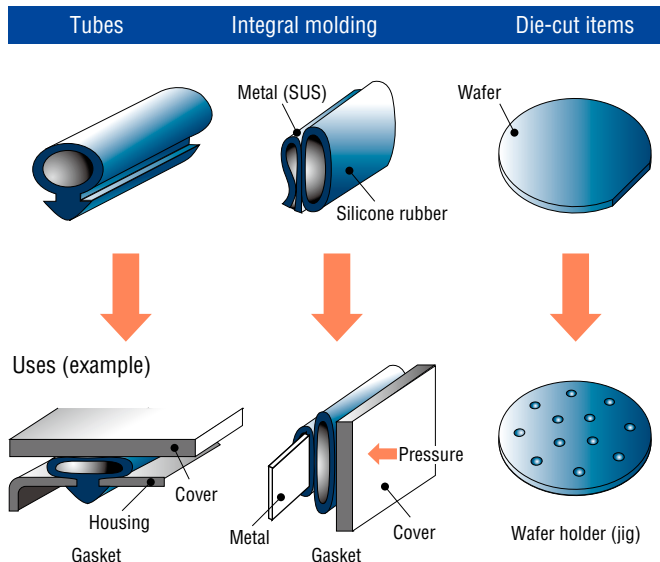
(Not specified values)

*2: material thickness=0.15 mm minimum

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)



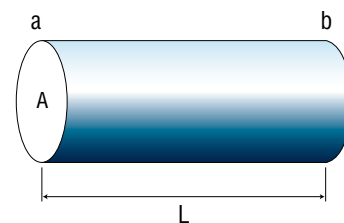
Measuring volume resistivity

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

$$R = \rho \frac{L}{A} \quad \left(\begin{array}{l} L: \text{length between a and b} \\ A: \text{cross section of conductor} \end{array} \right)$$

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).

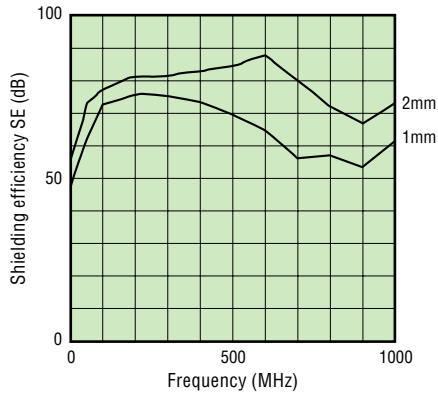


Data

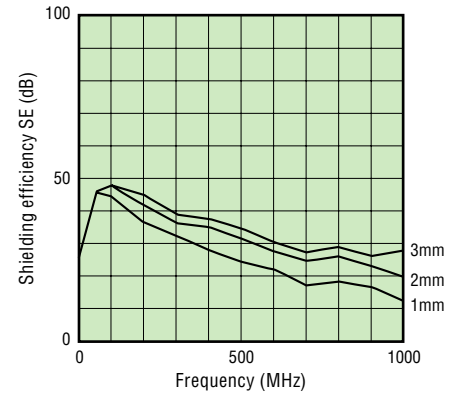
EMI shielding efficiency

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

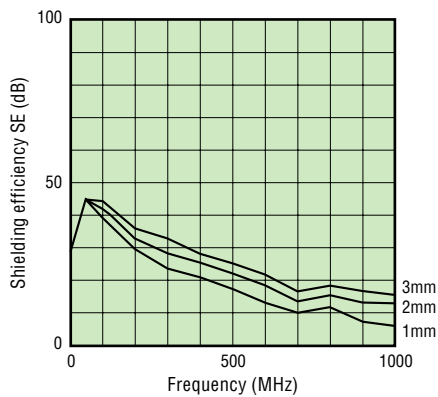
EC-A



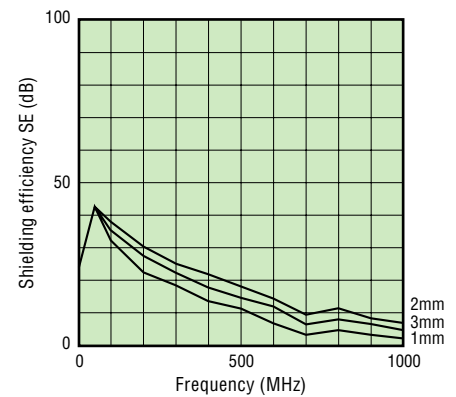
EC-BL



EC-BM



EC-BH

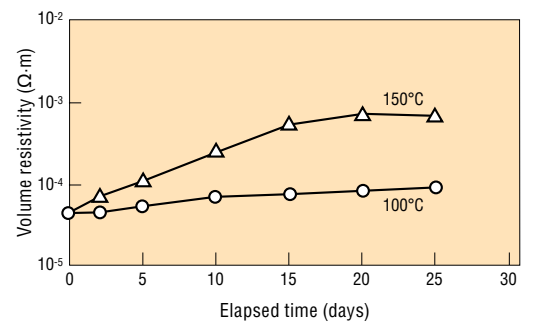
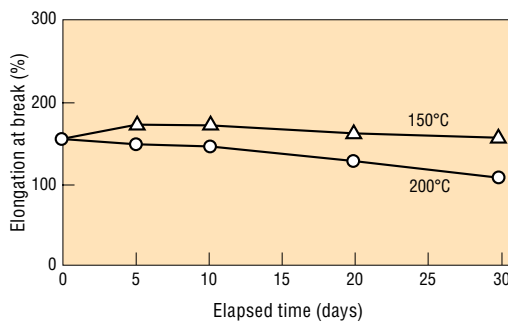
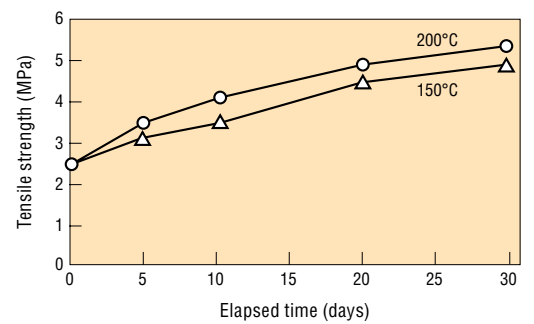
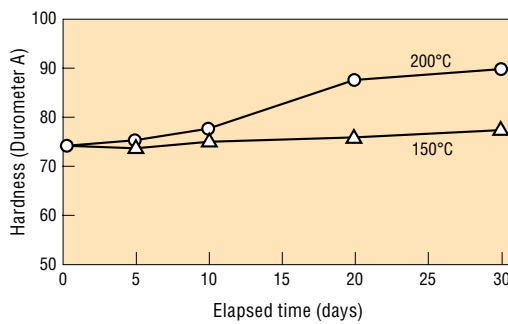


* None of the data represents specified values.

Heat resistance

Measured using test strip, in accordance with JIS K 6249

EC-A

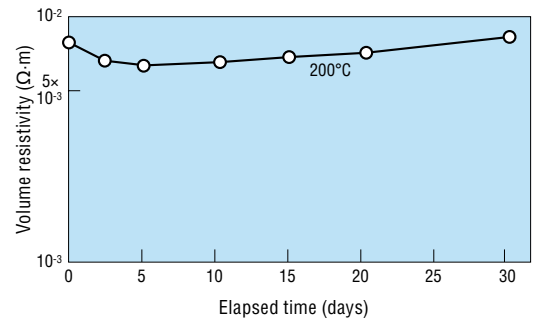
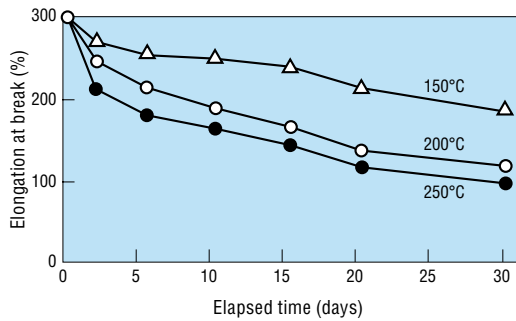
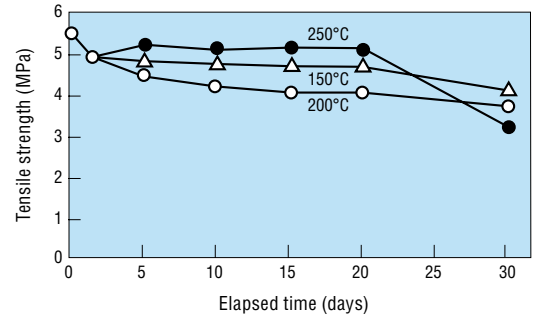
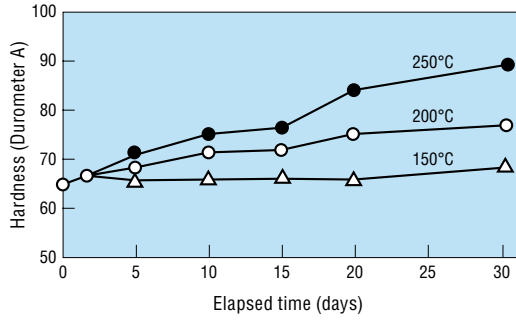


* None of the data represents specified values.

Heat resistance

Measured using test strip, in accordance with JIS K 6249

EC-BL

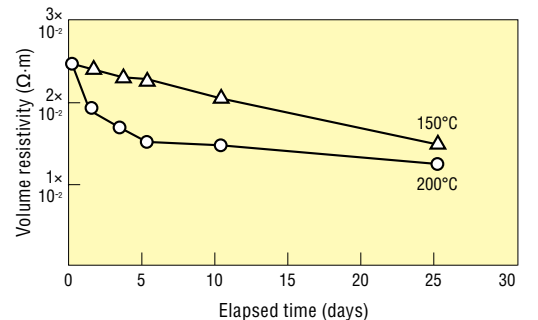
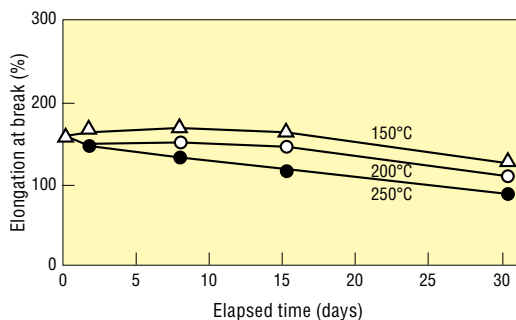
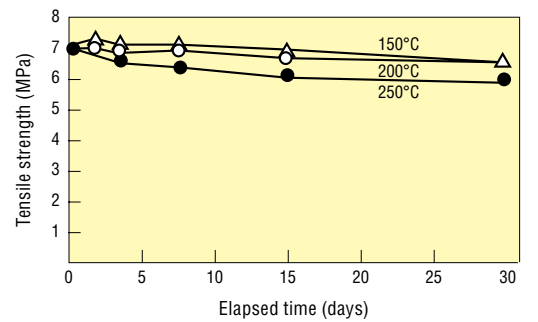
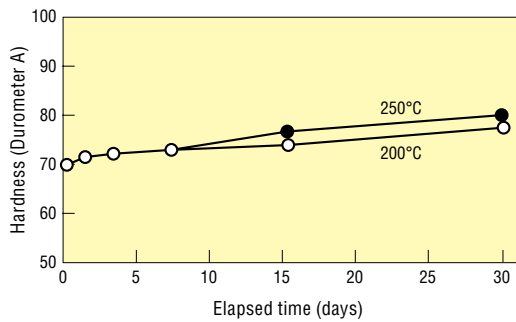


* None of the data represents specified values.

Heat resistance

Measured using test strip, in accordance with JIS K 6249

EC-BM



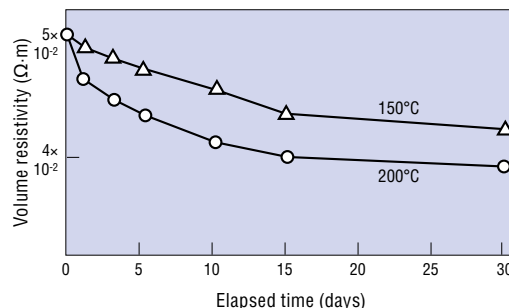
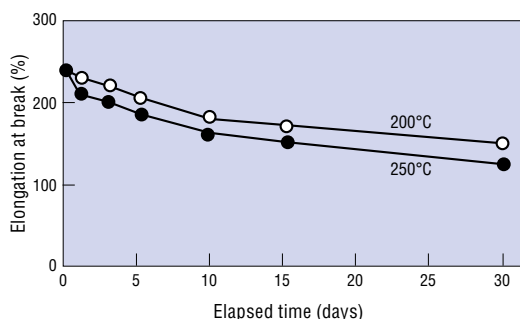
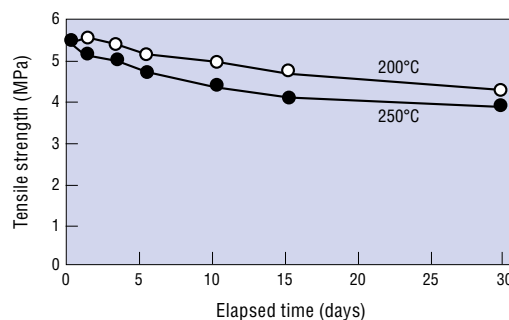
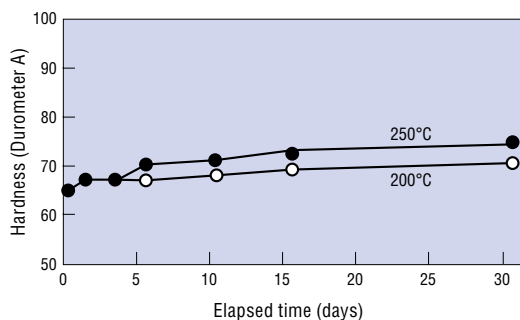
* None of the data represents specified values.

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 ₂ SO 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± _{0.1} ^{0.15}	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 ±₀⁰.

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.

Silicone Division Sales and Marketing Department III < Designed Products >

6-1, Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan

Phone : +81-(0)3-3246-5101 Fax : +81-(0)3-3246-5364

Shin-Etsu Silicones of America, Inc.

1150 Damar Drive, Akron, OH 44305, U.S.A.

Phone : +1-330-630-9860 Fax : +1-330-630-9855

Shin-Etsu Silicones Europe B. V.

Bolderweg 32, 1332 AV, Almere, The Netherlands

Phone : +31-(0)36-5493170 Fax : +31-(0)36-5326459

Germany Branch

Rheingastrasse 190-196, 65203 Wiesbaden, Germany

Phone : +49-(0)611-962-5366 Fax : +49-(0)611-962-9266

Shin-Etsu Silicone Taiwan Co., Ltd.

Hung Kuo Bldg. 11F-D, No. 167, Tun Hua N. Rd.,

Taipei, 10549 Taiwan, R.O.C.

Phone : +886-(0)2-2715-0055 Fax : +886-(0)2-2715-0066

Shin-Etsu Silicone Korea Co., Ltd.

GT Tower 15F, 1317-23, Seocho-Dong,

Seocho-Gu, Seoul 137070, Korea

Phone : +82-(0)2-590-2500 Fax : +82-(0)2-590-2501

Shin-Etsu Singapore Pte. Ltd.

4 Shenton Way, #10-03/06, SGX Centre II, Singapore 068807

Phone : +65-6743-7277 Fax : +65-6743-7477

India Branch

Flat No. 712, 7F, 24 Ashoka Estate, Barakhamba Road,
New Delhi, 110001, India

Phone : +91-11-43623081 Fax : +91-11-43623084

Shin-Etsu Silicones (Thailand) Ltd.

7th Floor, Harindhorn Tower, 54 North Sathorn Road,
Bangkok 10500, Thailand

Phone : +66-(0)2-632-2941 Fax : +66-(0)2-632-2945

Shin-Etsu Silicone International Trading (Shanghai) Co., Ltd.

29F Junyao International Plaza, No.789,

Zhao Jia Bang Road, Shanghai 200032, China

Phone : +86-(0)21-6443-5550 Fax : +86-(0)21-6443-5868

Guangzhou Branch

B-2409, 2410, Shine Plaza, 9 Linhexi Road,

Tianhe, Guangzhou, Guangdong 510610, China

Phone : +86-(0)20-3831-0212 Fax : +86-(0)20-3831-0207

- The data and information presented in this catalog may not be relied upon to represent standard values. Shin-Etsu reserves the right to change such data and information, in whole or in part, in this catalog, including product performance standards and specifications without notice.
- Users are solely responsible for making preliminary tests to determine the suitability of products for their intended use. Statements concerning possible or suggested uses made herein may not be relied upon, or be construed, as a guaranty of no patent infringement.
- The silicone products described herein have been designed, manufactured and developed solely for general industrial use only; such silicone products are not designed for, intended for use as, or suitable for, medical, surgical or other particular purposes. Users have the sole responsibility and obligation to determine the suitability of the silicone products described herein for any application, to make preliminary tests, and to confirm the safety of such products for their use.
- Users must never use the silicone products described herein for the purpose of implantation into the human body and/or injection into humans.

- Users are solely responsible for exporting or importing the silicone products described herein, and complying with all applicable laws, regulations, and rules relating to the use of such products. Shin-Etsu recommends checking each pertinent country's laws, regulations, and rules in advance, when exporting or importing, and before using the products.
- Please contact Shin-Etsu before reproducing any part of this catalog.
Copyright belongs to Shin-Etsu Chemical Co., Ltd.



The Development and Manufacture of Shin-Etsu Silicones are based on the following registered international quality and environmental management standards.

Gunma Complex ISO 9001 ISO 14001
(JCQA-0004 JCQA-E-0002)

Naoetsu Plant ISO 9001 ISO 14001
(JCQA-0018 JCQA-E-0064)

Takefu Plant ISO 9001 ISO 14001
(JQA-0479 JQA-EM0298)

<http://www.silicone.jp/>