

SUMITOMO CHEMICAL

Polyolefinic Thermoplastic Elastomer

ESPOLEX[®]

TPE Series



ESPOLEX

TPE Series

PRODUCT CONCEPT

Polyolefinic Thermoplastic Elastomer



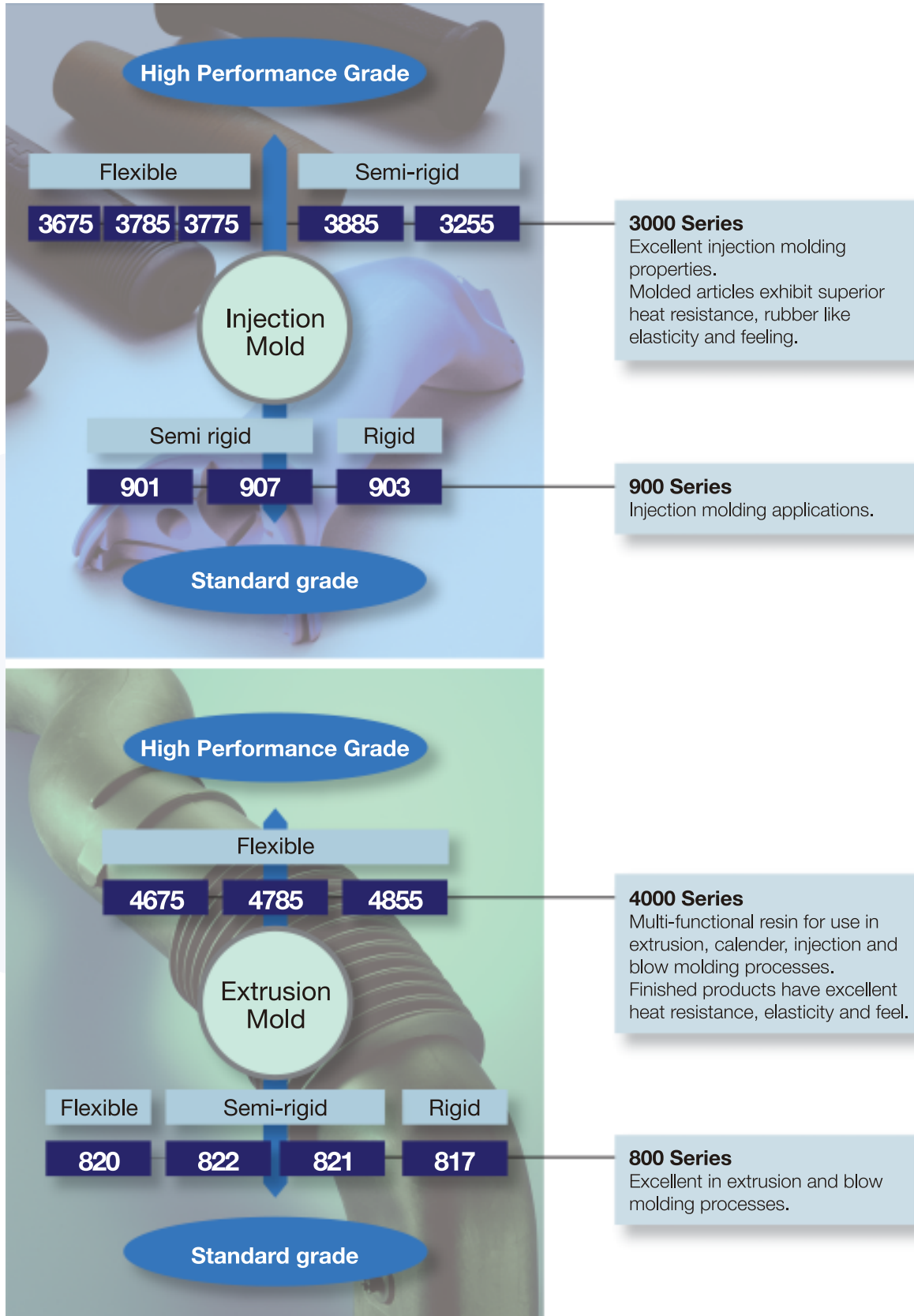
- 1) Processed with conventional thermoplastic manufacturing equipment.
- 2) Molded articles replace conventional rubber products and lower manufacturing costs.
- 3) ESPOLEX TPE Series can be blended with other polyolefins such as polyethylene and polypropylene to create varying ranges of hardness.
- 4) Recyclable.
- 5) Exhibits outstanding physical and chemical characteristics:

Density	880–910kg/m ³
Temperature resistance ..	–50°C–120°C
Weatherability	Outstanding resistance to ozone, ultraviolet light, outdoor exposure
Electrical property	10 ¹⁶ Ω·cm volume resistivity
Exposure to chemicals and liquids.....	Outstanding resistance to polar solvents, acids, alkalis, water, others. Swelling can occur when exposed to mineral oils, gasoline and aromatic hydrocarbon type products.

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GRADE MAP



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SPECIFICATIONS

Injection molding grade

Item			Test method and conditioning	Units	High performance grade					Standard grade		
					Flexible			Semi-rigid		Semi rigid	Rigid	
					3675	3785	3775	3885	3255 Black		901	907
Physical property	Density		ISO 1183	kg/m³	880	880	880	880	880	900	900	910
	Melt flow rate (MFR)		ISO 1133 21,18N	g/10min	–	–	–	1.5	20	8	7	5
			ISO 1133 98,07N	g/10 min	30	50	45	>100	>100	–	–	–
Mechanical property	Durometer A Hardness		ISO 868	–	60	70	75	85	95	–	–	–
	Durometer D Hardness			–	–	–	–	49	41	52	60	
	Flexural modulus		ISO 178	MPa	–	–	–	65	200	170	350	550
	Tensile strength	100% modulus	ISO 37 Type 1A 500mm/min	MPa	1.8	2.6	3.3	3.5	YS 5.9	YS 8.1	YS 11	YS 17
		Breaking strength		MPa	4.6	5.5	5.5	9.3	20	15	15	20
		Elongation at break		%	580	530	450	650	700	620	700	640
	Impact strength	Notched Izod impact at 23°C	ISO 179 3.2mmt	kJ/m²	NB	NB	NB	NB	NB	NB	NB	NB
		Notched Izod impact at –30°C			NB	NB	NB	NB	NB	5	15	54
Thermal property	Brittle temperature		ISO 812 Type A	°C	<–60	<–60	<–60	<–60	<–60	<–60	<–60	–58
Others	Compression set		ISO 37 Type A 23°C 22hrs	%	27	27	30	–	–	–	–	–
			ISO 37 Type A 70°C 22hrs	%	35	35	45	–	–	–	–	–

Major application areas	•Automotive interior (Gasket, grip etc.) •Automotive exterior (mold etc.) •Gasket •Bathroom articles •Mat •Overmolding etc.	•Automotive exterior (Side molding, Mud guard, Weather stripping etc.)	•Automotive exterior (Mud guard, Step mat etc.) •Recreational equipment •Knobs
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- 1) The values given are typical averages and not to be considered as sales specification limits or guaranteed values.
 2) Unless otherwise specified, non-rigid grade test specimens are compression molded while semi-rigid and rigid grade test specimens are injection molded.
 All tests are conducted at 23°C.

Typical injection condition of ESPOLEX TPE Series

- Cylinder temperature
 - Bottom: 180–200°C
 - Center: 200–220°C
 - Top: 210–230°C
 - Nozzle: 210–230°C
- Mold temperature: 40–60°C
- Injection Speed: Faster

Extrusion grade

Item			Test method and conditioning	Units	High performance grade			Standard grade			
					Flexible			Flexible	Semi-rigid		Rigid
					4675	4785	4855	820	822	821	817
Physical property	Density		ISO 1183	kg/m³	880	880	880	880	890	910	890
	Melt flow rate (MFR)		ISO 1133 21,18N	g/10 min	–	–	–	0.5	1	1.2	1.1
			ISO 1133 98,07N	g/10 min	35	40	20	–	–	–	–
Mechanical property	Durometer A Hardness		ISO 868	–	60	65	75	78	90	94	–
	Durometer D Hardness			–	–	–	–	–	40	57	
	Flexural modulus		ISO 178	MPa	–	–	–	24	37	62	360
	Tensile strength	100% modulus	ISO 37 Type 1A 500mm/min	MPa	1.7	2.2	3.0	3.8	YS 4.5	YS 5.4	YS 13
		Breaking strength		MPa	8.8	10	8.1	12	14	16	25
		Elongation at break		%	830	800	730	860	870	810	820
	Impact strength	Notched Izod impact at 23°C	ISO 179 3.2mmt	kJ/m²	NB	NB	NB	NB	NB	NB	NB
		Notched Izod impact at -30°C			NB	NB	NB	NB	NB	NB	6
Thermal property	Brittle temperature		ISO 812 Type A	°C	<–60	<–60	<–60	<–60	<–60	<–60	–45
Others	Compression set		ISO 37 Type A 23°C 22hrs	%	32	32	36	43	33	31	56
			ISO 37 Type A 70°C 22hrs	%	48	48	54	92	71	71	82
Major application areas					●Automotive interior skin ●Sheet ●Tube			●Sheet ●Hose			

- 1) The values given are typical averages and not to be considered as sales specification limits or guaranteed values.
Unless otherwise specified, non-rigid grade test specimens are compression molded.
- 2) Test specimens of 4000 Series are extruded.
- 3) Test specimens of 800 Series tensile tests are extruded. Another tests are compression molded.
- All tests are conducted at 23°C.

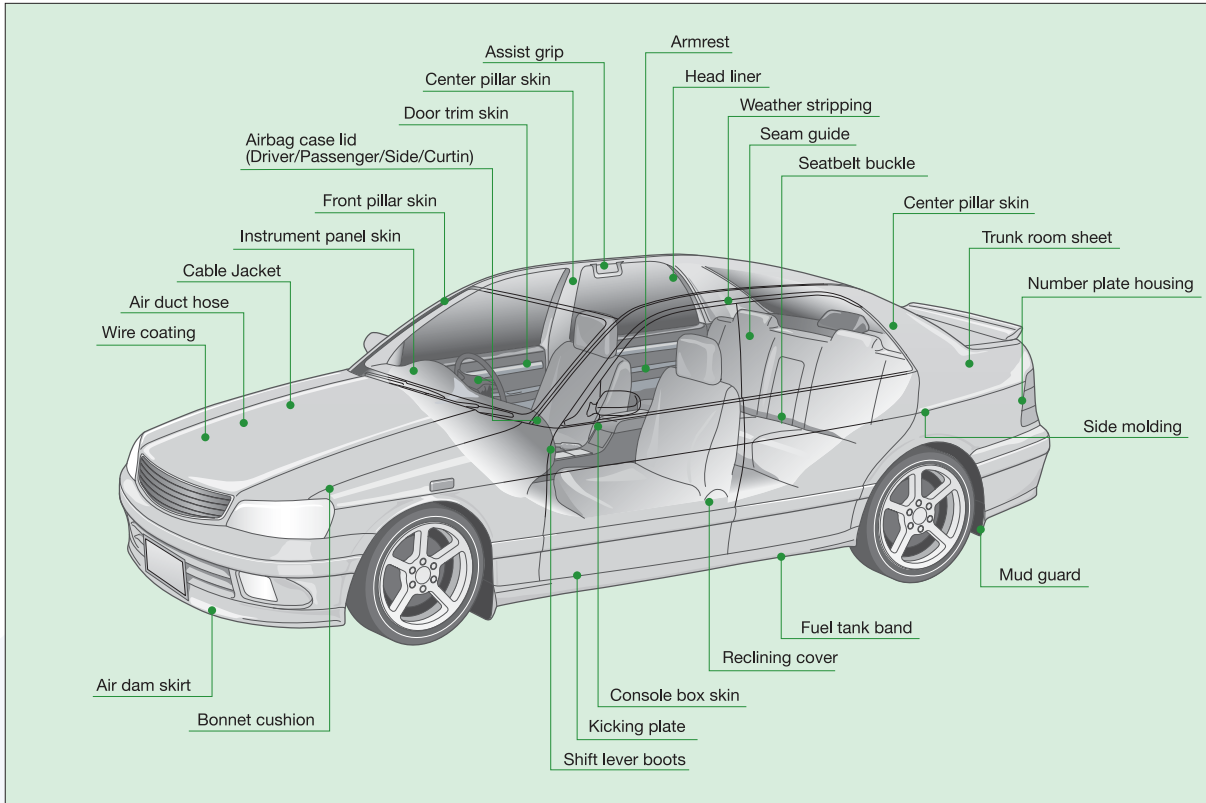
Typical extrusion condition of ESPOLEX TPE Series

- Cylinder temperature
 - Bottom: 170–190°C
 - Center: 180–200°C
 - Top: 190–210°C
 - Nozzle: 210–230°C
- Die temperature: 200–220°C

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APPLICATIONS



Grips, Knob, Handle, etc.



Automotive interior skin



Airbag case lid
(Driver/Passenger/Side/Curtin)



Hose, etc.



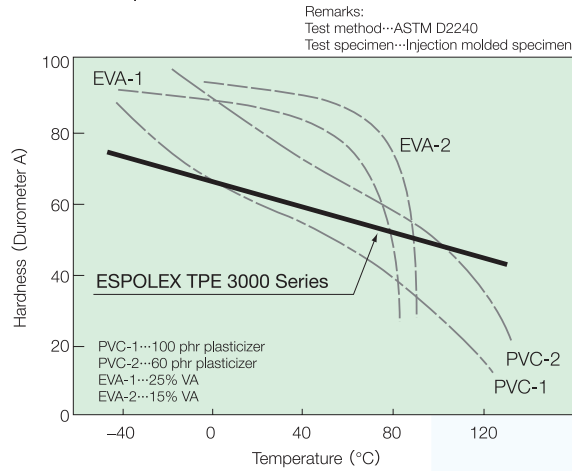
Caps of liquid fertilizers

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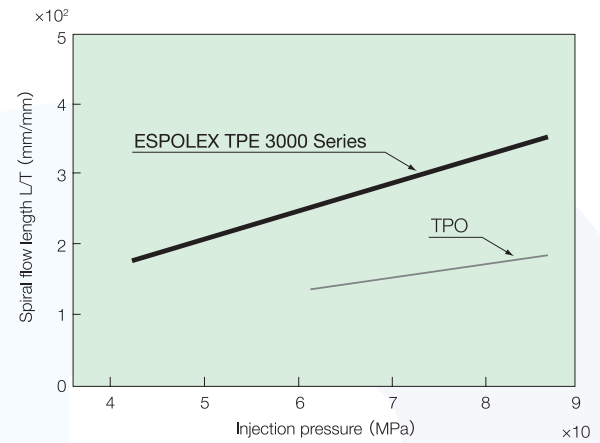
TPE Series

DATA

Effect of temperature on hardness

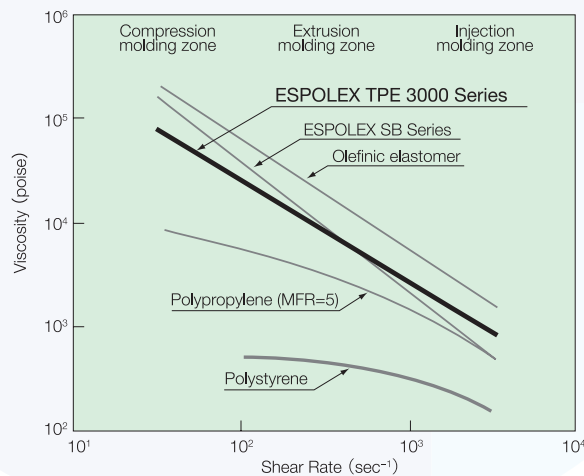


Spiral flow characteristics (230°C)

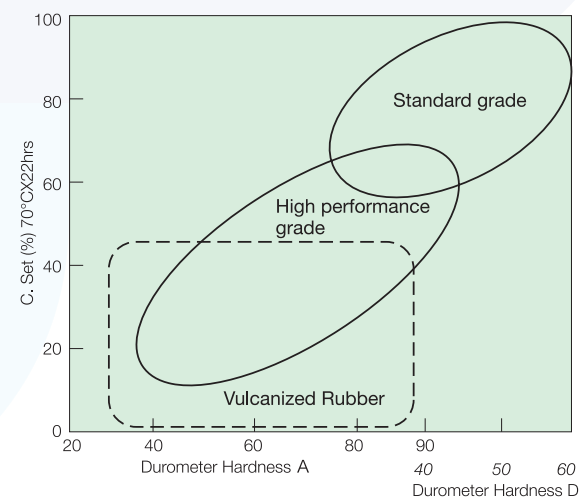


Effect of shear rate on viscosity (200°C)

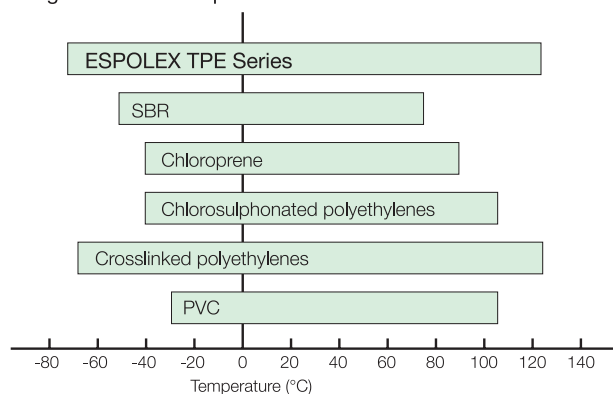
The figure shows the relation between shear rate and viscosity of ESPOLEX TPE Series at 200°C in comparison with other thermoplastic resins and elastomers. Since its viscosity is dependent on shear rate, effective processing control can be achieved through the adjustment of injection pressure and injection speed.



Coverage of hardness and compression set values



Range of service temperature



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Handling and Storage Information of ESPOLEX

Before using ESPOLEX, please refer to the Material Safety Data Sheet (MSDS). The following are general conditions in handling and storage of ESPOLEX. Please use this information for safety handling of ESPOLEX.

1. Health and Safety

During operations such as drying and processing of ESPOLEX, local exhaust ventilation and protective equipment (goggle, gloves and respirator, etc.) are recommended.

- ESPOLEX releases some gases during drying, melting and thermal decomposition. Avoid their inhalation and contact with eyes and skin.
- Never touch hot resin.
- If illness occurs, move the person to a well ventilated area and consult medical attention.

2. Flammability

ESPOLEX should not be used or stored near flames and other sources of ignition.

- ESPOLEX is flammable. If fire occurs, toxic gases containing carbon monoxide can be generated due to incomplete combustion.
- In the case of fire, use water, carbon dioxide or foam/powder extinguishing media to put out the fire.

3. Disposal

For disposal of ESPOLEX (landfill or incineration), employ an authorize contractor or ask local government. Disposal should be conducted in accordance with state and local regulations.

4. Storage

- ESPOLEX should be stored in accordance with state and local regulations.
- If pellets of ESPOLEX fall on a floor or aisle, remove them immediately to prevent possible slipping hazard.
- ESPOLEX should be kept away from direct sunlight, water and moisture and stored at normal room temperature.

Others

In use of ESPOLEX, please pay attention to the relevant intellectual property rights.

<Note>

This information is prepared based on the materials, information and data currently available to us. Revisions will be made when new knowledge or information is obtained.

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www.sumitomo-chem.co.jp/polyolefin/ (Japanese)
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