

SAMSUNG SDI



# starex<sup>®</sup>

ABS, ABS Alloy, ASA

ENJOY OUR EXCELLENCE AND EXPERTISE



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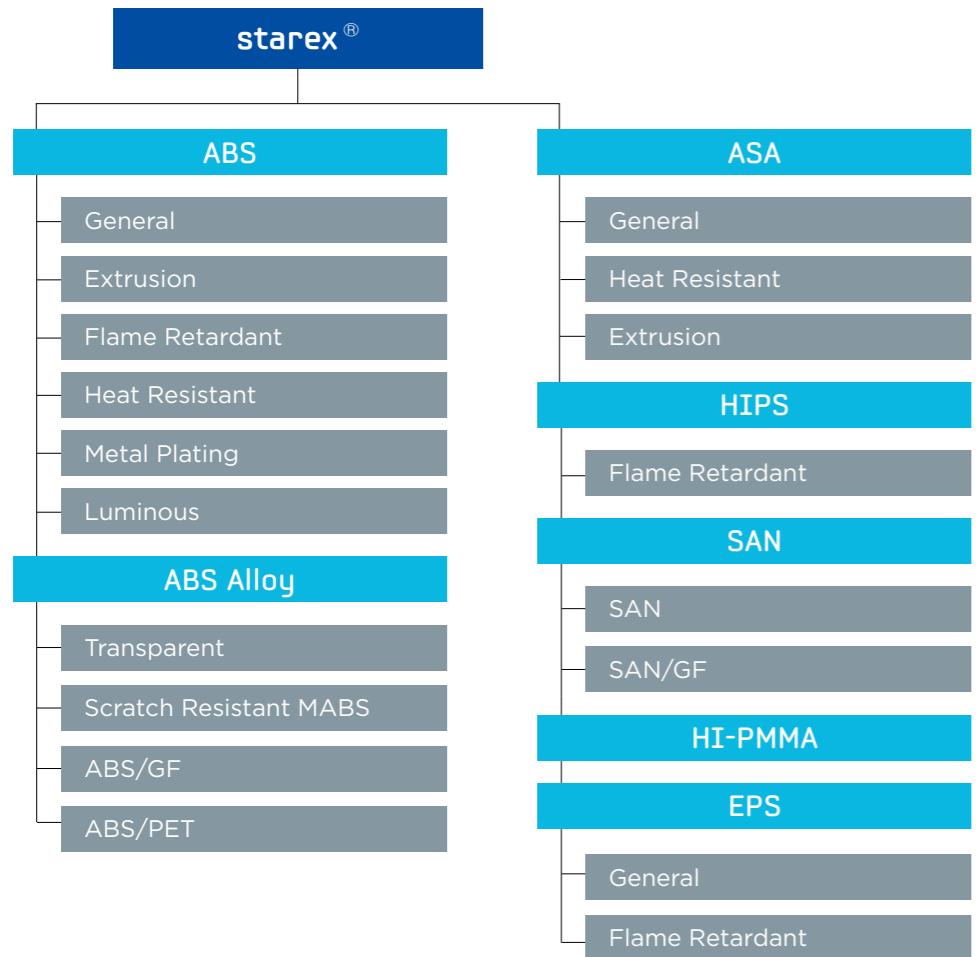
**starex®**

starex® is the styrene product brand of SAMSUNG SDI, representing the company's value that the top experts in the field and it can provide the best experience to its customers.

starex® covers the styrene product groups such as ABS, ASA, EPS, SAN, while offering high-functionality choices through various lineups.



# Product Portfolio



## starex® ABS

starex® ABS is a practical material and that has great workability, high impact, and high modulus characteristics, as well as excellent colorability and gloss. starex® ABS maintains superb resistance to impact across a wide range of temperatures, as well as tensile strength, rigidity, and heat resistance.

## starex® ABS Alloy

starex® ABS Alloy is an advanced high performance resin such as transparent ABS, non-painting scratch-resistant MABS, eco-friendly PCM based materials and ABS/GF. SAMSUNG SDI has differentiated product portfolio of ABS resin.

## starex® ASA

starex® ASA is a high weatherable resin having superior chemical stability, while maintaining excellent glossiness, moldability, and mechanical properties of ABS resin. starex® ASA is suitable for exterior materials because it does not discolor under UV exposure over a long time and its physical properties do not change much.

# starex® General Purpose ABS

starex® ABS, composed of AN, BD and SM, has excellent processability, heat stability and impact strength. It is applicable to various products such as electrical and electronic devices, home appliances and toys.



## KEY FEATURES

- Excellent balance of properties
- High gloss
- Excellent heat stability
- Good processability suitable for various applications

## APPLICATIONS

- TV
- Home appliances
- Toy
- Automotive
- Stationery

## PRODUCT LINE-UP

GENERAL	HIGH FLOW	HIGH GLOSS	FUNCTIONAL
<ul style="list-style-type: none"> <li>General</li> <li>SD-0150</li> <li>SD-0150GP</li> <li>SD-0150UF</li> <li>SD-0150AT</li> <li>SD-0150 W</li> <li>CM-0140UV</li> </ul>	<ul style="list-style-type: none"> <li>General</li> <li>HF-0660I</li> <li>HF-0660IW</li> <li>High Flow</li> <li>HF-0680</li> <li>Ultra High Flow</li> <li>HF-0690 M</li> </ul>	<ul style="list-style-type: none"> <li>High Gloss</li> <li>HG-0760</li> <li>HG-0760TV</li> <li>HG-0760GP</li> <li>Ultra High Gloss</li> <li>HP-0500</li> <li>SG-0167</li> </ul>	<ul style="list-style-type: none"> <li>Anti-Static</li> <li>AS-0151BS</li> <li>EA-0640</li> <li>Anti-Bacterial</li> <li>NA-0660I</li> <li>Low Gloss</li> <li>SL-0100</li> </ul>
<ul style="list-style-type: none"> <li>High Impact Strength</li> <li>SD-0170</li> <li>SD-0170 W</li> </ul>			
<ul style="list-style-type: none"> <li>Ultra High Impact Strength</li> <li>SD-0190H</li> </ul>			
<ul style="list-style-type: none"> <li>High Modulus for</li> <li>BC-0130 X</li> </ul>			
<ul style="list-style-type: none"> <li>Chemical Resistant</li> <li>EG-0763</li> </ul>			

# starex® Extrusion ABS

starex® Extrusion ABS is most suitable for refrigerator liners and construction components. The plastic has good sheet extrusion stability, chemical resistance and vacuum moldability. starex® extrusion ABS for refrigerators especially is the world-class product with the biggest global market share.

## KEY FEATURES

- Superb thin wall vacuum forming capability
- Aesthetically advanced high gloss feature
- Outstanding impact strength & tensile strength
- Excellent chemical resistance & crack resistance

## APPLICATIONS

- Refrigerator
- Construction & Pipe

## PRODUCT LINE-UP

REFRIGERATOR INNER LINER	CONSTRUCTION MATERIAL	PIPE
<ul style="list-style-type: none"> <li>CP</li> <li>General <ul style="list-style-type: none"> <li>SV-0167</li> </ul> </li> <li>Thin wall <ul style="list-style-type: none"> <li>QU-0191 S</li> </ul> </li> <li>High Impact at low temp <ul style="list-style-type: none"> <li>ST-0185</li> </ul> </li> <li>141B <ul style="list-style-type: none"> <li>ES-0173</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>General <ul style="list-style-type: none"> <li>SV-0167</li> <li>UV Resistant <ul style="list-style-type: none"> <li>SV-0165 U</li> </ul> </li> <li>Less Odor <ul style="list-style-type: none"> <li>SV-0167 D*</li> </ul> </li> </ul> </li> <li>SH-0160</li> </ul>	<ul style="list-style-type: none"> <li>High Impact <ul style="list-style-type: none"> <li>SP-0170</li> </ul> </li> <li>High Pressure <ul style="list-style-type: none"> <li>SP-0180</li> <li>SP-0183</li> </ul> </li> </ul>



\*Under development

# starex® Flame Retardant ABS

starex® Flame Retardant ABS is specially formulated to have the self-extinguishability making it much safer for the use in the electrical & electronic applications complying with the UL 94 regulations, the most widely accepted fire safety standards. starex® Flame Retardant ABS is taking its lead in the global market thanks to its excellent balance of mechanical properties and processability.



## KEY FEATURES

- High heat stability and good processability
- Excellent colorability
- Well-balanced physical properties

## APPLICATIONS

- TV
- Monitor
- OA machine
- Wiring device

## PRODUCT LINE-UP

NON-HALOGEN	BR	BEO
<ul style="list-style-type: none"> <li>V-2 <ul style="list-style-type: none"> <li>General <ul style="list-style-type: none"> <li>NH-0825</li> <li>NH-0925 S</li> </ul> </li> <li>Heat Resistant <ul style="list-style-type: none"> <li>NH-0927</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>TBBA <ul style="list-style-type: none"> <li>1.5T V-0 <ul style="list-style-type: none"> <li>VH-0800</li> </ul> </li> <li>2.0T V-0 <ul style="list-style-type: none"> <li>VH-0815</li> </ul> </li> <li>2.5T V-0, 3.0T 5VB <ul style="list-style-type: none"> <li>VH-0819 (High Flow)</li> </ul> </li> <li>2.5T V-0 <ul style="list-style-type: none"> <li>VH-0810</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>BEO <ul style="list-style-type: none"> <li>1.5T V-0, 2T 5VB <ul style="list-style-type: none"> <li>VE-0856</li> </ul> </li> <li>1.5T V-0, 2.5T 5VB <ul style="list-style-type: none"> <li>VE-0860 P</li> <li>VE-0860EX</li> </ul> </li> <li>1.5T V-0 <ul style="list-style-type: none"> <li>VE-0812</li> </ul> </li> <li>2.0T V-0 <ul style="list-style-type: none"> <li>VE-0852 (Chemical Resistant)</li> </ul> </li> <li>2.0T V-0, 2.5T 5VB, 3.0T 5VA <ul style="list-style-type: none"> <li>VE-0855YS</li> </ul> </li> <li>2.1T V-0, 2.5T 5VA <ul style="list-style-type: none"> <li>VE-0858</li> </ul> </li> </ul> </li> </ul>

# starex® Heat Resistant ABS

Although general purpose ABS has mechanical properties good enough for the practical use in terms of processability, impact strength, etc, its use is sometimes limited at high temperature due to the deformation of its molded products by heat.

starex® High Heat Resistant ABS offers an attractive alternative to general purpose ABS and other engineering plastics making it suitable for the applications designed for the use at high temperature.



## KEY FEATURES

- Low TVOC • High heat resistance
- Chemical resistance • High flowability

## APPLICATIONS

- Automotive interior: Cockpit module parts, Power window, Switch panel, Pull handle, Console

## PRODUCT LINE-UP

EXTRUSION	INJECTION
Blow Molding	General └ SR-0300 (VST 102)
BM-0320 J	Semi Heat Resistant (Under VST 105) └ SR-0310
SR-0320BM	└ SR-0315 V └ SR-0310FM
	Heat Resistant (VST 106~110) └ SR-0320 K
	└ Low TVOC └ SR-0320LT* └ SR-1320LT*
	Super Heat Resistant (Over VST 111) └ SR-0325LT (Low TVOC) └ SR-0330M └ SR-0340M

\*Under development

# starex® Metal Plating/Painting ABS

In general, ABS is a suitable material for metal plating. In consideration of better productivity, however, the material should be more easily etched and have better adhesion strength. starex® Metal Plating ABS generates uniform anchor holes during the etching process and has excellent adhesion strength making it possible to achieve higher productivity and lower metal plating rejections.



## KEY BENEFITS

- |  |   |
|--|---|
| <b>METAL PLATING</b>   | <b>PAINTING</b>   |
| <ul style="list-style-type: none"> <li>• High adhesion strength</li> <li>• Excellent appearance</li> <li>• Chemical resistance</li> <li>• Dimensional stability</li> </ul> | <ul style="list-style-type: none"> <li>• Chemical resistance</li> <li>• Painting uniformity</li> <li>• Excellent painting appearance</li> </ul> |

## APPLICATIONS

- |   |  |
|---|--|
| <b>METAL PLATING</b>  | <b>PAINTING</b>  |
| <ul style="list-style-type: none"> <li>• Automotive exterior: Radiator grille, Rear garnish, Emblem, Outside mirror, Door handle</li> <li>• TV: Stand base</li> </ul> | <ul style="list-style-type: none"> <li>• Bike</li> </ul> |

## PRODUCT LINE-UP

METAL PLATING	PAINTING
<ul style="list-style-type: none"> <li>└ MP-0160 R (General)</li> <li>└ MP-0670 (Good Appearance)</li> </ul>	<ul style="list-style-type: none"> <li>└ PT-0170 M (Chemical Resistance)</li> <li>└ PT-0180 (General)</li> </ul>

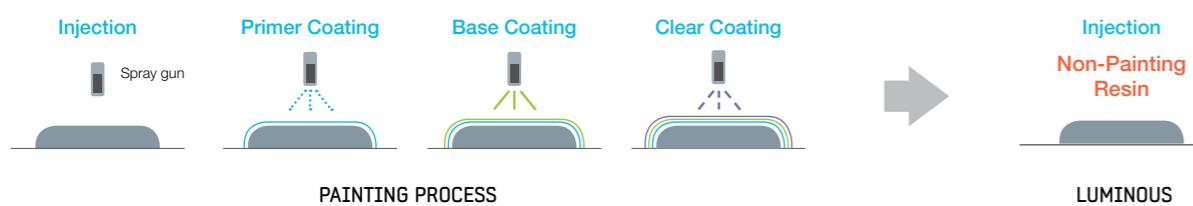
## starex® Luminous

Luminous is a premium-class “non-painting resin” that enables the manufacturing of plastic parts without painting. Bright, high gloss and metallic-look Luminous gives off the appearance of a painted surface and has improved features in terms of flow mark and weld line, compared with existing metallic resins.



### KEY FEATURES

- Fine exterior: Metallic-look without painting
- Eco-friendly process: Cost reduction through process simplification, Recyclability (No painting), Eco-friendly manufacturing process (No solvent use)
- A wide range of various visual effects available



### APPLICATIONS

- Refrigerator: Home bar, Dispenser, Door cap
- Vacuum cleaner: Dust cover, Cover control, Hand grip
- Washing machine: Top cover, LID, Control panel, Detergent drawer panel

### PRODUCT LINE-UP

LUMINOUS S	LUMINOUS P	LUMINOUS M	LUMINOUS XM
– LX-0760	– LX-0951	– LX-0981	LM-0990
– LX-0971	– LX-0957	– LX-0981F (Scratch Resistant)	
– LX-0970 L	– LX-0957EX	– LX-0987EX	

## starex® Transparent ABS

starex® Transparent ABS is deliberately formulated to have an excellent balance of transparency, mechanical properties, and processability, making it suitable for the applications such as home appliances, OA machines, and toys that need both transparency and good mechanical properties.



### KEY FEATURES

- Super clear transparency
- Excellent color consistency & stability
- Well-balanced properties

### APPLICATIONS

- Washing machine: Top cover
- Vacuum cleaner: Dust box
- TV frame
- Miscellaneous: Toy, Dispenser, Food containers

### PRODUCT LINE-UP

GENERAL	HIGH IMPACT	SPECIALTY
TX-0510T	TX-0520T TX-0530T	TX-0510F (NSF Certification)

**starex®**

## Scratch Resistant MABS

starex® MABS(ABS/PMMA) has excellent processability and high impact strength as well as scratch resistance and excellent coloring properties originated from PMMA. starex® MABS offers deep color effects without painting. Its superior surface quality makes it suitable for the exterior parts of electrical and electronic devices. SAMSUNG SDI is taking the lead in the scratch resistant materials market for TV housing.



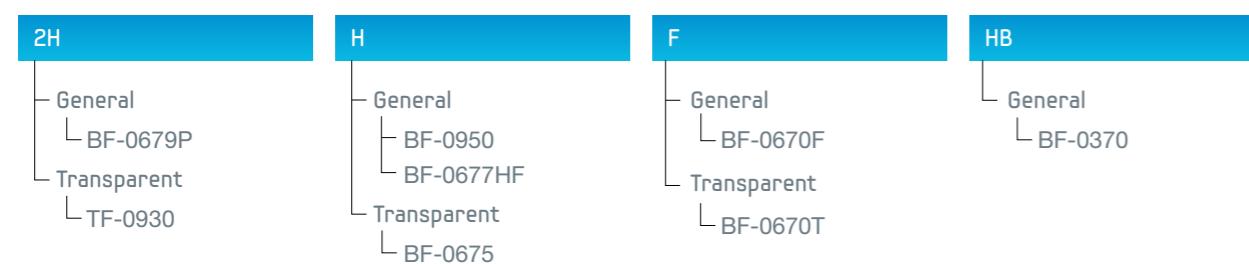
### KEY FEATURES

- Pencil scratch resistance: H or higher
- Excellent surface gloss
- No need to coat: Cost reduction, environment-friendly
- Good chemical resistance to especially IPA and ethanol

### APPLICATIONS

- TV
- Monitor
- Home theater

### PRODUCT LINE-UP



\*Under development

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## High Impact Strength ABS/GF

starex® ABS/GF, glass fiber reinforced ABS, features excellent flexural modulus, heat resistance, and dimensional stability. starex® ABS/GF is applicable to frames and precision parts that require high flexural modulus and dimensional stability.



### KEY FEATURES

- High impact strength & heat resistance
- Low changes in the mechanical property over a wide temperature range
- Dimensional stability

### APPLICATIONS

- TV
- Monitor
- OA machine
- Air conditioner fan

### PRODUCT LINE-UP

GENERAL	FLAME RETARDANT
GF5% └ GR-4005	GF10% └ VG-4910
GF10% └ GR-4010	GF20% └ VG-4920
GF15% └ GR-4015A	VG-4920F
GF20% └ GR-4020	
GF30% └ GR-4030	

## starex® PCM based ABS/PET

Eco-friendly PCM, which utilizes waste plastics, helps save the resources and reduce the emissions of CO<sub>2</sub>, while meeting the requirements of eco-friendly certifications such as EPEAT and TOC, as well as the RoHS regulation. SAMSUNG SDI has developed the world-first environment-friendly PCM based materials suitable for monitors, OA machines, mobile phone exteriors and automotive components.



### KEY FEATURES

- Chemical resistance & well-balanced properties
- Easier to comply with eco-certifications (EPEAT Gold & TCO Edge)
- Reduction of CO<sub>2</sub> emission

### APPLICATIONS

- Monitor
- OA machine

### PRODUCT LINE-UP

GENERAL	FLAME RETARDANT
Chemical Resistant └ EG-7000	
Eco-Friendly └ PCM 15% └ GC-0703 └ PCM 28% └ GC-0700 └ PCM 35% └ GC-0710 └ PCM 70% └ GC-0750	Eco-Friendly └ GC-0920*

\*Under development

## starex® Weather Resistant ASA

starex® ASA has both superior weatherability and impact strength. It also has outstanding color fastness and gloss retention, as well as dimensional stability. Thanks to such properties, it can be used for various outdoor applications such as automotive, construction materials, ships, and leisure products.



### KEY FEATURES

- Excellent weatherability
- Superior impact strength
- Color fastness & Gloss retention

### APPLICATIONS

- Automotive: Outside mirror, Rear lamp housing, Radiator grille
- Building & Construction: Window profile, Roofing, Rain gutter, Fencing
- Home appliances
- Sports & Leisure

### PRODUCT LINE-UP

INJECTION	EXTRUSION								
<table border="1"> <tr> <td>General</td> <td>Heat Resistant</td> <td>Specialty</td> </tr> <tr> <td>└ High Flow   └ WX-9120   └ WR-9120J   └ WR-9120 └ High Impact Strength   └ WX-9130</td> <td>└ Heat Resistant   └ WX-9300UV   └ WX-9310UV   └ WR-9300HF └ High Heat Resistant   └ WX-9330UV   └ WR-9330I</td> <td>└ Chemical Resistant   └ WX-9820 └ Home Appliances   └ WX-9520</td> </tr> </table>	General	Heat Resistant	Specialty	└ High Flow └ WX-9120 └ WR-9120J └ WR-9120 └ High Impact Strength └ WX-9130	└ Heat Resistant └ WX-9300UV └ WX-9310UV └ WR-9300HF └ High Heat Resistant └ WX-9330UV └ WR-9330I	└ Chemical Resistant └ WX-9820 └ Home Appliances └ WX-9520	<table border="1"> <tr> <td>High Flow └ WX-9700</td> </tr> <tr> <td>High Impact Strength └ WX-9750</td> </tr> </table>	High Flow └ WX-9700	High Impact Strength └ WX-9750
General	Heat Resistant	Specialty							
└ High Flow └ WX-9120 └ WR-9120J └ WR-9120 └ High Impact Strength └ WX-9130	└ Heat Resistant └ WX-9300UV └ WX-9310UV └ WR-9300HF └ High Heat Resistant └ WX-9330UV └ WR-9330I	└ Chemical Resistant └ WX-9820 └ Home Appliances └ WX-9520							
High Flow └ WX-9700									
High Impact Strength └ WX-9750									

# starex® General Purpose ABS

General ABS																General ABS			High Flow ABS			High Gloss ABS			Functional					
Properties	Test Method	Condition	Unit	SD-0150	SD-0150GP	SD-0150UF	SD-0150AT	SD-0150 W	CM-0140UV	SD-0170	SD-0170 W	SD-0190H		BC-0130 X	EG-0763	HF-0660I	HF-0660IW	HF-0680	HF-0690 M	HG-0760	HG-0760TV	HG-0760GP	HP-0500	SG-0167	AS-0151BS	EA-0640	NA-0660I	SL-0100		
<b>PHYSICAL PROPERTIES</b>																														
Melt Flow Index	Specific Gravity	ASTM D792	-	g/cm³	1.04	1.04	1.04	1.04	1.04	1.03	1.04	1.03			1.05	1.04	1.04	1.04	1.04	1.1	1.08	1.04	1.04	1.05	1.05	1.04	1.05	1.04	1.03	
	ASTM D1238	220°C, 10kg	g/10min		11	19		11.5		9.8						12										20	5.5			7.5
					2.5	2.2		2.2	3		1.4					2.6		3.3	3.5	5.5	8.9	3.3	6.2	3.8			3.5	1.8	3.2	
	ISO 1133	220°C, 10kg	g/10min		11	20		11.5		9.8						12										20	5.5			7.5
					2.5	2.2		2.2	3		1.4					2.6		3.3	3.5	5.5	8.9	3.3	6.2	3.8			3.5	1.7	3.2	
Mold Shrinkage	ASTM D955	-	%	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.4-0.7	0.4-0.7	0.4-0.7			0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.35-0.43	0.3-0.6	0.45-0.55	0.35-0.42	0.3-0.6	0.3-0.6	0.4-0.7			
<b>MECHANICAL PROPERTIES</b>																														
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm²	420	360	400	400	410	430	320	340	350			490	380	400	400	420	400	400	420	400	520	510	410	510	390		
	ISO 527-1A	50mm/min	Mpa	51	45	48	40	42	45	40	34	38			55	36	45	47	46	43	48	47	45	59	58	40	49	44	35	
Tensile Strain at Break	ASTM D638	5mm/min	%			16					91					14	46				20			24	39	18	58	20	30	
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	630	590	600	530	630	640	520	500	480			720	550	600	600	630	640	610	620	600	810	780	600	750	590	450	
	ISO 178	2mm/min	Mpa	76	72	68	69	63	65	62	50	59			50	72	76	74	68	77	71	72	88	87	65	71	57			
Flexural Modulus	ASTM D790	2.8mm/min	kgf·cm/cm²	21,000	21,000	20,000	20,000	22,000	21,000	17,000	17,000	17,000			22,000	20,000	22,000	22,000	21,000	24,000	21,000	22,000	20,000	26,000	24,000	22,000	26,000	21,000	16,000	
	ISO 178	2mm/min	Mpa	2,500	2,400	2,200	2,350	2,200	2,000	2,000	1,700	1,900			2,700	2,000	2,300	2,500	2,600	2,300	2,600	2,400	2,400	2,800	2,600	2,100	2,200	2,300	1,800	
Izod Impact Strength	ASTM D256	(notched)1/4	kgf·cm/cm	20	28	29	33	18	20	35	33	40			10	26	20	20	20	13	21	16	23	13	7.5	21	20	22	6	
		(notched)1/8	kgf·cm/cm			36									12	32				15			24	13	9	24	19	35	7	
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m²	17	26	32	33	19	20	30	30	44			16		21	20	19	17	20	16	20	12	24	20	22	23	11	
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m²	17	25	30	30		20	29		42					20	20	18	18	20	15	20	12	22	18	20	22	12	
Rockwell Hardness	ASTM D785	R-Scale		109	105	103	106	110	109	95	95	95			113	100	109	112	107	109	113	110	108	116	115	109	96	107	97	
	ISO 2039-2	R-Scale		113	108	102	104	110	109	101	95	95			115	100	111	112	111	109	113	110	110	117	114	109	104	106	93	
<b> THERMAL PROPERTIES</b>																														
Heat Deflection Temperature	ASTM D648	18.56kgf/cm² 6.4mm	°C	84		84	85		76			84			86	84	84		85	82	84			91	90	84	83	82		
	ISO 75-2	1.8MPa, 4.0mm	°C	79	79	79			78		78				80		74													
		0.45MPa, 4.0mm	°C	92	90	90			75	90		92			92		86													
VICAT Softening Temperature	ISO R306	B/50	°C	98	97	96	96	99	95	94	93	94			99	95	92	95	97	93	96	95	94	103	103	95	98	99	97	
<b>FLAME CHARACTERISTICS</b>																														
Flammability	UL94	-	-	HB	HB	HB	HB	HB																						

# starex® Extrusion ABS

Extrusion ABS													
Properties	Test Method	Condition	Unit	SV-0157	QU-0191 S	ST-0185	ES-0173	SV-0167	SV-0165 U	SH-0160	SP-0170	SP-0180	SP-0183
<b>PHYSICAL PROPERTIES</b>													
Specific Gravity	ASTM D792	-	g/cm²	1.04	1.04	1.04	1.04	1.03	1.04	1.04	1.03	1.04	1.04
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min	5.2	4.3	4.3	2.6	5.4	8.2	8	7.1	6	3.5
		200°C, 5kg	g/10min										
	ISO 1133	220°C, 10kg	g/10min		4.3	4.3	2.6	5.4	8.8	8	7.1	6	3.5
		200°C, 5kg	g/10min										
Mold Shrinkage	ASTM D955	-	%	0.4-0.6	0.4-0.6	0.4-0.6	0.4-0.6	0.4-0.6	0.4-0.6	0.4-0.6	0.4-0.6	0.41-0.5	
<b>MECHANICAL PROPERTIES</b>													
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm²	410	490	470	400	400	400	410	390	370	420
		5mm/min	Mpa										42
	ISO 527-1A	50mm/min	Mpa		52	49	41	44	51	43	45	46	
Tensile Strain at Break	ASTM D638	5mm/min	%		80	35	60	50		80	50		50
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	550	720	580	530	570		560	540	550	620
		2mm/min	Mpa		82	76	64	67	81		63	65	70
	ISO 178	5mm/min	Mpa							58			
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	20,000	24,500	21,500	19,000	20,000		19,000	17,500	19,000	19,000
		2mm/min	Mpa		2,700	2,500	2,000	2,200	2,800		2,000	2,100	2,200
	ISO 178	5mm/min	Mpa							80			
Izod Impact Strength	ASTM D256	(notched)1/4	kgf·cm/cm	26	24	30	36	37	22	33	39	38	41
		(notched)1/8	kgf·cm/cm		27	105	45	44		45	48		
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m²		27	35	42	36	17		39	38	35
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m²		26	35	44	33	21	45	36	36	35
Rockwell Hardness	ASTM D785	R-Scale		106	108		97	100	109	100	94	98	100
	ISO 2039-2	R-Scale			110	107	97	103	112	100	100	101	100
<b>THERMAL PROPERTIES</b>													
Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C		91	91	89	89		90	88		91
		1.8MPa, 4.0mm	°C		82	85	80	78	81		77	77	81
VICAT Softening Temperature	ISO R306	B/50	°C	101	101	100	97	97	100	99	97	97	101
<b>FLAME CHARACTERISTICS</b>													
Flammability	UL94	-	-	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB

# starex® Flame Retardant ABS

Flame Retardant ABS											
Properties	Test Method	Condition	Unit	NH-0825	NH-0925 S	NH-0927	VH-0800	VH-0801	VH-0819	VH-0810	
<b>PHYSICAL PROPERTIES</b>											
Specific Gravity	ASTM D792	-	g/cm²	1.05	1.05	1.05	1.17	1.15	1.16	1.16	1.16
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min								
		200°C, 5kg	g/10min	8.2	6.5	3.5	5.4	3.8	8.8	6	
	ISO 1133	220°C, 10kg	g/10min								
		200°C, 5kg	g/10min								
Mold Shrinkage	ASTM D955	-	%	0.3-0.6	0.3-0.6	0.3-0.6	0.30-0.37	0.34-0.41	0.45-0.65	0.28-0.34	
<b>MECHANICAL PROPERTIES</b>											
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm²				420	550	420	400	400
		50mm/min	Mpa				420				
	ISO 527-1A	50mm/min	Mpa	46							
Tensile Strain at Break	ASTM D638	5mm/min	%				25	25	14	17	10
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	660	640	670	620	600	610	610	
		2mm/min	Mpa	71	72	78	75	71	60	71	
	ISO 178	2mm/min	Mpa	2,500	2,400	2,600	2,700	2,400	2,100	2,500	
		5mm/min	Mpa								
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	22,000	23,000	26,000	22,000	22,000	22,000	22,000	
		2mm/min	Mpa	2,500	2,400	2,600	2,700	2,400	2,100	2,500	
	ISO 178	2mm/min	Mpa								
Izod Impact Strength	ASTM D256	(notched)1/4	kgf·cm/cm		19	16	20	25	17	23	
		(notched)1/8	kgf·cm/cm	22	21	18	22	28	20	25	
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m²	23	24	21	20	22	24	25	
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m²		20			21	19	22	23
Rockwell Hardness	ASTM D785	R-Scale		105	105	110	107	100	103	103	
	ISO 2039-2	R-Scale		110	112	112	107	104	104	106	
<b>THERMAL PROPERTIES</b>											
Heat Deflection Temperature	ASTM D648										

# starex® Flame Retardant ABS

Flame Retardant ABS										
Properties	Test Method	Condition	Unit	VE-0856	VE-0860 P	VE-0860EX	VE-0812	VE-0852	VE-0855YS	VE-0858
<b>PHYSICAL PROPERTIES</b>										
Specific Gravity	ASTM D792	-	g/cm <sup>3</sup>	1.15	1.18	1.17	1.17	1.2	1.2	1.18
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min	3.5	13.4	17				
		200°C, 5kg	g/10min				3.5	1.6	6	3.2
	ISO 1133	220°C, 10kg	g/10min	3.5	13.4	17				
		200°C, 5kg	g/10min				3.5	1.6	6	3.2
Mold Shrinkage	ASTM D955	-	%	0.3-0.4	0.42-0.52	0.3-0.6	0.3-0.6	0.3-0.6	0.2-0.6	0.3-0.6
<b>MECHANICAL PROPERTIES</b>										
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm <sup>2</sup>		430	420	380	340	300	360
		50mm/min	kgf/cm <sup>2</sup>	400						
	ISO 527-1A	5mm/min	Mpa						35	
		50mm/min	Mpa	43	45	47	44	44		41
Tensile Strain at Break	ASTM D638	5mm/min	%		37		12	56		12
		50mm/min	%	18						
	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	540	620	560	570	490	480	540
		ISO 178	2mm/min	Mpa	66	73	72	68	65	54
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	20,000	22,000	21,000	21,000	16,000	16,000	18,000
		ISO 178	2mm/min	Mpa	2,200	2,300	2,300	2,200	2,100	2,000
	ASTM D256	(notched)1/4	kgf·cm/cm	17	13	20	15	29	13	20
		(notched)1/8	kgf·cm/cm	18	24		22	45		26
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m <sup>2</sup>	24	22	23	18	33	13	30
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m <sup>2</sup>	25	25	25	20	32	13	27
Rockwell Hardness	ASTM D785	R-Scale		96	105	98	97	79	90	93
	ISO 2039-2	R-Scale		96	105	104	103	77	90	94
<b>THERMAL PROPERTIES</b>										
Heat Deflection Temperature	ASTM D648	18.56kgf/cm <sup>2</sup> , 6.4mm	°C	80	90	83	81	83		80
	ISO 75-2	1.8MPa, 4.0mm	°C	75	80	78	73	75		74
VICAT Softening Temperature	ISO R306	B/50	°C	90	99	94	89	87	87	90
<b>FLAME CHARACTERISTICS</b>										
Flammability	UL94	HB	mm							
		V-2	mm		1.5, 2.5-2.7					
		V-1	mm							
		V-0	mm	1.5, 2.0, 2.5, 3.0	2	1.5, 2.5-2.7	1.5, 2.5, 3.0		2.1, 2.5, 3.0	
		5VA	mm	3					2.5, 3.0	
		5VB	mm	2.0, 2.5	2.5-2.7	2.5-2.7		2.5		

# starex® Heat Resistant ABS

Heat Resistant ABS													
Properties	Test Method	Condition	Unit	BM-0320 J	SR-0320BM	SR-0300	SR-0310	SR-0315 V	SR-0310FM	SR-0320 K	SR-0325LT	SR-0330M	SR-0340M
<b>PHYSICAL PROPERTIES</b>													
Melt Flow Index	Specific Gravity	ASTM D792	-	g/cm <sup>3</sup>	1.04	1.04	1.05	1.04	1.04	1.04	1.05	1.05	1.06
	Water Absorption	ASTM D570	-	%	0.3				0.3	0.3			0.05
	ASTM D1238	220°C, 10kg	g/10min	4	3.5	13.4	13	26	18	9.4	4	2.9	2.5
		200°C, 5kg	g/10min										
Mold Shrinkage	ISO 1133	220°C, 10kg	g/10min	4	3.5	13	13	26	18	9.4	4	2.9	2.5
		200°C, 5kg	g/10min										
	ASTM D955	-	%	0.53-0.65	0.5-0.7	0.38-0.46				0.5-0.6	0.5-0.6	0.44-0.53	0.6
													0.58-0.70
<b>MECHANICAL PROPERTIES</b>													
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm <sup>2</sup>		430	450	410	400	400	420	440	420	430
		50mm/min	kgf/cm <sup>2</sup>	430									
	ISO 527-1A	50mm/min	Mpa	42	43	48	48	42	46	50	50	48	47
		5mm/min	%	50									
Tensile Strain at Break	ASTM D638	5mm/min	%	25									
		50mm/min	%										
	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	590	640	620	630	640	640	650	620	640	640
		ISO 178	2mm/min	Mpa	67	73	76	77	73	75	81	85	78
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	19,700	20,000	23,000	21,000	22,000	21,000	22,000	21,000	23,000	22,000
		ISO 178	2mm/min	Mpa	2,200	2,300	2,600	2,500	2,500	2,600	2,700	2,500	2,400
	ASTM D256	(notched)1/4	kgf·cm/cm	13	18	23	18	21	18	19	12	12	14
		(notched)1/8	kgf·cm/cm	25		30	20	25			15	13	16
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m <sup>2</sup>	25	21	23	16	24	16	16	15	15	12
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m <sup>2</sup>	26	22	24	17	24	18	17	15	14	12
Rockwell Hardness	ASTM D785	R-Scale		104	107	112	110	109	109	113	113	113	110
	ISO 2039-2	R-Scale		107	106	112	111	108	112	113		113	112
<b>THERMAL PROPERTIES</b>													

# starex® Metal Plating/Painting ABS

Metal Plating/Painting							
Properties	Test Method	Condition	Unit	MP-0160 R	MP-0670	PT-0170 M	PT-0180
<b>PHYSICAL PROPERTIES</b>							
Specific Gravity	ASTM D792	-	g/cm <sup>3</sup>	1.04	1.04	1.05	1.04
Water Absorption	ASTM D570	-	%	0.3	0.3	0.3	
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min				
		200°C, 5kg	g/10min	1.5	2.3	1.4	3.7
	ISO 1133	220°C, 10kg	g/10min		18		
		200°C, 5kg	g/10min	1.5	2.3		3.7
Mold Shrinkage	ASTM D955	-	%	0.5-0.7	0.5-0.6	0.5-0.6	0.6
<b>MECHANICAL PROPERTIES</b>							
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm <sup>2</sup>	480	450	440	400
	ISO 527-1A	50mm/min	Mpa	49	51	39	46
Tensile Strain at Break	ASTM D638	5mm/min	%	25	25	14	55
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	690	660	610	640
		ISO 178	2mm/min	Mpa	72	80	71
	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	23,000	21,500	20,000	22,000
		ISO 178	2mm/min	Mpa	2,350	2,350	2,300
Izod Impact Strength	ASTM D256	(notched)1/4	kgf-cm/cm	28	27	29	22
		(notched)1/8	kgf-cm/cm	30	29	22	25
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m <sup>2</sup>	27	25	19	22
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m <sup>2</sup>	26	25	18	22
Rockwell Hardness	ASTM D785	R-Scale		109	106	111	108
	ISO 2039-2	R-Scale		109	106	111	109
<b>THERMAL PROPERTIES</b>							
Heat Deflection Temperature	ASTM D648	18.56kgf/cm <sup>2</sup> , 6.4mm	°C	88	88	88	86
	ISO 75-2	1.8MPa, 4.0mm	°C	97	80	80	78
VICAT Softening Temperature	ISO R306	B/50	°C	100	100	97	96
<b>FLAME CHARACTERISTICS</b>							
Flammability	UL94	-	-	HB	HB	HB	HB

# starex® Luminous

Luminous (Non-painting)												
Properties	Test Method	Condition	Unit	LX-0760	LX-0971	LX-0970 L	LX-0951	LX-0957	LX-0981	LX-0981F	LX-0987EX	LM-0990
<b>PHYSICAL PROPERTIES</b>												
Specific Gravity	ASTM D792	-	g/cm <sup>3</sup>	1.04	1.05	1.05	1.04	1.09	1.05	1.06	1.09	1.1
Water Absorption	ASTM D570	-	%				0.05					
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min				16	20	29	12	21	18
		200°C, 5kg	g/10min	3.9							10	15
	ISO 1133	220°C, 10kg	g/10min				20	29	12	22	18	15
		200°C, 5kg	g/10min	3.9								
Mold Shrinkage	ASTM D955	-	%				0.34-0.42	0.21-0.29		0.2-0.3		0.7-0.8
<b>MECHANICAL PROPERTIES</b>												
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm <sup>2</sup>						460			440
		50mm/min	Mpa	450	510	440	460		470	400		490
Tensile Strain at Break	ASTM D638	50mm/min	%	45		41	50	49	46	48		50
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	690	660	610	640					
		ISO 178	2mm/min	Mpa	72	80	70	79	76	72	73	70
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	23,000	21,500	20,000	22,000					
		ISO 178	2mm/min	Mpa	2,350	2,350	2,300					
Izod Impact Strength	ASTM D256	(notched)1/4	kgf-cm/cm	28	27	29	22					
		(notched)1/8	kgf-cm/cm	30	29	22	25					
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m <sup>2</sup>	27	25	19	22					
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m <sup>2</sup>	26	25	18	22					
Rockwell Hardness	ASTM D785	R-Scale		109	106	111	108					
	ISO 2039-2	R-Scale		109	106	111	109					
<b>THERMAL PROPERTIES</b>												
Heat Deflection Temperature	ASTM D648	18.56kgf/cm <sup>2</sup>	°C	85	88	89	85	85	84	82	86	81
		1.8MPa	°C	77		76	77	77	75	75		70
VICAT Softening Temperature	ISO R306	B/50	°C	96	98	98	96	94	95	95	96	88
<b>FLAME CHARACTERISTICS</b>												
Flammability	UL94	-	-	HB	HB	HB	HB	HB	HB	HB	HB	

# starex® ABS Alloy

Transparent ABS																				MABS					MABS					ABS/GF				
Properties	Test Method	Condition	Unit	TX-0510T	TX-0520T	TX-0530T	TX-0510F	BF-0370	BF-0670F	BF-0670T				BF-0677HF	BF-0675	BF-0679P	BF-0950	TF-0930	GR-4005	GR-4010	GR-4015A	GR-4020	GR-4030	VG-4910										
<b>PHYSICAL PROPERTIES</b>																																		
Melt Flow Index	Specific Gravity	ASTM D792	-	g/cm³	1.1	1.1	1.08	1.1	1.05	1.12	1.11				1.13	1.13	1.13	1.11	1.1	1.08	1.15	1.19	1.18	1.27	1.12									
			220°C, 10kg	g/10min	17	15	13	14	18	19	23				19	11.5	13	13	25	15	7.8	7	5.6	5.4	23									
	ASTM D1238		250°C, 10kg	g/10min																														
			250°C, 2.16kg	g/10min																														
			220°C, 10kg	g/10min	16	15	15	14	18	19	23				19	11.5	12	13	25	18	7.8	7	5.6	5.4	23									
	ISO 1133		250°C, 10kg	g/10min																														
			200°C, 5kg	g/10min																														
Mold Shrinkage	ASTM D955	-	%					0.3	0.25-0.3	0.4	0.39-0.48				0.4	0.4	0.4	0.35-0.43	0.3-0.4	0.2-0.4	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3									
<b>MECHANICAL PROPERTIES</b>																																		
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm²	460	440	420	430	520	510	510					480	480	500	520	620	600	740	740	900	1,040	750									
		50mm/min	kgf/cm²																															
	ISO 527-1A	50mm/min	Mpa																															
		5mm/min	Mpa	450	430	380	47	520	50	52					53	48	59	55	600	740	740	900	1,040	750										
Tensile Strain at Break	ASTM D638	5mm/min	%					30	25	25	18				15	25	18	25	12	3.6	3.4		2.9	2.6	3.4									
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	650	600		600	770	750	750					700	710	730	750	950	890	1,000	1,000	1,300	1,300	800									
		2mm/min	Mpa	70	70	62	70	87	75	74					80	70	60	85	80	90	110	95	140	150	113									
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	21,000	20,000	19,500	20,000	25,000	24,000	24,000					25,000	23,000	24,100	26,000	29,000	31,000	41,000	54,000	61,000	79,000	37,000									
		2mm/min	Mpa	2,200	2,200	1,900	2,200	2,800			2,400				2,600			2,800	2,600		4,100	5,000	6,100	8,300										
Izod Impact Strength	ASTM D256	(notched)1/4	kgf-cm/cm					16	13	8	9				9	7	8	10	2	7.2	8.7		7	6.5	12									
		(notched)1/8	kgf-cm/cm	13	15	17	16	15	8.5	7.5					12	8	9.4	11	2	7.1	9	7	7.5	7.3	7									
		(unnotched)1/4	kgf-cm/cm																	30														
		(unnotched)1/8	kgf-cm/cm																	30														
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m²	13	12	15	12	14	8.5	8					10	7.3	7.3	8	2	9.1	11	5	9.7	8.6	7.8									
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m²	10	12	16	12	12	7.5	7.4					10	7.5	7.4	7	2	7.6	10	6	9	10	7.2									
Rockwell Hardness	ASTM D785	R-Scale		109	106	101.6	106	112	114	115					114	115	116	116	118	110	114	110	112	112	109									
		ISO 2039-2	R-Scale	110	107	105	106	115	114	116					116	115	119	116	118		114	110	114	112	114									
Pencil Scratch	JIS K 5401	500g weight							F					H	H	2H	H	2H																
		1000g weight						HB		F																								
<b>THERMAL PROPERTIES</b>																																		
Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C					80	89	82	80				84	86	85	92	84	96	100	102	105	103	97									
		1.8MPa, 4.0mm	°C	72	71	70	71	83	78	73					76	75	76	78	84	89	99		104	103	95									
VICAT Softening Temperature	ISO R306	B/50	°C	90	89	87	88	102	96	89					95	96	98	100	94	103	106	106	107	107	102									
<b>FLAME CHARACTERISTICS</b>																																		
Flammability	UL94	HB	mm	1.5, 3.0	1.5, 3.0	1.5, 3.0		1.0, 1.5, 3.0	0.8, 2.0, 3.0	1.5, 3.0																								

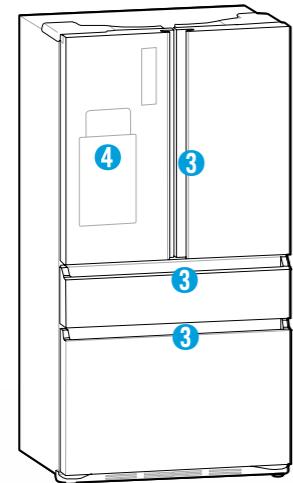
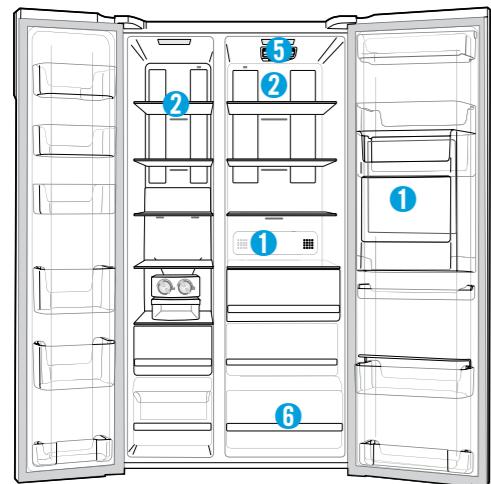
# starex® ABS Alloy

				ABS/GF			ABS/PET			
Properties	Test Method	Condition	Unit	VG-4920	VG-4920F	EG-7000	GC-0700	GC-0703	GC-0710	GC-0750
<strong>PHYSICAL PROPERTIES</strong>										
Melt Flow Index	ASTM D792	-	g/cm²	1.33	1.33	1.1	1.09	1.07	1.12	1.11
	ASTM D1238	220°C, 10kg	g/10min	25	42					
		250°C, 10kg	g/10min			35				
		250°C, 2.16kg	g/10min							
	ISO 1133	220°C, 10kg	g/10min	25	41					
		250°C, 10kg	g/10min			35				20
		200°C, 5kg	g/10min							
Mold Shrinkage	ASTM D955	-	%	0.1-0.3	0.1-0.3	0.44-0.54	0.4-0.7		0.47-0.57	
<strong>MECHANICAL PROPERTIES</strong>										
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm²	960	870					
		50mm/min	kgf/cm²			390	410	400	410	500
	ISO 527-1A	50mm/min	Mpa			42		40	40	47
		5mm/min	Mpa	900	870					
Tensile Strain at Break	ASTM D638	5mm/min	%	3	2.8					
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	1,050	1,050	570	530	520	620	700
	ISO 178	2mm/min	Mpa	130	146	60	58	50	60	68
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	60,000	58,000	20,000	17,500	18,500	19,100	21,000
	ISO 178	2mm/min	Mpa			1,900	1,900	1,900	1,900	
Izod Impact Strength	ASTM D256	(notched)1/4	kgf-cm/cm	5	6.1	20	20		12	22
		(notched)1/8	kgf-cm/cm	5	6	21	42	30	28	30
		(unnotched) 1/4	kgf-cm/cm							
		(unnotched) 1/8	kgf-cm/cm							
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m²	7	9.2	34	10		5.2	12
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m²	7	9.1	27	8	30	5	12
Rockwell Hardness	ASTM D785	R-Scale		110	110	95	96	100	96	106
	ISO 2039-2	R-Scale		115	116	101	97		100	105
Pencil Scratch	JIS K 5401	500g weight								
		1000g weight								
<strong>THERMAL PROPERTIES</strong>										
Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	96	93	78	80		80	86
	ISO 75-2	1.8MPa, 4.0mm	°C	95	95	70	71		70	77
VICAT Softening Temperature	ISO R306	B/50	°C	101	102	88	93	91	94	99
<strong>FLAME CHARACTERISTICS</strong>										
Flammability	UL94	HB	mm			1.5, 3.0	3.0	1.5, 3.0	1.5, 3.0	3.0
		V-2	mm							
		V-1	mm							
		V-0	mm	1.6, 2.0, 3.0	1.6, 2.0, 3.0					
		5VA	mm	2.0, 3.0	2.0, 3.0					
		5VB	mm							
<strong>OTHER PROPERTIES</strong>										
Yellow Index	ASTM D1925	3.2mm	%			20			25	
Transmissivity	ASTM D1003	3.2mm	%							
Haze	ASTM D1003	3.2mm	%							

# starex® ASA

ASA														
Properties	Test Method	Condition	Unit	WX-9120	WR-9120J	WR-9120	WX-9130	WX-9300UV	WX-9310UV	WR-9300HF	WX-9330UV	WR-9330I	WX-9700	WX-9750
PHYSICAL PROPERTIES														
Specific Gravity	ASTM D792	-	g/cm <sup>2</sup>	1.08	1.07	1.06	1.06	1.08	1.08	1.07	1.09	1.07	1.07	1.07
Melt Flow Index	ASTM D1238	220°C, 10kg	g/10min	16	26	17.6	3	10	6	15	4	5	9	4
	ISO 1133	220°C, 10kg	g/10min	15	26	17.6	3	10	6	15	0.4-0.7	5	9	4
MECHANICAL PROPERTIES														
Tensile Strength at Yield	ASTM D638	5mm/min	kgf/cm <sup>2</sup>	460	450	480		440	440	460	450	480	430	400
	ISO 527-1A	50mm/min	Mpa	41	46	46	45	47	49	50	45	52		43
Tensile Strain at Break	ISO 527-1A	5mm/min	%	18	15	18		13	12	16	36	11		
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	670	650	680	600	630	680	700	640	710	620	570
	ISO 178	2mm/min	Mpa	67	70	70	65	70	70	76	73	80	65	62
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm <sup>2</sup>	22,000	21,000	22,000	19,000	20,000	22,000	23,000	21,000	23,000	20,000	17,000
	ISO 178	2mm/min	Mpa	2,100	2,300	2,300	2,000	2,300	2,400	2,500	2,300	2,600	2,030	1,950
Izod Impact Strength	ASTM D256	(notched)1/8	kgf-cm/cm	19	21	20	50	16	18	12	22	14	50	53
Charpy Impact Strength	ISO 179 1eA	(notched)	KJ/m <sup>2</sup>	14	11	10	14	12	14	8.6	13	10	15	32
Izod Impact Strength	ISO 180 1A	(notched)	KJ/m <sup>2</sup>	13	14	8.3	12	10	16	9.3	9	9	10	41
Rockwell Hardness	ASTM D785	R-Scale		103	105	108	98	104	105	107	103	107	99	95
	ISO 2039-2	R-Scale		103		108	98	106	106	111	103	108	96	95
THERMAL PROPERTIES														
Heat Deflection Temperature	ASTM D648	18.56kgf/cm <sup>2</sup>	°C	89	87	83		89	90	88	92	93	77	72
	ISO 75-2	1.8MPa	°C	77	77	77	77	77	80	80	83	82	75	77
VICAT Softening Temperature	ISO R306	B/50	°C	97	98	96	95	96	101	99	103	101	95	94

# Refrigerator



**1. Liner Case**  
ABS QU-0191 S  
ABS SV-0157

**2. LED Cover**  
Flame Retardant -PC FD-1112

**3. Handle**  
ABS HG-0760GP  
Luminous LX-0971

**4. Case Dispenser**  
ABS HG-0760GP  
Luminous LX-0971

**5. Power Box**  
Flame Retardant-ABS VE-0860 P  
Flame Retardant-HIPS VE-1801  
PC/ABS NH-1015V

**6. Vegetable box**  
ABS HG-0760GP

# Washing Machine



**1. Detergent Box**  
Chemical Resistant ABS EG-7000, EG-0763  
ABS HG-0760GP



**2. Drawer Cover**  
Luminous ABS LX-0971  
ABS HG-0760GP



**3. Control Panel**  
Luminous ABS LX-0970 M  
ABS HG-0760GP  
Transparent ABS TX-0510T



**5. Diaphragm**  
TPE (Thermoplastic Elastomers)  
EK-1045



**6. Front Door Frame**  
Metal Plating ABS MP-0160 R  
Luminous ABS LX-0971  
ABS HG-0760GP, ASA WX-9520



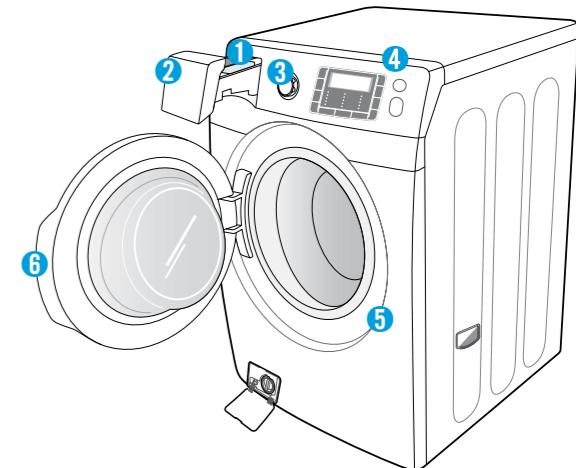
**7. Transparent Door Window**  
Transparent ABS TX-0520T



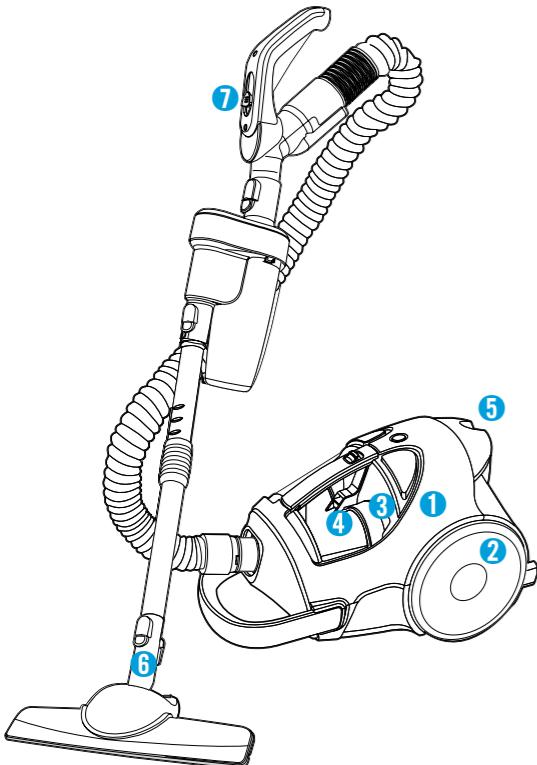
**8. Top Cover Assembly**  
Luminous ABS LX-0971  
Chemical Resistant ABS EG-7000, EG-0763  
ABS SD-0150



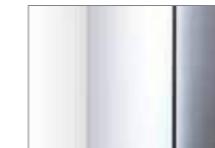
**9. Control Panel**  
Luminous ABS LX-0971  
ABS HG-0760GP  
**Control Box (Inner)**  
Flame Retardant-ABS VE-0860 P  
Flame Retardant-HIPS VE-1801  
PC/ABS NH-1015V



# Vacuum Cleaner



# Air Conditioner



- 1. Panel Door**  
ABS HF-0690 M



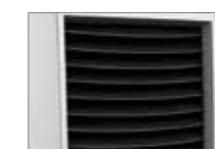
- 2. Panel Display**  
MABS TF-0930



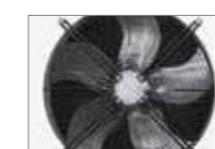
- 3. Cabi Body**  
ABS HF-0690 M



- 4. Frame**  
Luminous LX-0970 M



- 5. Blade**  
ABS HG-0760GP  
Luminous LX-0970 M



- 6. Propeller Fan**  
ABS/GF GR-4020



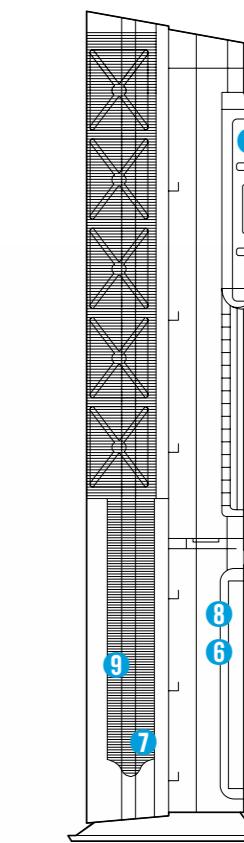
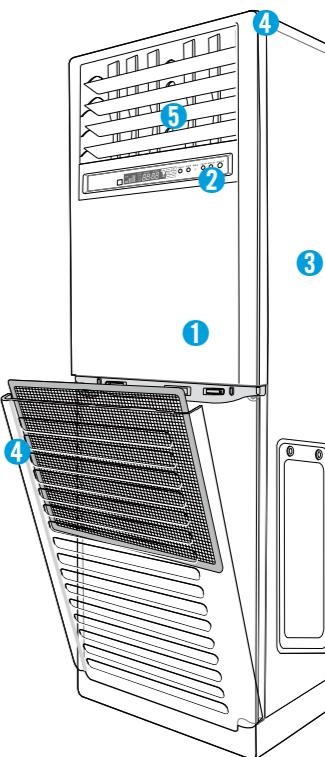
- 7. Case PCB, Cover PCB**  
Flame Retardant-ABS VE-0860 P  
Flame Retardant-HIPS VE-1801  
PC/ABS NH-1015V



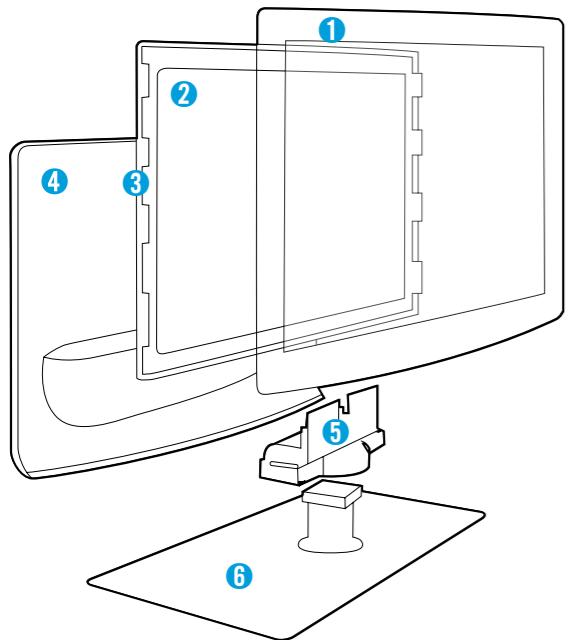
- 8. Cross Fan**  
SAN/GF GR-5020 T



- 9. Drain Fan**  
ABS/PET EG-7030



# TV/Monitor



## 1. Front Cover

MABS BF-0950  
ABS HG-0760TV, SD-0150  
Flame Retardant PC/ABS NH-1017D, NE-1030, NE-1030TV  
PC/ABS/GF HM-1100(F), LS-1159, LS-1159S  
TR ABS TX-0510T

## Double Injection

Flame Retardant PC TN-1100  
MABS TF-0930, BF-0677HF, BF-0950



## 2. Back Light Frame

PC/ABS/GF (V2) LS-1150G, PC/GF (V2) LS-3104G  
Flame Retardant PC LH-1070W  
PC/GF (V2) HN-3102GH



## 3. Middle Cover

PC/ABS/GF HM-1100, HM-1100F, LS-1159



## 4. Rear Cover

mPPE NH-1904  
Flame Retardant PS VE-1801, VE-1897, VE-1890 K  
PC/ABS/GF HM-1100F, LS-1159, LS-1159S



## 5. Guide Stand Neck

PC/GF 20% HF-3200 H  
Flame Retardant PC/GF 20% HF-3202H



## 6. Stand Base

MABS BF-0950  
ABS HG-0760TV, SD-0150  
Flame Retardant PC/ABS NH-1017D  
Metal Plating ABS MP-0670  
Metal Plating Flame Retardant PC/ABS QP-1010, WP-1041  
PC/ABS/GF HM-1200

# OA - Multifunctional Copier/Printer



## 1. Internal

**Developer & Toner**  
Flame Retardant ABS/GF 20% GR-4020  
Flame Retardant ABS NH-0825 S



## LSU

PC/GF 30% HM-3301GL  
PC/GF 20% HF-3201M



## Fuser

Flame Retardant PBT/GF30% VB-5300GS  
Flame Retardant PC/GF20% NH-3208GL



**Main Frame (Chassis)**  
Flame Retardant ABS VE-0860 P  
Flame Retardant PC NH-1023P



## 2. ADF / Tray

Transparent PC(HB) SC-1220R  
Transparent ABS(HB) TX-0510  
ABS(HB) HF-0660I



## 3. Exterior & Others

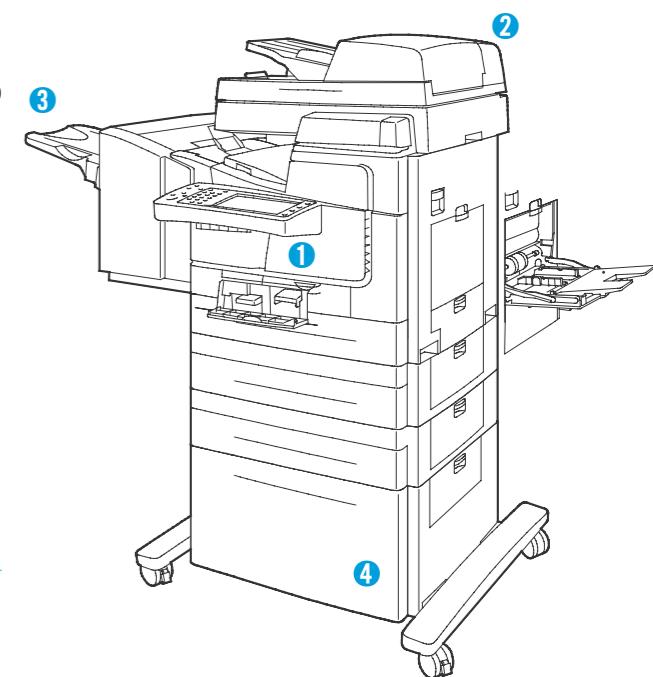
**Housing**  
ABS/PMMA BF-0677HF  
NH PC/ABS NE-1029, GC-1017  
ABS(HB) CM-0140  
Flame Retardant ABS VE-0856, NH-0825 S

## Cassette

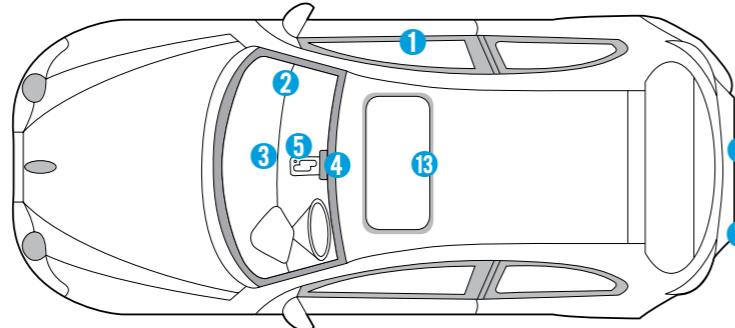
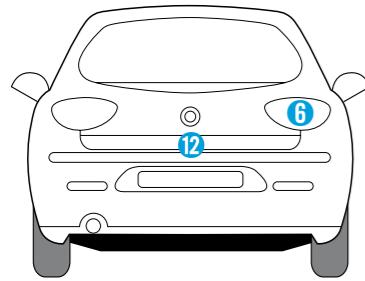
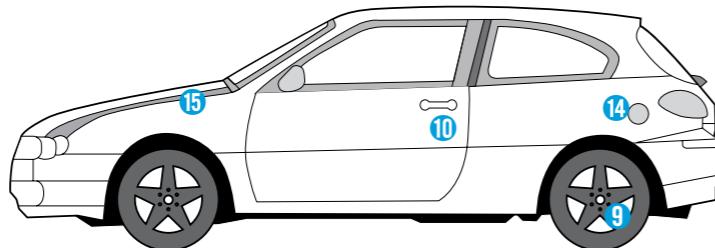
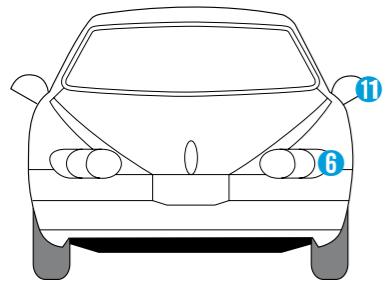
ABS(HB) CM-0140, GC-0700

## Gear

PPS/GF 40% XP-2140  
PC LF-1025



# Automotive



## INTERIOR



- 1. Power Window Switch Cover**  
Heat Resistant ABS  
SR-0320 K, SR-0325LT



- 2. Air Vent**  
PC/PBT, PC/ABS



- 3. Center Fascia**  
PC, PC/ABS



- 4. Overhead Console**  
PC/ASA



- 5. Console**  
Heat Resistant ABS  
SR-0320 K, SR-0325LT

## LIGHTING



- 6. Head Lamp Bexel**  
PBT/PET



- Rear Lamp Housing**  
PC/ABS

## EXTERIOR



- 7. Tailgate Garnish**  
PC/ABS,  
MP ABS, MP-0670



- 8. Rear Spoiler**  
Blow Molding ABS BM-0320 J



- 9. Wheel Cover**  
Metal Plating PC/ABS,  
PC/ABS, PA/PPE



- 10. Outside Door Handle**  
Metal Plating PC/ABS



- 11. Side Mirror**  
ASA WX-9310UV, PBT/PET/GF



- 12. Radiator Grill**  
MP ABS MP-0670,  
ASA WX-9310UV

## STRUCTURE



- 13. Panorama Sunroof Frame**  
PBT/ASA/GF



- 14. Fuel Filler Door**  
PA/PPE/CNT

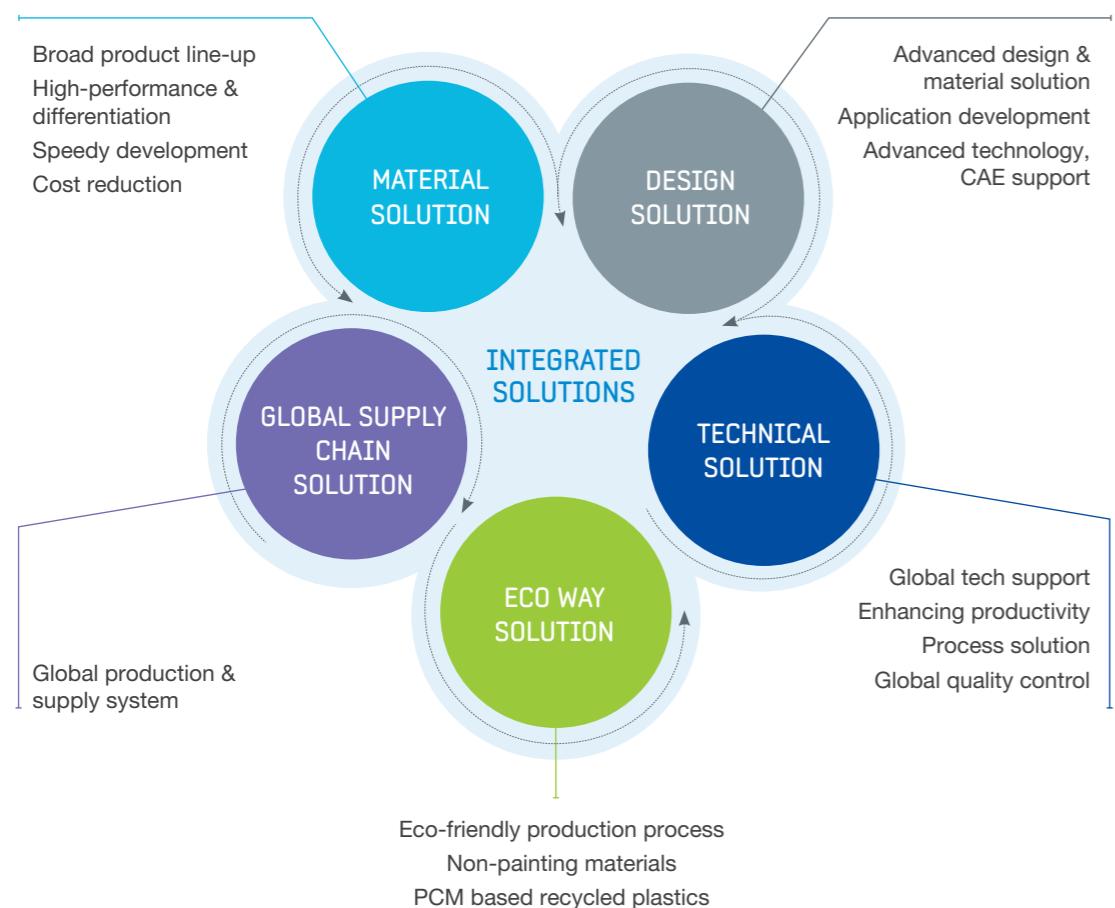


- 15. Fender**  
PA/PPE/CNT

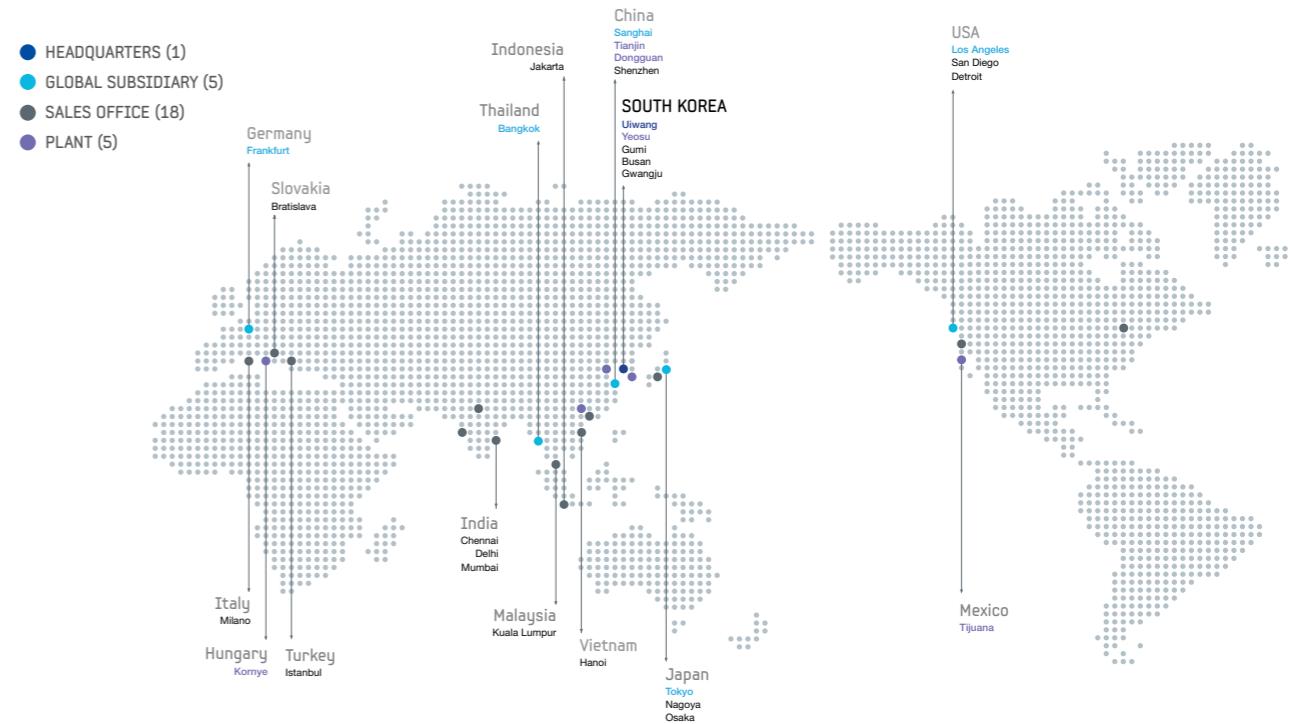


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