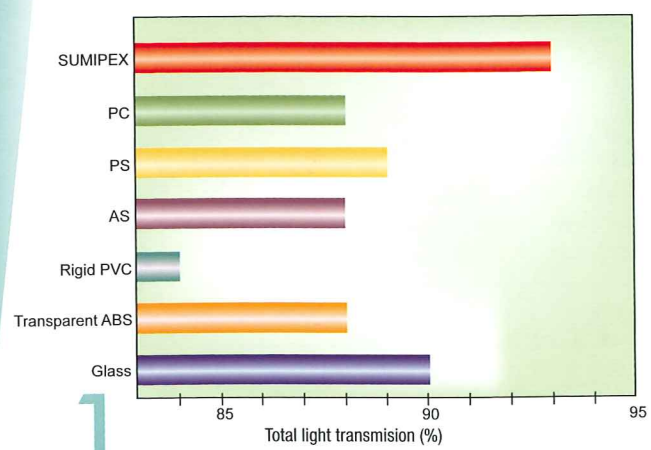


Physical Properties

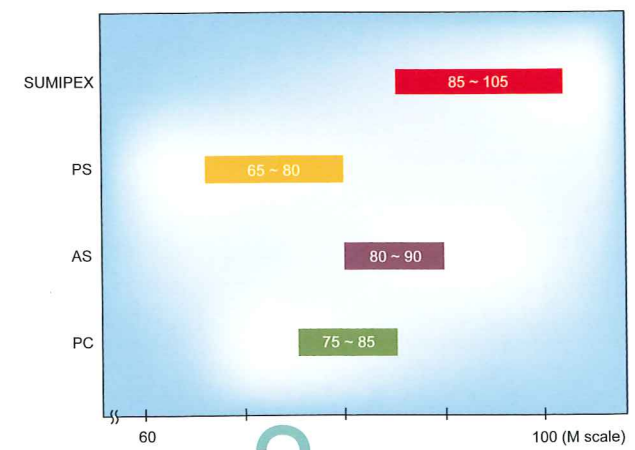
Item	Test method		Unit	High Flow	General	Heat Resistant	Extrusion	Optical	Impact Resistant Grade						
	ISO	JIS		LG2	LG	MH	EX	MGSS	HT20Y	HT25X	HT50Y	HT55X	HT03Y	HT01X	
Optical	Refractive Index	ISO 489	JIS K7142	-	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
	Total Light Transmission	ISO 13468-1	JIS K7361-1	%	92	92	92	92	92	92	92	91	91	91	91
	Haze	ISO 14782	JIS K7136	%	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.7	0.9	0.9	1.1	1.1
Thermal	Coefficient of Linear Expansion	ISO 11359-2	JIS K7197	1/°C	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵	8x10 ⁻⁵	9x10 ⁻⁵	9x10 ⁻⁵	9x10 ⁻⁵
	Vicat Softening Temperature (VST)	ISO 306	JIS K7206 (B50)	°C	95	96	109	104	106	89	108	92	103	93	97
	Deflection Temperature Under Load 1.82 MPa (annealed)	ISO 75-2	JIS K7191 (Af method)	°C	90	91	101	99	96	80	100	84	94	85	87
	Melt Flow Rate (MFR) 230 °C, 37.3N (3.8kgf)	ISO 1133	JIS K7210	g/10min.	15	10	2	1.5	10	24	2	14	2	4	2
Mechanical	Tensile Strength at break	ISO 527-2	JIS K7162	MPa	68	72	76	74	63	57	67	49	56	37	38
	Tensile Strain at break	ISO 527-2	JIS K7162	%	2	3	4	5	2	12	16	35	38	74	74
	Flexural Strength	ISO 178	JIS K7171	MPa	110	115	120	120	94	92	107	80	90	61	64
	Flexural Modulus	ISO 178	JIS K7171	MPa	3000	3000	3100	3100	3100	2600	2800	2300	2500	1700	1800
	Charpy Impact Strength (notched)	ISO 179-1	JIS K7111	KJ/m2	1.4	1.4	1.4	1.4	1.3	1.6	1.8	3.5	3.8	5.2	5.6
	Rockwell Hardness Scale M	ISO 2039-2	JIS K7202	-	94	94	100	100	95	80	90	65	75	50	50
Electrical	Surface Resistivity	IEC 60093	JIS K6911	Ω	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶	>10 ¹⁶
	Volume Resistivity	IEC 60093	JIS K6911	Ω cm	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵
	Insulation Resistance	IEC 60167	JIS K6911	Ω	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵
	Dielectric Strength	IEC 60243-1	JIS K6911	kV/mm	20	20	20	20	20	20	20	20	20	20	20
	Dielectric Constant (1MHz)	IEC 60250	JIS K6911	-	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Other	Specific Gravity	ISO 1183	JIS K7112 (A method)	-	1.19	1.19	1.19	1.19	1.19	1.18	1.18	1.17	1.17	1.15	1.15
	Mold Shrinkage	ISO 294-4	ASTM D-955	%	0.2 - 0.6	0.2 - 0.6	0.2 - 0.6	0.2 - 0.6	0.2 - 0.6	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7
	Water Absorption	ISO 62	JIS K7209	%	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
	Flammability	UL 94		-	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB

The above data are typical laboratory values and are intended to serve as guides only

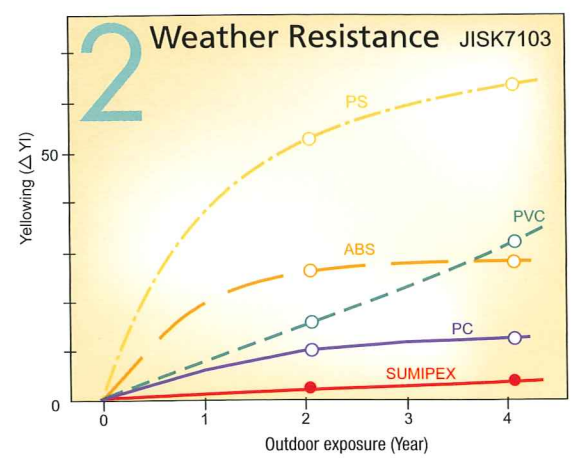
Comparison of SUMIPEX® with Other Transparent Resins



1 Total Light Transmission



3 Rockwell Hardness (ISO-2039-2)



2 Weather Resistance JISK7103

Chemical Resistance

Chemical resistance of SUMIPEX® is shown below. Check the suitability before using. (Contact us regarding the details)

Suitable for SUMIPEX®		Unsuitable for SUMIPEX®	
Aliphatic Hydrocarbon	Paraffin, Hexane	Chlorinated aliphatic hydrocarbon	Methylene chloride, Chloroform, Carbon Tetrachloride
Oils and Fats	Turpentine Oil, Olive oil	Aromatic hydrocarbon	Benzene, Toluene, Xylene
Inorganic Salt Solution	Salt Water	Alicyclic hydrocarbon	Cyclohexane
Gas	Oxygen, Nitrogen, Carbon Dioxide	Ketone	Acetone, MEK
Dilute Acid	Dilute Hydrochloric acid, 30% sulfuric acid	Alcohol	Methyl alcohol
Alkali	Sodium carbonate Sodium Hydroxide	Ether	Diethyl ether
Dilute Alcohol	10% Methyl Alcohol	Ester	Plasticizer (DOP, DBP, ETC.) Ethyl acetate
Antifreeze Liquid	Ethylene Glycol		

Typical Injection Molding Conditions

Molding conditions are affected by type and capacity of molding machine, shape and weight of molding products, and/or structure of mold. Typical injection molding conditions of each grade of SUMIPEX® are recommended below.

Grade		LG/LG2	MH	MGSS	HT55X/HT01X
Pre-drying Conditions	Temp. °C	70 - 80	80 - 90	80 - 85	80 - 85
	Time hr	4 - 6	4 - 6	4 - 6	4 - 6
Barrel Temp.	Front °C	225 - 245	240 - 260	220 - 235	240 - 260
	Middle °C	220 - 240	230 - 260	215 - 225	230 - 245
	Back °C	210 - 220	220	210	220
Mold Temp.	°C	60 - 85			
Injection Pressure	MPa	140 - 160			
Hold Pressure	MPa	20 - 100	20 - 80		
Back Pressure	gage MPa	1.1 - 1.4	0.9 - 1.4		
Screw Speed	rpm	30 - 70	40 - 60		
Cooling Time	sec.	20 - 60			

<Note> Typical Injection Molding Conditions of other HT grade will be provided upon request

Typical Annealing Conditions

To reduce internal stress which may lead to crazing, please refer to the table below for annealing conditions.

Grade	EX/MH/MGSS/HT/55X/HT01X	LG/LG2
Temp. °C	75-85	60-80
Time hr	4	4

Typical Extrusion Molding Conditions

Please refer to the table below for typical extrusion molding conditions.

Item		MH/EX/HT55X/HT01X
Screw L/D		30-35
Cylinder Temperature °C	Hopper Side	200-210
	Center Side	230-240
	Die Side	240-245
Die Temperature °C		235-245

Authorised Standards

UL Standard (U.S.A.)

File No. E202194	LG, LG2, MH, EX
File No. E54705B	All HT Grades, MGSS

RoHS (Restriction of Use of Hazardous Substances) Directive 2002/95/EC

Element/ Compound Name	Results
Cadium (Cd)	Not Detected All Grades
Lead (P)	Not Detected All Grades
Mecury (Hg)	Not Detected All Grades
Hexavalent Chromium	Not Detected All Grades
PBBs (Polybrominated Biphenyl)	Not Detected All Grades
PBDEs (Polybrominated Diphenyl Ether)	Not Detected All Grades

Test For FDA Regulation of Acrylic

With reference to U.S. 21 CFR Food and Drug Administration Part 177.1010 Clause B	
SUMIPEX® MH, LG, LG2	Suitable for use in contact with all types of food except high alcoholic content foods (greater than 8 percent alcohol), in the condition of the hot filled /pasteurized above 150F (for aqueous & fatty foods) and at room temperature filled and stored (for alcoholic foods)

Automotive Safety Standard (FMVSS) (U.S.A.)

SUMIPEX® MH are authorized in SAE Standard. Clear, Amber, Red are registered in AMECA List.

UL = Underwriters Laboratories
 FMVSS = Federal Motor Vehicle Safety Standard
 SAE = Society of Automotive Engineers, Inc

Types of Packaging



25kgs Paper Bag/ Resin Bag



19,000kgs Seabulk Bag



750kgs Flexicon Bag

Important Notes When using SUMIPEX®

The following considerations are important to achieve optimal quality in the molded product.

Dust Prevention

- PMMA resin has such a superior gloss and transparency that even a small dust can spoil its external appearance.
- Handle SUMIPEX® in a clean or dust-free environment.
- When opening bag, special care should be taken to prevent dust and paper fibre from entering the bag.

Contamination Prevention

- Even a little contamination with other resins causes white muddiness and/or haze in the molded product.
- All equipment (hopper dryer, barrel, screw, nozzle, etc.) should be thoroughly cleaned before using SUMIPEX®.

Moisture Prevention

- PMMA resin absorbs much moisture in the humid atmosphere.
- SUMIPEX® should always be stored in a dry environment.

Handling & Storage Information

SUMIPEX® is a thermoplastic. It is a flammable resin and is soluble in organic solvents. Before using SUMIPEX®, please refer to the Material Safety Data Sheet (MSDS) separately prepared by us. Following are general precautions in handling and storage of SUMIPEX®. Please use this information for safe use of SUMIPEX®.

Health and Safety

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

- SUMIPEX® releases gases due to drying, melting and thermal decomposition. Avoid their inhalation and contact with eyes and skin.
- Never touch hot resin directly.
- When feeling sick due to inhalation, rest in a well ventilated place and, if necessary, see a doctor.

Flammability

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

- SUMIPEX® is flammable. If it should catch fire, 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.

Disposal

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

Storage

- SUMIPEX® should be stored in accordance with state and local regulations.
- If SUMIPEX® pellets fall onto the floor or aisle, remove them immediately to prevent possible slipping hazard.
- SUMIPEX® should be kept away from direct sunlight, water and moisture and stored at ambient temperature.

Others

All technical information and data in this brochure are believed to be accurate and reliable. However we do not guarantee results, freedom from patent infringement, or suitability of our products for any resultant application.

<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.