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MILASTOMER™

Olefin-based TPV (Thermoplastic Vulcanizate)



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

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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.

M I L A S T O M E R

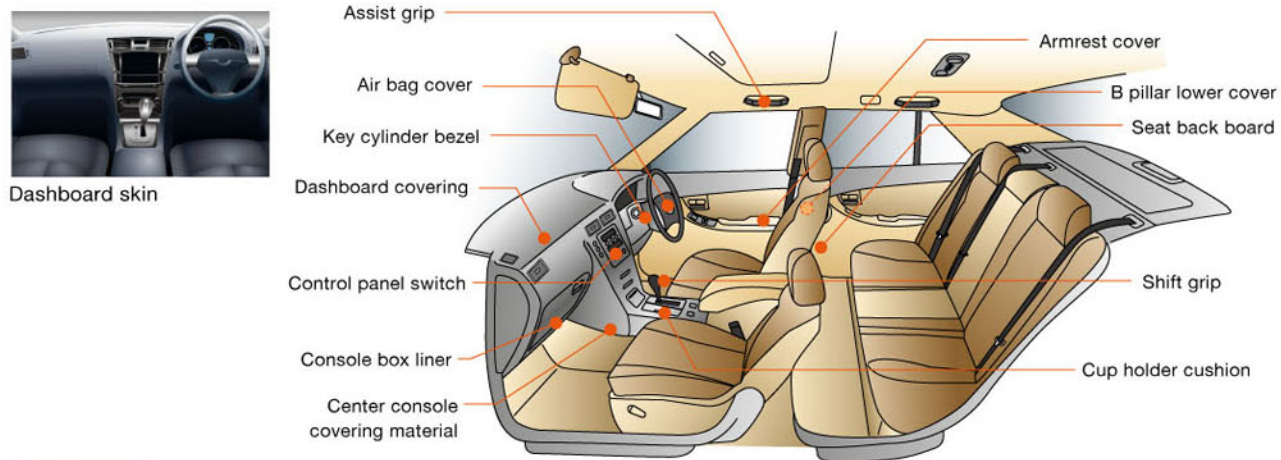
Olefin-based TPV (Thermoplastic Vulcanizate)
MILASTOMER™

Sample applications of MILASTOMER™

Examples of use in automotive exterior parts



Examples of use in automotive interior parts



Others



MILASTOMER™ Processing

MILASTOMER™ contains no hygroscopic filler, so there is no need to dry before processing.

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

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

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

② Die temperature : 30-50 °C

③ Injection speed : Set comparatively slow.

④ Cooling time : Varies depending on product shape and die temperature. Product wall thicknesses and standard cooling times are given in the table at right.

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).

Olefin-based TPV (Thermoplastic Vulcanizate) MILASTOMER™

What is MILASTOMER™?

MILASTOMER™ is a vulcanized thermoplastic elastomer (TPV) whose main raw materials are olefin-based rubber and olefin-based resin. It was created using the resin and synthetic rubber technologies Mitsui Chemicals has developed over many years.

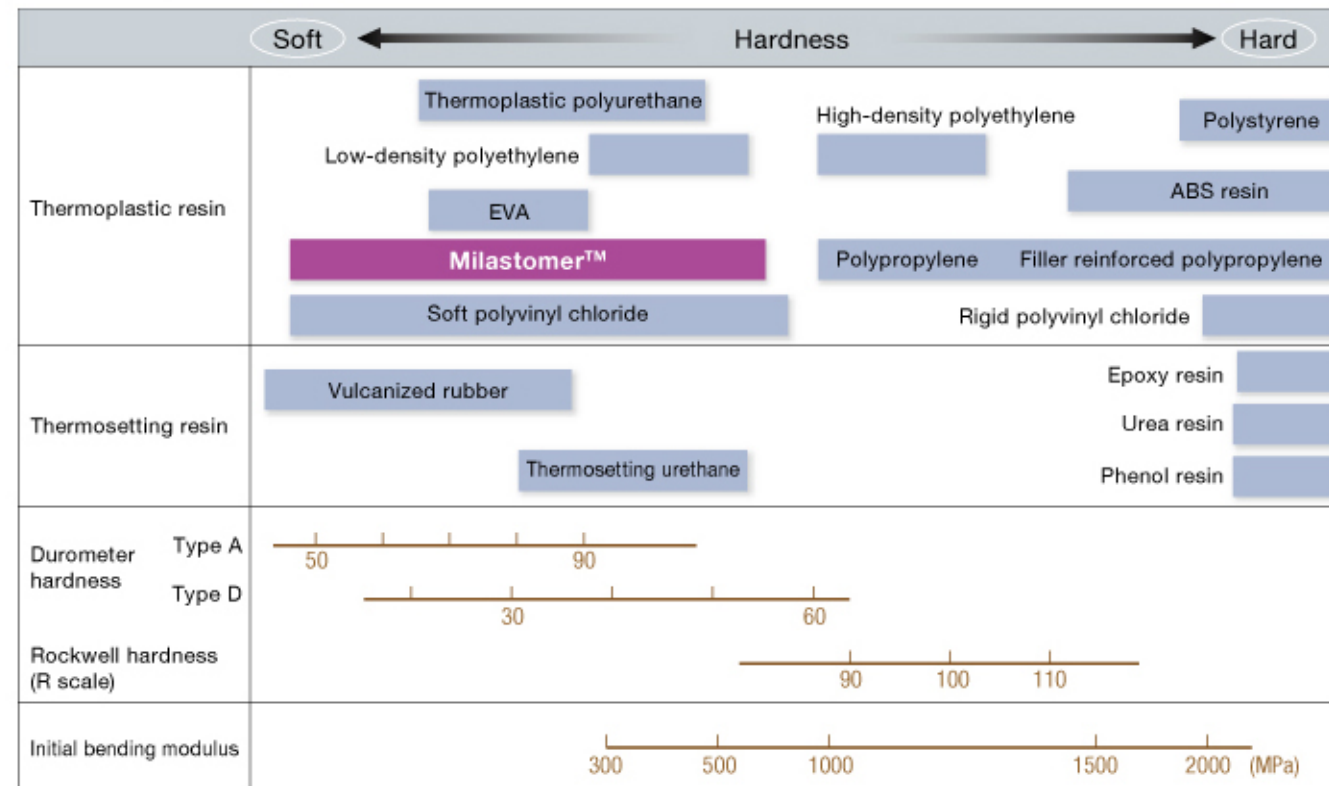
MILASTOMER™ is available in a wide range of grades, ranging from grades which are flexible like vulcanized rubber to grades which are semi-hard like low-density polyethylene. Numerous grades are also available with unique characteristics to suit individual applications.

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, and electrical insulation performance, as well as outstanding secondary processability characteristics such as coating performance, thermal adhesiveness and vacuum forming performance.

MILASTOMER™ Due to these outstanding characteristics, 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

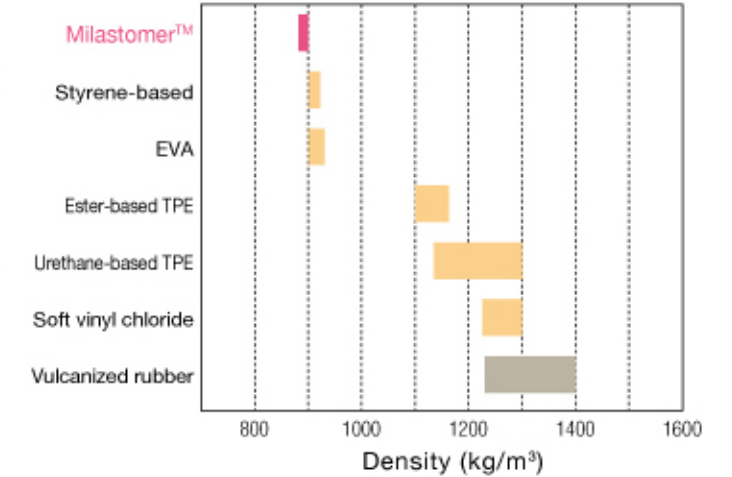


MILASTOMER™ Features

1 Density

With a density of at most 900 kg/m³, 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).

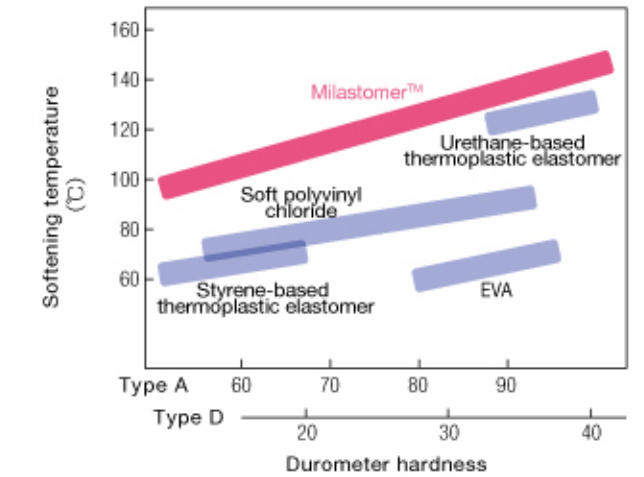
Fig. 2 Comparison of density



2 Heat resistance

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

Fig. 3 Comparison of softening temperature



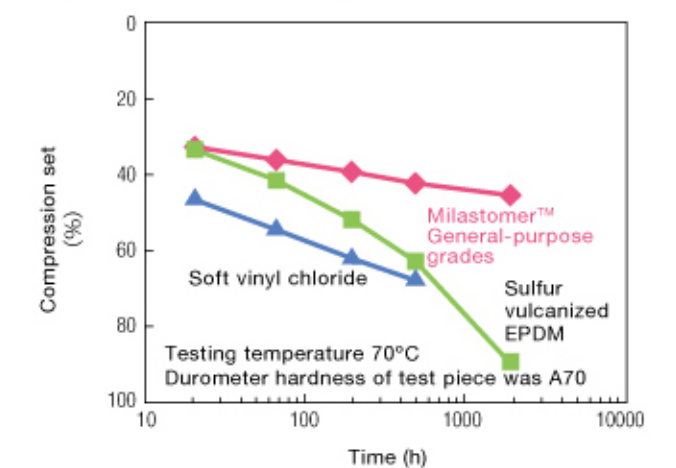
3 Rubber elasticity

MILASTOMER™ has outstanding rubber elasticity at high temperatures. In particular, it exhibits deformation recovery superior 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, and mineral oil etc.

Fig. 4 Comparison of long-term compression set



5 Weatherability, Ozone resistance

The 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, just like polyethylene and polypropylene.

Color	Category	Property		process-ing		Hardness (Duro A)		Hardness (Duro D)		MFR		Density		Modulus at 100% EL		Tensile Strength at break		Elogation		Compression set		Brittle temperature		Major Uses (Features)	
		Unit				-		-		g/10min		kg/m ³		MPa		%		%		°C					
		Method		Extrusion	Calendar	Blow	Injection	Mitsui Method Harmonized with ISO 48			Mitsui Method Harmonized with ISO1133		Mitsui Method Harmonized with ASTM D1505		Mitsui Method Harmonized with ISO37				Mitsui Method Harmonized with ISO815		Mitsui Method				
		Condition						Instantaneous	5 sec. delay	5 sec. delay	230°C 2.16kg	230°C 10kg	Density gradient tube		JIS No.3 dumbbell 500mm/min		23°C / 22h	70°C / 22h	-						
Black	General	5020BS	○				54	49	-	-	15	880	1.3	3.5	450	26	45	<-60	Weather Strip, Gasket						
		5030BS				○	54	48	-	-	20	880	1.2	3.3	460	27	44	<-60	Grip, Compound						
		6020BS	○				57	53	-	-	10	880	1.4	4.4	540	24	38	<-60	Weather Strip, Gasket						
		6030BS				○	59	56	-	-	30	880	1.4	3.8	480	24	37	<-60	Grip, Compound						
		7030BS	○			○	72	66	-	-	35	880	2.4	5.3	440	29	43	<-60	Weather Strip, Gasket, Grip						
		8032BS	○			○	83	79	-	-	15	890	3.2	7.1	580	30	51	<-60	Weather Strip, Gasket, Grip						
		8030BS	○				89	86	-	-	15	890	4.5	8.6	580	31	52	<-60	Weather Strip, Gasket						
		9020BS	○				90	89	-	-	10	890	5.7	7.5	500	41	51	<-60	Weather Strip, Gasket						
		9070BKS				○	-	-	38	20	-	890	8.2	13.2	640	-	-	<-60	Mud Guard,Gasket, Grip						
		M2400BS	○				-	-	36	0.2	-	900	7.0	13.0	630	-	-	-60	Weather Strip, Gasket						
		M3800BS				○	-	-	40	15	-	890	9.7	14.8	700	-	-	-60	Grip						
		M4400BS	○				-	-	49	0.4	-	900	10.8	16.7	680	-	-	-60	Weather Strip, Gasket						
		M4800BS				○	-	-	48	15	-	890	12.6	18.6	590	-	-	-60	Grip						
		W600B	○			○	63	57	-	-	50	870	1.9	4.4	420	26	38	<-60	Weather Strip, Gasket						
	W651B	○			○	67	63	-	-	60	880	-	5.5	500	27	38	<-60	Weather Strip, Gasket							
	W700B	○			○	73	67	-	-	30	880	2.5	5.6	450	29	45	<-60	Weather Strip, Gasket							
	C700BM				○	71	66	-	-	85	880	-	5.2	400	25	39	<-60	Weather Strip, Gasket (High Flow Grade)							
	W750B	○			○	75	70	-	-	45	880	2.8	6.8	580	34	47	<-60	Weather Strip, Gasket							
	C800BM				○	80	77	-	-	65	880	3.1	8.0	670	32	46	<-60	Weather Strip, Gasket (High Flow Grade)							
	G750BS				○	78	74	-	2.2	-	880	3.0	5.8	450	-	42	<-60	Corner Joint for Weather Strip							
	G800BS				○	82	79	-	1.0	-	880	3.0	5.9	550	-	53	<-60	Corner Joint for Weather Strip							
	S-250B				○	22	16	-	2.3	-	880	0.4	1.5	500	8	24	<-60	Ultra Low Hardness							
	S-350B				○	37	31	-	1.1	-	880	0.8	2.5	490	-	28	<-60	Ultra Low Hardness							
	S-450B	○			○	46	40	-	1.0	-	880	1.1	2.6	360	11	23	<-60	Ultra Low Hardness							
	5517BS				○	60	55	-	-	100	880	1.7	3.4	400	27	43	<-60	Gasket, Grip(High Flow Grade)							
	S-650BS				○	68	64	-	-	180	880	2.2	5.0	490	-	-	<-60	Quarter Window Seal							
	S-702B				○	81	78	-	13	-	880	2.9	8.2	600	-	-	<-60	Gasket, Grip(High Flow Grade)							
	S-808BS				○	87	84	-	24	-	880	3.6	5.7	450	-	-	<-60	Gasket, Grip(High Flow Grade)							
8051BS				○	89	86	-	35	-	890	5.2	7.9	440	-	-	<-60	Mud Guard,Gasket, Grip(High Flow Grade)								
A9560B				○	95	92	-	12	-	890	9.5	12.3	350	-	-	-	R&P Boots, Oil Resistant Grade								
G4502BS	○				-	-	48	-	15	920	-	13.6	150	-	-	-	Slip Coat for Glass Run Chanel								
K2000BS	○				-	-	32	4.5	-	900	-	8.3	380	-	-	-	Surface Coat for Gasket(High Gloss Grade)								
Natural	General	4010NS	○				46	40	-	-	5	880	1.2	4.4	610	25	43	<-60	Grip, Compound						
		5020NS	○				53	48	-	-	30	880	1.3	3.5	480	25	45	<-60	Weather Strip, Gasket						
		5030NS				○	51	48	-	-	30	880	1.2	3.4	540	26	44	<-60	Grip, Compound						
		6020NS	○				56	52	-	-	15	880	1.2	4.3	600	26	35	<-60	Weather Strip, Gasket						
		6030NS	○	○		○	58	53	-	-	50	880	1.4	3.4	450	31	45	<-60	Tooth Brush Grip, Interior Skin						
		7030NS	○			○	73	68	-	-	30	880	2.3	6.1	580	32	45	<-60	Weather Strip, Gasket, Grip						
		8032NS	○			○	81	77	-	-	15	880	3.3	6.7	520	30	52	<-60	Weather Strip, Gasket, Grip						
		8030NS	○				88	83	-	-	15	880	4.2	8.2	590	32	54	<-60	Weather Strip, Gasket						
		9020NS	○				91	89	-	-	10	890	5.4	6.6	560	37	58	<-60	Weather Strip, Gasket						
		9070NS				○	-	-	39	25	-	890	8.2	11.7	620	-	-	<-60	Mud Guard, Gasket, Grip						
		M2400NS	○				-	-	32	0.5	-	890	6.3	11.8	600	-	-	-60	Weather Strip, Gasket						
		M3800NS				○	-	-	41	19	-	880	10.0	13.7	650	-	-	-60	Grip						
		M4400NS	○				-	-	46	0.5	-	890	10.4	17.8	650	-	-	-60	Weather Strip, Gasket						
		M4800NS				○	-	-	49	20	-	890	12.7	17.2	560	-	-	-60	Grip						
	5030NHS	○	○			52	48	-	-	4.5	880	1.3	3.3	400	-	-	<-60	Interior Skin							
	8030NHS	○	○			88	84	-	-	9.3	880	4.6	8.1	520	-	-	<-60	Interior Skin							
	5530NS	○			○	62	55	-	-	140	880	1.7	4.0	470	26	35	<-60	Gasket, Grip(High Flow Grade)							
	L900NS				○	91	88	-	18	-	880	8.6	17.4	460	-	-	<-60	Gasket, Grip(High Flow Grade)							
6010NS				○	69	65	-	-	11	880	1.7	4.7	860	-	-	<-60	Lends Gasket								

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