

 **MITSUI CHEMICALS, INC.**  
<http://www.mitsuichem.com/index.htm>

**MITSUI CHEMICALS (CHINA) CO., LTD.**

Room 2102, Capital Square, 268 Hengtong Road,  
Jing' an District, Shanghai, 200070, P.R. China  
TEL +86-21-5888-6336 FAX +86-21-5888-6337

**MITSUI CHEMICALS FUNCTIONAL COMPOSITES (SHANGHAI) CO.,LTD.**

736 Huachuang Road, Jinshan District, Shanghai, P. R. China  
TEL +86-21-67321999 FAX +86-21-67321998

**MITSUI CHEMICALS KOREA, INC.**

15F, Building-B, PINE AVENUE, 100,  
Eulji-ro, Jung-gu, Seoul, KOREA 04551  
TEL +82-2-6031-0200 FAX +82-2-6031-0220

**MITSUI CHEMICALS ASIA PACIFIC, LTD**

3 HarbourFront Place #10-01  
HarbourFront Tower 2 Singapore 099254, Singapore  
TEL +65-6534-2611 FAX +65-6535-5161

**MITSUI CHEMICALS (THAILAND) CO., LTD.**

Floor 33, Tower A, The 9th Tower Grand Rama 9  
33/4 Rama 9 road, Huay Kwang, Bangkok 10310, Thailand  
TEL +66-2-026-3242 FAX +66-2-107-1855

**MITSUI CHEMICAL INDIA, PVT. LTD.**

3rd Floor, B-Wing, Prius Platinum, D3, District Center,  
Saket, Delhi – 110017, India  
TEL: +91-11-3010-7400 FAX: +91-11-3010-7499

**MITSUI CHEMICALS AMERICA, INC.**

800 Westchester Avenue, Suite S306 Rye Brook, NY 10573, U.S.A.  
TEL +1-914-253-0777 FAX +1-914-253-0790

**MITSUI CHEMICALS EUROPE GmbH.**

Oststr. 34, 40211 Düsseldorf, Germany  
TEL +49-211-173320 FAX +49-211-17332-701

**Head Office**

**MILASTOMER Dept., Performance Compound Div.**  
Shiodome City Center, 5-2, Higashi-Shimbashi 1-chome,  
Minato-ku, Tokyo 105-7122  
TEL: 03-6253-3452 FAX: 03-6253-4219

**Osaka Branch**

**Performance Compound Group,  
Functional Polymeric Materials Dept.**  
Shinanobashi Mitsui Bldg. 8F, 11-7, Utsubohonmachi 1-chome,  
Nishi-ku, Osaka 550-0004  
TEL: 06-6446-3602 FAX: 06-6446-3638

**Nagoya Branch**

**Automotive Materials Group,  
Functional Polymeric Materials Dept.**  
Nagoya Mitsui Main Bldg., 8F, 24-30, Meiekiminami 1-chome,  
Nakamura-ku, Nagoya 450-0003  
TEL: 052-587-3601 FAX: 052-587-3620

**Sodegaura R & D Center**

**TPE Section,  
Elastomer Department, Polymeric Materials Laboratory**  
580-32, Nagaura, Sodegaura, Chiba 299-0265  
TEL: 0438-64-2484 FAX: 0438-64-2483

# MILASTOMER™

Thermoplastic Elastomer

2019.06

**Milastomer™** <http://jp.mitsuichem.com/service/performance/automotive/milastomer/>

The information in this pamphlet is based on documentation, information, data, and other sources available at the current time. We make no guarantees about the data or assessments provided, or about products manufactured using Milastomer™. The information provided may be partly or wholly revised based on new findings.

Milastomer™ does not conform to self-regulatory standards established by the Japan Hygienic Olefin And Styrene Plastics Association. It cannot be used in medical devices, food containers, applications which remain in constant contact with the human body, or applications where there is a risk of direct or indirect ingestion into the human body. If you wish to use Milastomer™ in some other application requiring special consideration to safety, please determine whether it can be used by first testing and confirming safety in the application at your company.

When using this product, please take safety measures appropriate to the application or usage.

# Thermoplastic Elastomer MILASTOMER™

## What is MILASTOMER™?

**MILASTOMER™** is a thermoplastic elastomer which main raw materials are rubber and olefin-based resin. It was created using the resin and synthetic rubber technologies that Mitsui Chemicals has developed over many years.

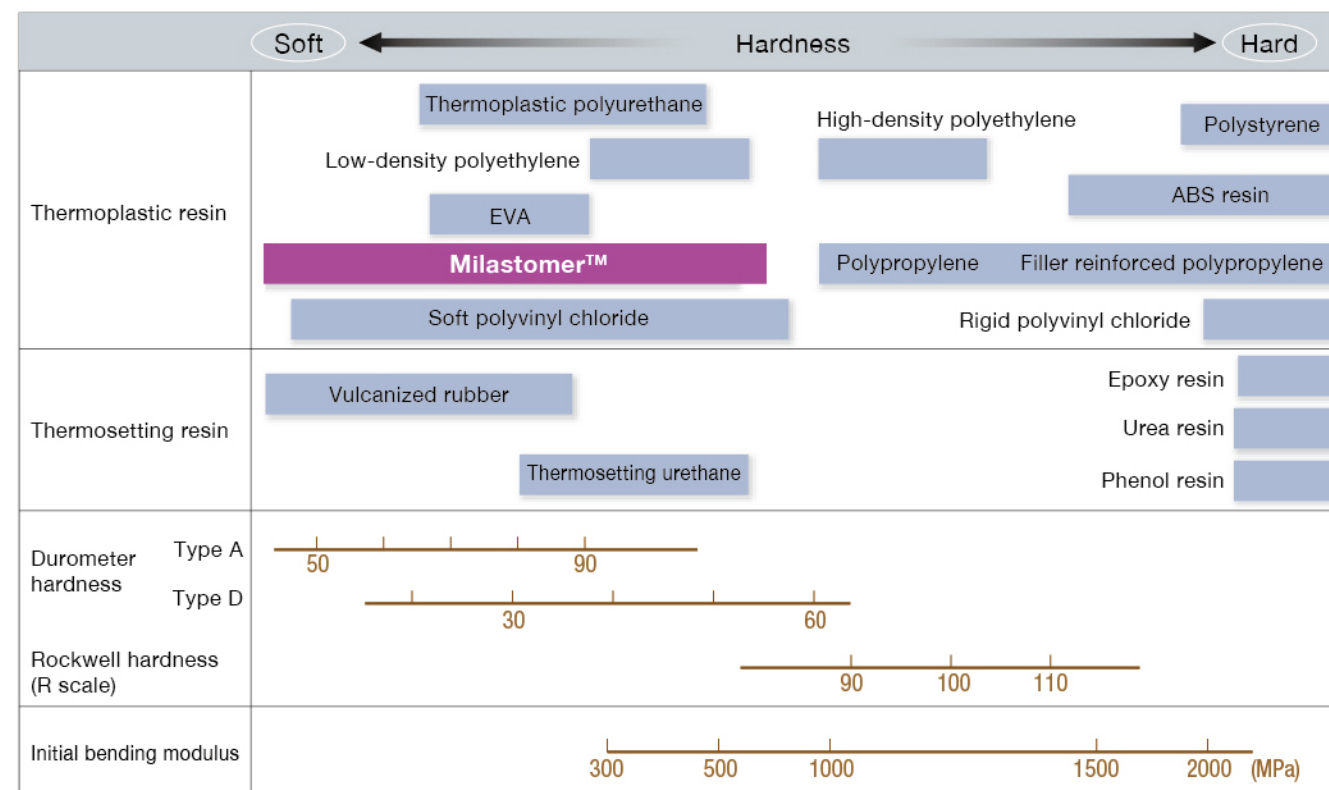
**MILASTOMER™** is available in a wide range of grades, ranging from grades which are flexible like vulcanized rubber to grades which are semi-hard like low-density polyethylene. Numerous grades are also available with unique characteristics to suit individual applications.

**MILASTOMER™** does not require compounding or vulcanization processes like rubber and can be molded just like general-purpose resin. The natural grade can be easily colored.

**MILASTOMER™** has superior lightness, rubber elasticity, heat resistance, cold resistance, weatherability, chemical resistance, electrical insulation performance and outstanding secondary processability characteristics such as coating performance, thermal adhesiveness and vacuum forming performance.

**MILASTOMER™** is used in a variety of fields including automotive parts, building materials, appliance parts, sporting goods, and daily necessities.

Fig. 1: Comparison based on resin/rubber hardness



## MILASTOMER™ Features

### 1 Density

With a density at approximately 900 kg/m<sup>3</sup>, MILASTOMER™ is the lightest general-purpose elastomer material. Product weight can be reduced by about 30% by substituting MILASTOMER™ for ordinary vulcanized rubber (Fig. 2).

### 2 Heat resistance

MILASTOMER™ has superior heat resistance to other elastomers and can be used for inhigh-temperature applications (Fig. 3).

### 3 Rubber elasticity

MILASTOMER™ has outstanding rubber elasticity at high temperatures. In particular, it exhibits superior deformation recovery to vulcanized rubber in long-term compression set testing (Fig. 4).

### 4 Chemical resistance

MILASTOMER™ is resistant to water, acid, alkali, alcohol, acetone, and vegetable oil. However care is necessary during use because it is attacked by aromatic organic solvents, gasoline, mineral oil, etc.

### 5 Weatherability, Ozone resistance

MILASTOMER™ B (Black) grade has outstanding weatherability and can be used outdoors over the long-term. Both B grade and N (Natural) grade have superior ozone resistance.

### 6 Electrical characteristics

MILASTOMER™ has outstanding electrical insulation performance, like polyethylene and polypropylene.

Fig. 2 Comparison of density

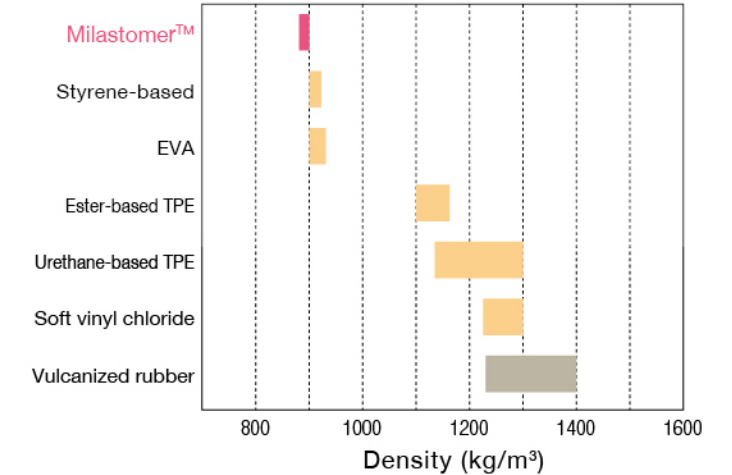


Fig. 3 Comparison of softening temperature

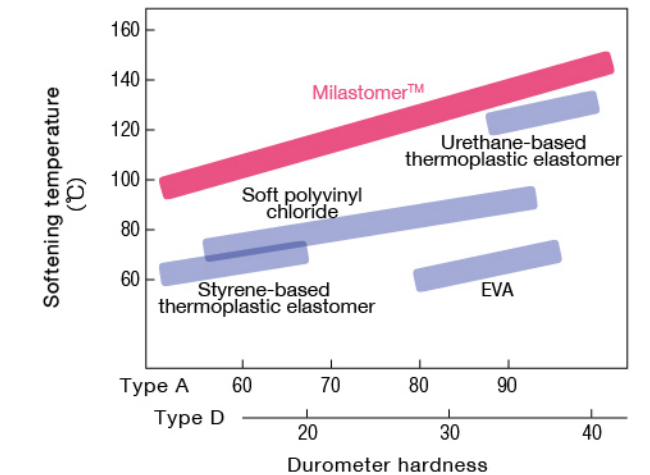
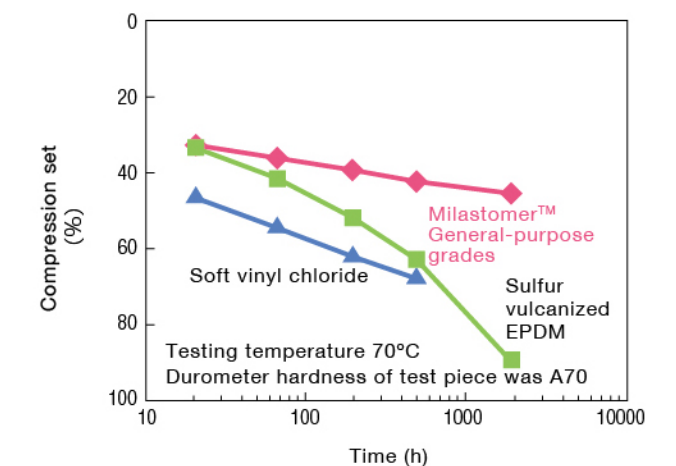


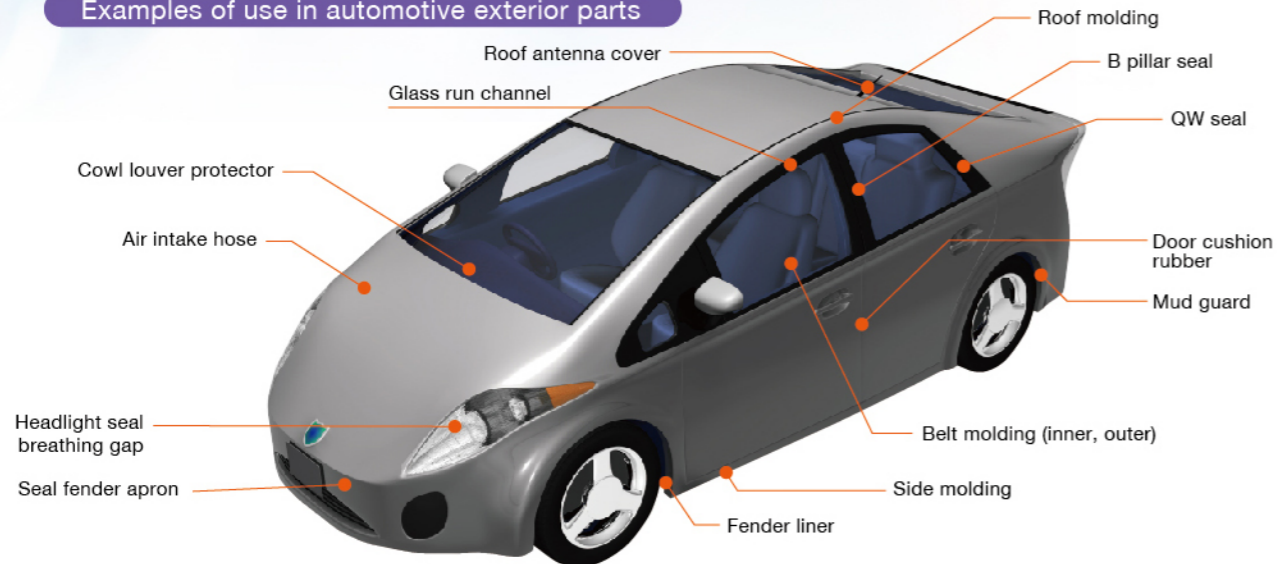
Fig. 4 Comparison of long-term compression set



# Thermoplastic Elastomer MILASTOMER™

## Sample applications of MILASTOMER™

### Examples of use in automotive exterior parts



Door trim skin



Weather seals

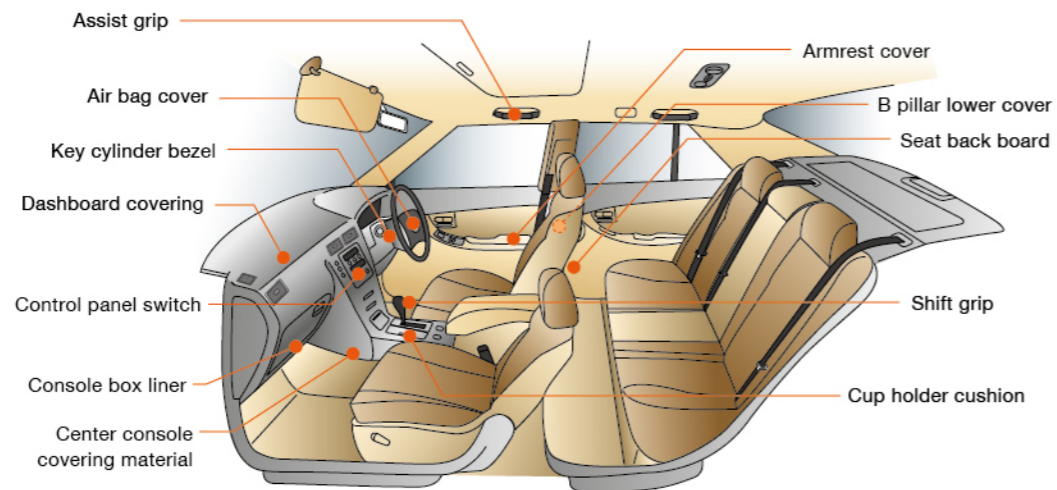


Mud guard

### Examples of use in automotive interior parts



Dashboard skin



### Others



Speaker edge, damper



Tooth brush grips



Architectural gaskets



Drain pipe joints, drain hose

## MILASTOMER™ Processing

MILASTOMER™ contains no hygroscopic filler, so there is no need to dry before processing. (except for oil resistance grade "A-series") Recommended pre-drying time of "A-series" is 80degree / 3 hours.

### 1 Injection

MILASTOMER™ has good fluidity and low crystallinity, and thus it is possible to mold products with beautiful appearance because it is hard for sink marks to form at ribs and parts with uneven thickness, and welds tend not to be conspicuous. Sprues, runners, burrs, and scraps can be reused. Thermal stability is good, and corrosive gases tend not to be produced even by thermal decomposition, so general-purpose molding machines are perfectly adequate for processing.

**1.Machine** ..... A general-purpose injection molding machine can be used.

**2.Mold and shrinkage factor** ..... In particular low-hardness grades have inferior fluidity somewhat to high-hardness grades, so please design sprues, runners, and gates a little shorter and larger. The mold shrinkage factor varies, from 10/1000 to 16/1000 depending on the processing conditions and product form.

**3.Processing conditions** ..... Standard processing conditions are as follows, but adjustment may be necessary depending on the product shape.

①Cylinder temperature : C1/C2/C3/N=200/220/220/220(°C)

②Die temperature : 30-50 °C

③Injection speed : Set comparatively slow.

④Cooling time : Varies depending on product shape and die temperature.

Product wall thicknesses and standard cooling times are given in the above table.

Product wall thickness	Cooling time
2 mm	20sec
3 mm	30sec
4 mm	40sec
5 mm	50sec

### 2 Extrusion

MILASTOMER™ has comparatively high melt viscosity, low temperature dependence of viscosity and comparatively small die swell, and thus enables extrusion molding of odd shapes with a complex profile which are difficult to mold with conventional polyolefin resin.

**1.Machine** ..... A general-purpose machine for polyolefin can be used. Ideal specifications are an L/D ratio of 24 or more, and a metering type screw with a compression ratio of 3-4. To obtain a good appearance, the resin must be adequately and uniformly plasticized by, for example, using a screen pack (80-120 mesh).

**2.Dies** ..... Plate dies are used for odd-shaped extrusion, and a land length of about 10 mm is appropriate. Land length must be adjusting by engraving from the back side at thin-walled parts where it is difficult to achieve the desired shape.

**3.Sizing equipment (Calibrator)** ..... Sizing equipment may have to be used, depending on the product shape and required dimensional precision.

### 3 Other

Please consult with us about other types of molding (e.g., blow molding, calendar molding, thermal fusion bonding, vacuum molding, and foaming).

Color	Category	Processing				Hardness (Duro A)		Hardness (Duro D)		MFR		Density	Modulus at 100% EL	Tensile Strength at break		Elogation at break	Compression set		Brittle temperature	Major Uses (Features)
		process-ing				-		-		g/10min		kg/m <sup>3</sup>	MPa		%	%		°C		
		Method	Extrusion	Calendar	Blow	Injection	Mitsui Method referred to ISO 7619			Mitsui Method referred to ISO1133		Mitsui Method referred to ASTM D1505	Mitsui Method referred to ISO37				Mitsui Method referred to ISO815		Mitsui Method	
		Condition					Instantaneous	5 sec. delay	5 sec. delay	230°C 2.16kg	230°C 10kg	Density gradient tube	JIS No.3 dumbell		500mm/min		23°C / 22h	70°C / 22h	-	
Natural	General	4010NS	○				46	40	-	-	5.0	880	1.0	4.4	610	25	43	<-60	Grip, Gasket	
		5020NS	○				53	48	-	-	15	880	1.2	3.6	500	25	37	<-60	Weather Strip, Gasket	
		5030NS				○	51	48	-	-	20	880	1.0	3.1	540	26	44	<-60	Grip, Compound, Packing	
		6020NS	○				56	52	-	-	15	880	1.2	3.8	500	26	35	<-60	Weather Strip, Gasket	
		6030NS	○	○		○	58	53	-	-	40	880	1.4	4.0	450	31	45	<-60	Grip, Interior Skin	
		7030NS	○			○	70	-	-	-	35	880	2.3	7.1	670	32	43	<-60	Weather Strip, Gasket, Grip	
		8032NS	○			○	82	77	-	-	15	880	3.3	8.8	600	30	52	<-60	Weather Strip, Gasket, Grip	
		8030NS	○			○	87	83	-	-	15	880	4.2	7.5	590	32	54	<-60	Weather Strip, Gasket	
		9020NS	○				90	-	-	-	14	890	6.0	10.6	700	37	58	<-60	Weather Strip, Gasket	
		9070NS				○	-	-	39	25	-	890	8.4	14.0	620	-	-	<-60	Mud Guard, Gasket, Grip	
		M3800NS				○	-	-	42	19	-	880	10.3	15.0	650	-	-	-60	Grip	
		M4400NS	○				-	-	47	0.5	-	890	10.5	17.3	680	-	-	-60	Weather Strip, Gasket	
		M4800NS				○	-	-	48	17	-	890	12.6	17.7	600	-	-	-60	Grip	
Natural	Special	5030NHS	○	○		52	48	-	-	4.5	880	1.2	3.9	500	-	-	<-60	Interior Skin		
		5031NHS	○	○		59	-	-	-	6.1	870	1.5	5.3	600	-	-	<-60	Interior Skin		
		7060NS	○	○		73	-	-	-	36	880	2.8	8.2	570	-	-	-	Interior Skin		
		8030NHS	○	○		88	84	-	-	10	880	4.5	8.8	600	-	-	<-60	Interior Skin		
		W600NS	○			○	60	-	-	-	56	880	1.7	5.2	500	-	32	<-60	Gasket, Grip	
		5530NS	○			○	62	55	-	-	140	880	1.7	3.7	470	26	35	<-60	Gasket, Grip (High Flow Grade)	
6010NST				○	70	-	-	-	12	880	2.1	7.6	1000	-	-	<-60	Lends Gasket			
Black	General	5020BS	○			54	49	-	-	15	880	1.2	3.6	450	26	45	<-60	Weather Strip, Gasket		
		5030BS				○	54	48	-	-	14	880	1.1	3.6	600	27	44	<-60	Grip, Compound	
		6020BS	○				57	50	-	-	10	880	1.4	4.4	530	29	40	<-60	Weather Strip, Gasket	
		6030BS				○	58	-	-	-	30	880	1.5	4.2	480	24	37	<-60	Grip, Compound	
		7030BS	○			○	71	-	-	-	31	880	2.4	7.2	620	29	42	<-60	Weather Strip, Gasket, Grip	
		8032BS	○			○	82	79	-	-	15	890	3.4	6.8	580	30	51	<-60	Weather Strip, Gasket, Grip	
		8030BS	○			○	86	-	-	-	18	890	4.3	7.6	600	35	54	<-60	Weather Strip, Gasket	
		9020BS	○				91	-	-	-	17	890	6.0	9.6	650	-	-	<-60	Weather Strip, Gasket	
		9070BKS				○	-	-	39	20	-	890	8.4	14.4	640	-	-	<-60	Mud Guard, Gasket, Grip	
		M2400BS	○				-	-	36	0.2	-	900	7.0	12.2	630	-	-	-60	Weather Strip, Gasket	
		M3800BS				○	-	-	42	15	-	890	10.1	15.2	700	-	-	-60	Mud Guard, Grip	
		M4400BS	○				-	-	47	0.4	-	900	10.8	16.6	680	-	-	-60	Weather Strip, Gasket	
		M4800BS				○	-	-	48	15	-	890	12.5	17.8	620	-	-	-60	Mud Guard, Grip	
Black	Special	W600B	○		○	61	57	-	-	50	870	1.7	4.6	520	26	38	<-60	Weather Strip, Gasket		
		C700BM	○		○	70	67	-	-	120	880	2.6	6.2	460	28	36	<-60	Weather Strip, Gasket (High Flow Grade)		
		C701BM	○		○	70	64	-	15 (5kg)	170	880	-	6.6	550	29	38	<-60	Weather Strip, Gasket (High Flow Grade)		
		C705BS	○		○	73	70	-	-	120	880	2.7	6.5	450	-	37	-	Weather Strip, Gasket (High Flow Grade)		
		C800BM	○		○	80	76	-	1.0	73	880	3.2	7.8	550	31	45	<-60	Weather Strip, Gasket (High Flow Grade)		
		G800BS				○	80	-	-	-	-	880	3.2	6.7	550	-	53	<-60	Corner Joint for Weather Strip	
		5517BS	○			○	60	55	-	-	60	880	1.6	3.5	400	27	43	<-60	Gasket, Grip(High Flow Grade)	
		S-650BS				○	66	-	-	-	140	880	2.0	4.8	460	-	-	<-60	Quarter Window Seal (High Flow Grade)	
		S-702B				○	81	78	-	10	-	880	3.0	8.5	600	-	-	<-60	Gasket, Grip (High Flow Grade)	
		8051BS				○	89	86	-	30	-	890	5.6	8.7	440	-	-	<-60	Mud Guard, Gasket, Grip (High Flow Grade)	
		G4502BS	○				-	-	47	-	14	920	-	13.3	130	-	-	-	Slip Coat for Glass Run Channel	
		G463BS	○				-	-	46	-	16	920	-	12	120	-	-	-	Slip Coat for Glass Run Channel	
		A5500B	○				-	-	51	-	42	900	-	26	790	-	-	-	Slip Coat for Glass Run Channel	
K2000BS	○				-	-	32	4.5	-	900	-	9.0	380	-	-	-	Surface Coat for Gasket (Hihg Gloss Grade)			
S-250B				○	22	16	-	2.3	-	880	0.4	1.6	500	8	24	<-60	Ultra Low Hardness			
S-350B				○	37	31	-	1.1	-	880	0.7	2.7	490	-	28	<-60	Ultra Low Hardness			
S-450B				○	46	40	-	2.2	-	880	1.1	2.7	400	11	23	<-60	Ultra Low Hardness			
Black	Oil Resistance	A600B			○	○	60	-	-	-	13	880	1.9	3.7	220	-	20	-60	Boots, Bellows, Hose, Injection Parts	
		A700B			○	○	71	-	-	-	29	880	2.9	6.0	260	-	25	-57	Boots, Bellows, Hose, Injection Parts	
		A750B			○	○	81	-	-	-	51	880	4.1	8.7	330	-	33	-56	Boots, Bellows, Hose, Injection Parts	
		A900B			○	○	88	-	-	-	54	890	5.4	11.8	410	-	39	<-60	Boots, Bellows, Hose, Injection Parts	
		A950B			○	○	-	-	36	-	88	890	8.8	14.6	440	-	50	-58	Boots, Bellows, Hose, Injection Parts	
		A970B			○	○	-	-	43	-	52	890	9.7	18.6	530	-	58	-57	Boots, Bellows, Hose, Injection Parts	

\*Figures shown here are representative values, not manufacturer's specifications.