

INFINO

Create Infinite Possibilities



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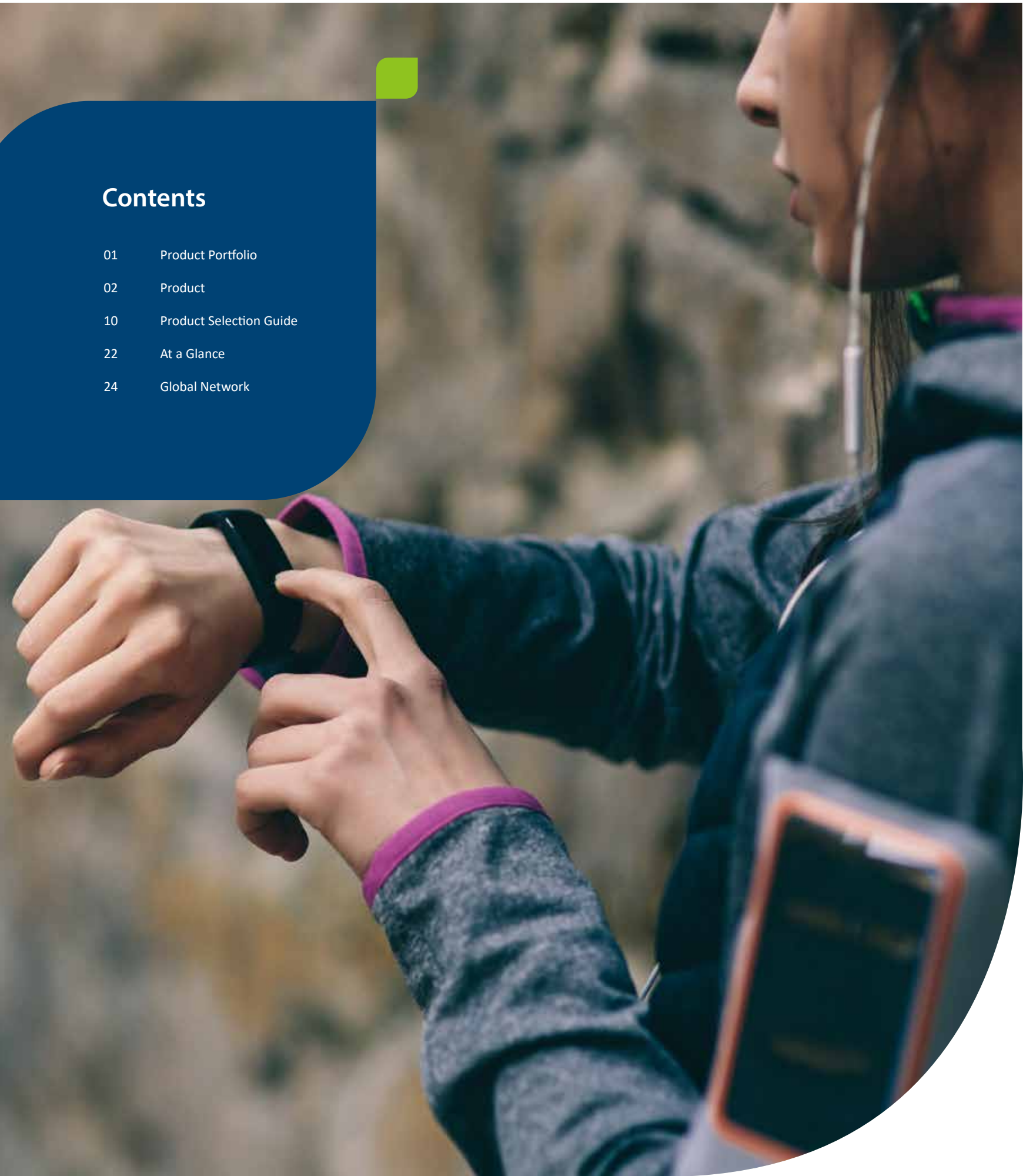
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INFINO

PC & PC Alloy, High Performance EP





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Product Portfolio

INFINO® is LOTTE Chemical's high-performance engineering plastics brand, symbolizing the company's commitment to pursuing infinite possibilities and creating differentiated solutions and values for customers.

INFINO® PC & PC Alloy

PC	PC/ABS	PC/ABS/GF	PC/GF	Special Alloy
Transparent	General	Flame Retardant	General	PC/ASA
General	Metal Plating		High Impact	PC/PET
Flame Retardant	Flame Retardant		Flame Retardant	PC/PBT
Eco-friendly	Eco-friendly		Dimensional Stability	
Medical	Luminous		Eco-friendly	

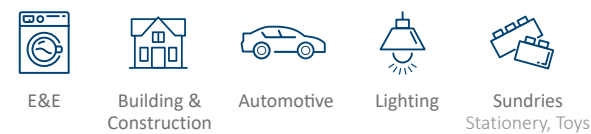
High Performance EP

PPA	PBT	mPPE	PPS	PCT
PPA/GF	PBT	mPPE	PPS/GF	PCT/GF
	PBT/GF	mPPE/GF	PPS/GF/MF	
	PBT/ABS/GF	PA/PPE		
	PBT/ASA/GF	PA/PPE/GF		
	PBT/PET/GF, MF	PA/PPE/CNT		



Transparent PC

APPLICATIONS



KEY FEATURES



PRODUCT LINE UP

General

- SC-1100(U)R
- SC-1102UR
- SC-1220(U)R
- SC-1222UR
- SC-1280UR (Lighting)
- QC-1100UR (1.6T V2, f1)
- QC-1220UR (1.6T V2, f1)

Extrusion

- SC-1060P
- SC-1060U
- SC-1063U

Automotive

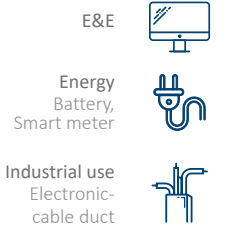
- General
 - LT-1100
 - LT-1220
- High Flow
 - LT-1620 *
- Diffusion
 - TP-1020U
 - TP-1025U *
- High Impact
 - IV-1025U *
 - IV-1075C (Chemical Resistant)

* Under Development



Flame Retardant PC & PC Alloys

APPLICATIONS



KEY FEATURES



FLAME RETARDANT PC PRODUCT LINE UP

General

Semi-transparent

- High Flow (Semi-transparent)
 - TN-1045M(2.0T V2)
- High Heat
 - TH-1100(2.0T V0)
 - TH-1108(3.0T V0, f1)
- Anti-microbial
 - ABF-1010SC *

Opaque

- General
 - SA-1100(0.75T V2)
 - SA-1220(0.75T V2)
- Anti-microbial
 - ABF-1012SA(0.75T V2)
- High Heat
 - HN-1064IF(1.5T V0)
 - NH-1035(2.0T 5VB)
 - HN-1024(1.0T V0)
- Flame Retardant for Thin-wall
 - UF-1017S(0.8T V0)
 - UF-1002(0.75T V0, 2.5T 5VA)
 - UF-1063(0.6T V0)
 - UF-1064*(0.6T V0, High Impact)
- Eco-friendly
 - GC-1022U(1.5T V0, PCR 20%, RTI)
 - GC-1050AM (1.0T V0, PCR 50%)*
- High Impact at Low Temp.
 - UH-1064 (1.5T V0, f1)
 - UH-1068(1.5T V0, f1)

Reinforced

GF 10%

- General
 - HN-3102GH(1.5T V0)
- High Flow
 - LS-3104G(0.75T V2)
 - HN-3102G(1.5T V0)
- High Heat
 - HN-3104(1.5T V0, 3.0T 5VA, f1)

GF 20%

- High Flow
 - NH-3204G(2.0T V0)
 - NH-3208GL(0.75T V0)
 - HF-3200H(1.5T V2)
- Surface Quality
 - NH-3200(0.75T V0)
- High Heat
 - HN-3204(1.5T V0, 2.5T 5VA, f1)
- High Impact
 - NH-3203(0.8T V0)*

GF 30%

- General
 - HM-3301GL
- High Impact
 - NH-3303(1.0T V0)

GF 40%

- General
 - NH-3402F(2.0T V1)

Low Smoke

- EN45545-2 Compliant
 - FS-1152(R1 HL2)
 - FS-1030(R22 HL3)

FLAME RETARDANT PC/ABS PRODUCT LINE-UP

General

- General
 - High Impact
 - NH-1015B
 - High Flow
 - NH-1015V
 - Light Resistant
 - NH-1013U(1.5T V0)
 - Flame Retardant for Thin-wall
 - NH-1021(1.0T V0)

High Heat

- General
 - NH-1037(1.5T V0)
- High Flow
 - NH-1033(1.5T V0)
- Chemical Resistant
 - NH-1041(1.5T V0)
- Anti-microbial
 - ABF-1030NH(1.5T V0)

High Flow

- General
 - NE-1030(1.5T V0)
- Anti-hydrolysis
 - NH-1098(1.5T V0)

High Flame Retardant

- General
 - NE-1060(2.0T 5VB)
- High Heat
 - NH-1049(2.5T 5VB, GWIT)*
 - NH-1034(2.5T 5VA)
- Chemical Resistant
 - NH-1047(2.0T 5VB)
 - NH-1048 (1.5T 5VB)

High Modulus

- High Impact
 - NH-1150HH(1.2T V0, MF 15%)
- High Flow
 - NE-1306(2.0T 5VB, MF 30%)
 - NM-1229I(1.0T V1, MF 20%)

Functionality

- Eco-friendly
 - GC-1048(1.5T V0/5VB, PCR 30%)
 - GC-1045 (1.5T V0, PCR 30%)
 - GV-1066 (1.5T V0, PCR 60%) *
 - GC-1017 (1.5T V0, PCR 30%, RTI)
- Luminous
 - LX-1031(1.5T V0, Sparkle)

Reinforced

GF 10%

- General
 - HM-1100F (1.5T V0)

GF 15%

- General
 - LS-1150G (0.75T V2)
 - LS-1159 (2.0T V0)
- High Impact
 - LS-1159S (2.0T V0)

* Under Development



High Impact PC & PC/GF

APPLICATIONS



Mobile devices



E&E

KEY FEATURES



Flowability



High modulus



Impact strength after painting process



Surface quality



Chemical resistance
Cosmetic

PRODUCT LINE UP

General

General

- AH-1080
- CF-1050
- CF-1070

High Impact

- GM-1030 *
- GM-1080

Transparent

- CF-1021T

Eco-friendly

- GW-1029 (PCM 50%)

Reinforced

General

- AH-3100 (GF 10%)
- AH-3200 (GF 20%)

Dimensional Stability

- LS-3302 (GF 30%)
- LS-3307LC (MF 30%, Isotropy) *

High Impact

- CF-3104HF (GF 10%)
- CF-3200HF (GF 20%)
- CF-3300HF (GF 30%)

Surface Quality

- GI-3103 (GF 10%)

Eco-friendly

- GW-3203 (GF 20%, PCM 30%)

* Under Development



High Heat Resistant EP

APPLICATIONS



LED



Connector



Mobile devices
Engine Room,
Interior, Exterior

KEY FEATURES



Long-term
heat stability



High modulus



Quality stability

PRODUCT LINE UP

PCT (High Reflectivity/Reliability)

Processability at Low Temp.

General

- TK-2046MA
- High Luminance
- TK-2050LP

Processability at High Temp.

- TL-2058

PPA (High Heat Resistance/Impact Strength)

Connector (PA6T)

Flame Retardant

- HX-4302G (0.4T, V0)
- HX-4452G (0.4T, V0)

Automotive

General

- HA-4302G (GF 30%)

Long-term Heat Resistance

- HA-4350HP (GF 35%)

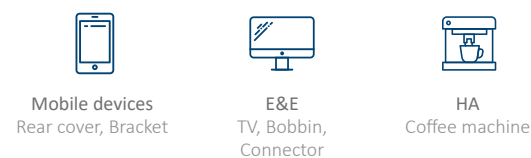
Metal Plating

- HA-4400MP



Super Structural EP

APPLICATIONS



KEY FEATURES



PRODUCT LINE UP

PA, PPA (Super Modulus)

- HM-4300G (PPA/GF 30%, 10GPa)
- HM-4500G (PPA/GF 50%, 13GPa)
- HM-4650G (PPA/GF 65%, 20GPa)
- MKD-1016 (PA/GF 55%, 15GPa, Low Warpage)
- HM-4650LW (PPA/GF 65%, 20GPa, Low Warpage)

PPS (High Impact/Anti-scratch)

- XP-2130A (PPS/GF 30%, Anti-scratch)
- XP-2140C (PPS/GF 40%, Cross)

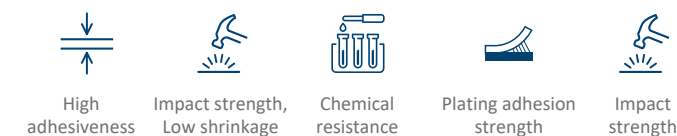


Metal Adhesion, LDS Materials

APPLICATIONS



KEY FEATURES



Metal Adhesion

LDS

Metal Adhesion

LDS

PRODUCT LINE UP

Metal Adhesion

- PBT/GF
 - JS-5406 (GF 40%, High Quality)
 - JS-5207LD (GF 20%, Low Permittivity)

LDS (Laser Direct Structuring)

- PC
 - LP-1025 (Chemical Resistant)
- PC/GF
 - LP-3105 (GF 10%, Chemical Resistant)
 - LP-3305 (GF 30%, Chemical Resistant)
 - LP-3303 (GF 30%, Black)
- PC/ABS
 - LP-1010 (Black)
 - LP-1011 (White etc.)



Medical Solution

APPLICATIONS



Medical devices
Hemodialyzer housing,
IV Set, Oxygenator,
Drug/Fluid Delivery

KEY FEATURES



Biocompatibility



Global medical
standards
ISO-10993, USP Class VI,
Food Contact



Gamma-ray
resistance



Property
stability

PRODUCT LINE UP

EtO Sterilization

- ML-1010R (MFI 11.5)
- ML-1020R (MFI 22)

Gamma-ray Sterilization

- High Impact
 - MR-1005 (MFI 7.5)
- Mid Flow
 - MR-1015 (MFI 18)
- High Flow
 - MR-1020 (MFI 20)

Automotive Materials

Interior

PC

- General
 - LT-1100
 - LT-1220
- Diffusion
 - TP-1020
 - TP-1020U
 - TP-1025U
- High Impact
 - IV-1025U
 - IV-1075C (Chemical Resistant)

PC/ABS/GF

- WP-1100 (10%)
- WP-1200 (20%)

PC/ABS

- General
 - HP-1000X
 - HP-1000XA
- Low TVOC
 - HP-1000XL
- High Flow
 - WP-1069
 - WP-1089
- Chemical Resistant
 - HP-1000XC
 - WP-1059J
- Luminous(Paint-free)
 - LX-1098F
 - LX-1025

PC/ASA

- WR-7250H
- IF-7900 (Emotional Feeling)
- WR-7390EA (Eternal Antistatic)

PC/PBT

- AE-3080C

PBT/PET/GF

- AR-6300
- AR-6308

PA/ABS

- SR-9325 *

Exterior

PC/ABS

- Painting
 - WP-1059
- Metal Plating
 - WP-1041(G)
 - WP-1051
 - WP-1061
 - WP-1071

PC/ABS/MF

- WP-1170M(MF17%)

PC/ASA

- General
 - WR-7000
- Heat Resistant
 - WX-7010
 - WX-7030

PC/PET

- General
 - AE-2030
- High Flow
 - AE-2039
- High Modulus (MF)
 - AE-2130 (5%)
 - AE-2150 (15%)

PC/PBT

- High Impact
 - AE-3060
 - AE-3063I (High Impact at Low Temp.)

PBT/PET/GF

- AR-6508

Lighting

PC

- General
 - LT-1100
 - LT-1220
- High Flow
 - LT-1620

PC/ABS

- General
 - HP-1000XA
- High Flow
 - WP-1069
 - WP-1089
- High Gloss/Low Gas
 - HP-1000XG

PBT

- ASF-9810FL
- ASF-9810FM
- ASF-9860

PPE

- IL-8020 *
- IL-8030 *
- IL-8040 *

Structure

PBT/ASA/GF

- AR-5300H

PA/PPE/CNT

- CA-7000C *
- CA-7009

PBT/PET/GF

- AR-6200

Power Train (EV Battery)

PA/GF

- HA-9305G *
- HA-9305T *
- HA-7350G *

PA/MF

- HA-9153M *

PPE/GF

- VB-8100 *
- VB-8200 *
- VB-8300 *

* Under Development



Product Selection Guide

Transparent PC

				General			
Properties	Test Method	Condition	Unit	SC-1100R	SC-1100UR	SC-1102UR	SC-1220R

Physical Properties

Specific Gravity	ASTM D792	-	-	1.2	1.2	1.2	1.2
Melt Flow Index	ASTM D1238	300°C, 1.2kg	g/10min	11.5	11.5	11.5	22
	ISO 1133	300°C, 1.2kg		11.5	11.5	11.5	22
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7
		X-Flow at 3.2mm(TD)		0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7

Mechanical Properties

Tensile Strength at yield	ASTM D638	50mm/min	kgf/cm²	640	640	640	640
	ISO 527	50mm/min	MPa	64	64	64	64
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	920	920	920	920
	ISO 178	2mm/min	MPa	92	92	92	92
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	23,000	23,000	23,000	23,000
	ISO 178	2mm/min	MPa	2,300	2,300	2,300	2,300
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf-cm/cm	15	15	15	10
		1/8inch at 23°C		87	87	87	75
	ISO 180 1A	at 23°C, 4mm	kJ/m²	80	80	80	65
Charpy Impact	ISO 179 1eA	at 23°C, 4mm	KJ/m²	75	75	75	60
Rockwell Hardness	ASTM D785	R-scale	-	120	120	120	120
	ISO 2039-2			120	120	120	120

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	127	127	127	125
		4.6kgf/cm², 6.4mm		137	137	137	136
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		125	125	125	123
		0.45MPa, 4.0mm		137	137	137	136
VICAT Softening Temperature	ISO 306	B/50	°C	146	146	146	145

Flame Characteristics

Flammability	UL94	HB	mm				
		V-2		0.75-3.0	0.75-3.0	0.75-3.0	0.75-3.2

General					Extrusion		
SC-1220UR	SC-1222UR	SC-1280UR	QC-1100UR	QC-1220UR	SC-1060P	SC-1060U	SC-1063U

1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
22	20	28	11.5	22	6	6	6
22	20	28	11.5	22	6	6	6
0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7
0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7	0.5-0.7

640	640	640	640	640	660	660	660
64	64	64	64	64	66	66	66
920	920	920	920	920	930	930	930
92	92	92	92	92	93	93	93
23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
10	10	10	15	10	15	15	15
75	75	70	87	75	90	90	90
65	65	60	80	65	85	85	85
60	60	50	75	60	80	80	80
120	120	120	120	120	120	120	120
120	120	120	120	120	120	120	120

125	125	123	127	125	128	128	128
136	136	135	137	136	138	138	138
123	123	122	125	123	126	126	126
136	136	135	137	136	138	138	138
145	145	144	146	145	147	147	147

					2.6-3.2	2.6-3.2	2.6-3.2
0.75-3.2	0.75-3.2	0.8-3.2	1.6-3.2	0.8-3.2	1.6-2.0	1.6-2.0	1.6-2.0



Flame Retardant PC & PC Alloys

				Flame Retardant PC								
Properties	Test Method	Condition	Unit	TN-1045M	TH-1100	TH-1108	SA-1100	SA-1220	ABF-1012SA	HN-1064IF	HN-1024	UF-1017S

Physical Properties

Specific Gravity	ASTM D792	-	-	1.22	1.2	1.2	1.2	1.2	1.2	1.18	1.2	1.2
Melt Flow Index	ASTM D1238	220°C, 5kg	g/10min									19
		220°C, 10kg										
		250°C, 2.16kg										
		250°C, 5kg										
		250°C, 10kg		92	17	17				30	19	
		260°C, 2.16kg										
	ISO 1133	300°C, 1.2kg	g/10min	41		12	9	20	18			
		300°C, 2.16kg										
		220°C, 5kg										19
		220°C, 10kg										
		250°C, 2.16kg										
		250°C, 5kg		92	17	17				30	19	
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.3-0.6	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.3 - 0.6
		X-Flow at 3.2mm(TD)		0.3-0.6	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.3 - 0.6

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²	750	650	650	650	650	620	600	640	620
	ISO 527	50mm/min	MPa									
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	1,100	960	900	980	990	990	800	890	910
	ISO 178	2mm/min	MPa	108	95	90	90	90	90	80	80	90
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	27,000	22,000	23,000	23,000	23,000	23,000	21,000	22,000	23,500
	ISO 178	2mm/min	MPa	2,650	2,400	2,200	2,260	2,050	2,100	2,100	2,100	2,350
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf-cm/cm	4.1			20	12	12			
		1/8inch at 23°C		2.5	5	80	70	70	70	60	70	65
Charpy Impact Strength (V-notched)	ISO 180 1A	at 23°C, 4mm	kJ/m²	2.5			70	45	45	50	70	64
	ISO 179 1eA	at 23°C, 4mm	KJ/m²			30	70	25	25	60	65	67
Rockwell Hardness	ASTM D785	R-scale	-	124	119	119	120	120	120	118	118	119
	ISO 2039-2			124	119	119	120	120	120	119	118	119

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	97	130	130	127	120	121		126	
		4.6kgf/cm², 6.4mm						130				
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		89	123	123	125	118	120	119	125	93
		0.45MPa, 4.0mm		99				128				104
	ISO 75-2 (Annealing)	1.8MPa, 4.0mm		100								105
VICAT Softening Temperature	ISO 306	B/50	°C	106	144	144	142	138	140	140	143	109
		B/120		108								112

Flame Characteristics

Flammability	UL94	HB	mm									
		V-2		0.8,3.0	0.8	1.5	0.75, 1.5, 2.0, 2.5, 3.0	0.75, 1.5, 2.5, 3.0	0.75, 1.5, 2.5, 3.0	0.75, 1.0	0.75	0.4
		V-1								1.2		
		V-0			2.0, 2.5, 3.0	3				1.5, 3.0	1.0, 1.2, 1.5, 3.0	0.7-3.0
		5VA										
		5VB										

Other Properties

Transmissivity	ASTM D1003	2.5mm	%		85							
		3.2mm			89							
Yellow Index	ASTM D1003	2.5mm	%		2							
		3.2mm			0.6							

Flame Retardant PC																	
UF-1002	UF-1063	GC-1022U	UH-1064	UH-1068	FS-1152	HN-3102GH	LS-3104G	HN-3102G	HN-3104	NH-3204G	NH-3208GL	HF-3200H	NH-3200	HN-3204	HM-3301GL	NH-3303	NH-3402F

1.19	1.19	1.18	1.19	1.18	1.36	1.26	1.25	1.26	1.28	1.34	1.35	1.37	1.34	1.35	1.41	1.42	1.51
20	19										23.2						
					19								19				
		18				22	30	33	12.5	36		11			7		33
			16	13				9					12	9			
																23	
20	19										23.2						
					19								19				
		18				22	30	31	12.5	36		11			5.4		33
			16	13				9					12	9			
																23	
0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.2-0.5	0.3-0.6	0.2-0.5	0.3-0.4	0.3-0.6	0.2-0.5	0.2-0.4	0.3-0.6	0.1-0.4	0.2-0.5	0.1-0.3	0.1-0.3	0.1-0.4
0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.2-0.5	0.3-0.6	0.2-0.5		0.3-0.6	0.2-0.5	0.2-0.4	0.3-0.6	0.1-0.4	0.2-0.5		0.1-0.3	0.1-0.4

						800	800	860		1,100	1,070	1,100	1,200	850		1,400	1,430
650	620	590	600	600	500											1,375	
						80		75		100	105	110	120	88		140	184
65	62	55	60	55	55		80								115		
950	930	800	850	800	750	1,200	1,400	1,500	1,000	1,490	1,400	1,500	1,500	1,500	2,000	1,750	1,800
95	93	80	85	85	80	120	130	120	90	146	140	170	150	150	153	175	250
25,000	24,000	21,000	21,000	21,000	45,000	35,000	38,000	41,000	35,000	53,500	59,300	55,000	60,000	55,000	78,000	85,000	110,000
2,440	2,400	2,100	2,100	2,100	4,200	3,500	3,800	3,700	3,500	6,000	5,400	5,800	6,000	5,400	7,900	8,500	12,000
				45	45	9	6	5	8					10		14	10
65	70	60	75	75	6	9	8	5.6	10	9	9	15	10	7		15	11
	60	50	65	55		9		5.6	10	7	10	11.5	10	7		15	16
	60	50	60	60	6	9	6	5.9	10	8	10	14	10	7	11	15	17
119	118	120	118	118	120	90		90	115		120		120	119	93	120	122
119	118	120	118	120	120	90	121	90	115		120	118	120	119	119	120	122

	95	127	123	125	89	138	135	137	140	114	93	140	100	138	143	116	110
									142	139		145	105	143			117
	90	123	121	122	88	138			132	137		91	140	97	137	142	114
							135	140	136		98	145	102	142	146		122
											94						
											98						
108	107	142	139	140	97		143	143	142		100	147			150		118
							146				104	150			152		

									0.75								
									0.75, 0.90, 3.0				1.5				
		0.75, 1.0															
		1.2								1.2	1.5				1.5		2
0.7,3.0	0.6, 3.0	1.5, 3.0	1.5, 3.0	1.5, 3.0		1.5-1.6		1.5, 1.6		1.5, 2.5, 3.0	2.0, 2.5, 3.0	0.75, 3.0	3	0.75,3.0	1.5-3.0	3.0,6.0	0.75(BK) 1.0-3.0(ALL) 3.0(BK)
2.5,3.0										3					2.5		
										2.5	2.0, 2.5, 3.0						



Flame Retardant PC & PC Alloys

				Flame Retardant PC/ABS							
Properties	Test Method	Condition	Unit	NH-1015B	NH-1015V	NH-1013U	NH-1021	NH-1037	NH-1033	NH-1041	ABF-1030NH

Physical Properties

Specific Gravity	ASTM D792	-	-	1.18	1.17	1.18	1.2	1.19	1.18	1.18	1.18
Melt Flow Index	ASTM D1238	220°C, 5kg	g/10min								
		220°C, 10kg		23	30	33	28	19	35	27	40
		250°C, 2.16kg									
		250°C, 5kg									
		250°C, 10kg									
		260°C, 2.16kg									
		300°C, 1.2kg									
		300°C, 2.16kg									
	ISO 1133	220°C, 5kg	g/10min								
		220°C, 10kg		23	30	33	28	19	35	27	40
		250°C, 2.16kg									
		250°C, 5kg									
		250°C, 10kg									
		260°C, 2.16kg									
		300°C, 1.2kg									
		300°C, 2.16kg									
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.5-0.7	0.5-0.7	0.4~0.7	0.4-0.6	0.4-0.7	0.40~0.70	0.4-0.7	0.4-0.7
		X-Flow at 3.2mm(TD)		0.5-0.7	0.5-0.7	0.4~0.7	0.4-0.6	0.4-0.7	0.40~0.70	0.4-0.7	0.4-0.7

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²								
		50mm/min		630	650	630	600	670	600	640	600
	ISO 527	5mm/min	MPa								
		50mm/min		60	61	60	60	61	60	65	60
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	880	890	920	950	1,000	900	900	900
		2mm/min		88	89	90	95	92	90	90	90
	ISO 178	2.8mm/min	MPa								
		2mm/min									
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	23,000	24,000	25,000	26,000	27,000	23,000	25,000	23,000
		2mm/min		2,450	2,550	2,650	2,600	2,500	2,300	2,550	2,300
	ISO 178	2.8mm/min	MPa								
		2mm/min									
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf-cm/cm				8	19	15		15
		1/8inch at 23°C		57	55	50	30	60	60	65	60
	ISO 180 1A	at 23°C, 4mm	kJ/m²	40	14	30	30	32	55	30	55
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²	44	17	30	20	36	30	18	30
Rockwell Hardness	ASTM D785				118	118	120	120	119	119	119
	ISO 2039-2	R-scale	-	118	118	118	120	120	119	119	119

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C		86	88	89	100	92	93	92
		4.6kgf/cm², 6.4mm					97	108			
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		81	82	82	85	93	86	85	90
		0.45MPa, 4.0mm		93	94		96	105			
	ISO 75-2 (Annealing)	1.8MPa, 4.0mm		93	97			100			
		0.45MPa, 4.0mm		98	102			106			
VICAT Softening Temperature	ISO 306	B/50	°C	98	100	98	100	110	107	105	105
		B/120		100	103			114			

Flame Characteristics

Flammability	UL94	HB	mm								
		V-2									
		V-1		1.2, 1.3	1.2, 1.3	1.2, 1.3					
		V-0		1.5, 2.0, 2.1, 2.5, 3.0	1.5, 2.0, 2.1, 2.5, 3.0	1.5, 2.0, 2.1, 2.5, 3.0	1.0, 3.0	1.5-3.0	1.5, 3.0	1.5-3.0	1.5, 3.0
		5VA		3	3	3					
		5VB		2.5, 2.1, 2.5	2.0, 2.1, 2.5	2.0, 2.1, 2.5		2.5-3.0		2.0-3.0	

Flame Retardant PC/ABS															
NE-1030	NH-1098	NE-1060	NH-1034	NH-1048	NH-1150HH	NE-1306	NM-1229I	GC-1048	GC-1045	GC-1017	LX-1031	HM-1100F	LS-1150G	LS-1159	LS-1159S

1.18	1.17	1.18	1.18	1.18	1.28	1.44	1.34	1.18	1.19	1.17	1.18	1.26	1.28	1.28	1.28
							40								
53	45	47	40	36	29	22		38	55	46	24	26		14	9
				16									24		
							40								
53	45	47	40	36	29	22		38	55	46	24	26		14	9
				16									24		
0.4-0.7	0.4-0.7	0.4-0.7	0.3-0.6	0.4-0.7	0.2-0.5	0.05-0.35	0.2 - 0.5	0.3 - 0.6	0.4-0.7	0.3-0.6	0.4-0.7	0.3 – 0.6	0.2-0.5	0.2-0.5	0.2-0.5
0.4-0.7	0.4-0.7	0.4-0.7	0.3-0.6	0.4-0.7	0.2-0.5	0.15-0.45	0.2 - 0.5	0.3 - 0.6	0.4-0.7	0.3-0.6	0.4-0.7	0.3 – 0.6	0.2-0.5	0.2-0.5	0.2-0.5

						650	520					800	900	800	900
640	630	630	580	630	640			630	600	580	550				
						65	50					80	86	80	90
60	60	61	55	60	64			60	60	58	54				
890	850	880	850	850	940	1,000	890	900	900	890	820	1,000	1,400	1,200	1,200
90	90	90	80	90	90	100	90	90	90	86	82	100	135	110	
															120
25,000	25,000	25,000	23,000	24,000	44,000	72,000	42,000	25,000	24,500	25,500	23,000	40,000	46,000	48,000	45,000
2,500	2,700	2,550	2,300	2,500	4,400	7,200	4,100	2,500	2,450	2,700	2,300	4,000	4,600	5,000	4,500

12		15		17	6		3.5	17	15			8		6	8
50	45	51	50	50	6	4	3	50	60	45	37	8	9	6	8
16	25		15		6	6	3.5	40	30	17	34	8	8.2	6	8
17	26	12	15	45	6.5	6	3	50	15	15	37	7	9.9	6	8
	110	117	118	116	110	120		116	116	115	115	118	121	120	120
118	110	117	118	116	110	120		116	116	115	115	118	121	120	120

83		82	88	79	86	106	84	79	80	83		93	127	91	90
					89					91		95			93
77		78	82	75	80	104	83	76	78	77	76	92	125	91	90
90					85					86	86	94	127		93
85												83			
93											90				
93	96	91	100	90	95	115		90	95	93	93	98		97	
95										94					

1					0.4								0.75-3.0		
				1	1		1		1.5					1.5	1.5
1.5, 2.0, 3.0	1.5,3.0	1.5-3.0	1.2	1.2 - 3.0	1.2, 3.0	1.5/3.0	1.5, 2.0-2.2	1.2, 1.5, 3.0	1.5, 3.0	2.0, 3.0	1.5-3.0	1.5, 2.0, 3.0		2.0, 2.5, 3.0	3
			2.5												
		2.0-3.0	2	1.5		2	2.0-2.2	1.5/3.0		2.0, 3.0					



High Impact Strength PC & PC/GF

				General					
Properties	Test Method	Condition	Unit	AH-1080	CF-1050	CF-1070	GM-1080	CF-1021T	GW-1029

Physical Properties

Specific Gravity	ASTM D792	-	-	1.18	1.18	1.2	1.2	1.18	1.18
Melt Flow Index	ASTM D1238	250°C, 10kg	g/10min	18	18	13	28	36	19
		300°C, 1.2kg		11		8	16	19	
	ISO 1133	250°C, 10kg		18	18	13	28	36	19
		300°C, 1.2kg		11		8	16	19	
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	
		X-Flow at 3.2mm(TD)		0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	0.4-0.7	

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²						
		50mm/min		580	600	600	600	650	590
	ISO 527	5mm/min	MPa						
		50mm/min		51	55	58	60	60	60
Flexural Strength	ASTM D790	2mm/min	kgf/cm²						
		2.8mm/min		800	850	850	800	850	840
	ISO 178	2mm/min	MPa	80	84	80	80	92	81
		2.8mm/min							
Flexural Modulus	ASTM D790	2mm/min	kgf/cm²						
		2.8mm/min		21,000	20,000	20,000	20,000	21,000	20,000
	ISO 178	2mm/min	MPa	2,200	2,100	2,100	2,000	2,300	1,980
		2.8mm/min							
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf·cm/cm		55	55	60	10	56
		1/8inch at 23°C		75	70	70	72	70	
	ISO 180 1A	at 23°C, 4mm	kJ/m²	59	60	60	53	60	65
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²	70	60	65	58	60	91
Rockwell Hardness	ASTM D785	R-scale	-	118	120		116	120	116
	ISO 2039-2			118	120		116	120	116

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	129			125	120	124
		4.6kgf/cm², 6.4mm					135	133	
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		125	121		115	130	
		0.45MPa, 4.0mm			136		130	133	
VICAT Softening Temperature	ISO 306	B/50	°C	143	141	140	139	140	139

Flame Characteristics

Flammability	UL94	HB	mm	0.8, 3.0					0.8,3.0
		V-2			0.8, 2.5, 3.0	0.8, 2.5, 3.0	0.8, 3.0		
		V-1							

Reinforced							
AH-3100	AH-3200	LS-3302	CF-3104HF	CF-3200HF	CF-3300HF	GI-3103	GW-3203

1.23	1.32	1.4	1.25	1.33	1.4	1.25	1.33
24	27	12	23	23	22	33	23
15			12.5	15	10.5	21	
24	27	12	23	23	22	33	23
15			12.5	11.5	10.5	21	
0.2-0.5	0.2-0.5	0.1-0.4	0.3-0.6	0.2-0.5	0.1-0.4	0.3-0.6	0.2-0.5
0.3-0.6	0.3-0.6		0.3-0.6	0.3-0.6	0.3-0.6	0.4-0.7	0.3-0.6

800	1,000	1,300		1,000	1,200	560	
			600				
80	100	120		100	125	53	
			60				
			950				
1,200	1,500	1,800		1,400	1,700	880	1,400
120	150	175	95	170	180		170
						85	
			30,000				
34,000	55,000	75,000		56,000	66,000	32,000	56,000
3,500	5,500	8,300	3,000	6,000	7,300		6,000
						3,160	
17	16	12	20	20	15	16	18
20	17	17	28	19	18	23	19
18	17	12	20	19	17	18	19
	18	12	20	25	18	19	25
		120	116	116	115	115	116
		120		116	115	115	116

136	138	140	141	139	140	131	139
		144	137	143	143	136	143
136	135	140	141	137	138	130	137
		144	137	142	143	134	142
		149		148	143	126	

0.8-3.0						0.8, 3.2	
		0.8	0.8	0.8	0.8		
		3.2	3.2	3.2	3.2		



High Heat Resistant EP

				PCT			PPA				
Properties	Test Method	Condition	Unit	TK-2046MA	TK-2050LP	TL-2058	HX-4302G	HX-4452G	HA-4302G	HA-4350HP	HA-4400MP

Physical Properties

Specific Gravity	ASTM D792	-	-	1.6	1.71	1.71	1.43	1.58	1.34	1.47	1.44
Melt Flow Index	ASTM D1238	300°C, 1.2kg	g/10min	18	22	25					
		330°C, 2.16kg					20	8.5	5		
	ISO 1133	300°C, 1.2kg		18	22	25					
		330°C, 2.16kg					20	8.5	5		
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.5-0.8	0.4-0.7	0.4-0.7	0.3-0.6	0.2-0.4	0.3-0.6	0.3-0.6	0.1 - 0.3
	ASTM D955	X-Flow at 3.2mm(TD)		0.5-0.8	0.4-0.7	0.4-0.7	0.5-0.8	0.4-0.6	0.5-0.8	0.4-0.7	0.3 - 0.5

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²	740	600	530	1,450	1,500		2,000	1,750
	ISO 527	5mm/min	MPa			53	145	150		200	175
		10mm/min		60	60						
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	1,100	750	530	2,200	2,400	2,300	2,550	2,400
	ISO 178	2mm/min	MPa	105	75	53	220	240	220	250	240
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	65,000	50,000	64,000	95,000	135,000	80,000	112,000	90,000
	ISO 178	2mm/min	MPa	6,900	5,000	6,400	9,500	13,500	7,500	11,000	9,000
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf·cm/cm	3	2	1.5	5	6			10
		1/8inch at 23°C		3.6	2.8	1.9	5	6	11	8.5	10
	ISO 180 1A	at 23°C, 4mm	KJ/m²		2	1.5	5	6		8.5	10
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²	3.6	3	1.9	5	6	13		10
Rockwell Hardness	ASTM D785	R-scale	-				120	125	125	110	100
	ISO 2039-2						120	128		110	100

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	250	195	230	280	285	280	280	275
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		250	195	230	280	285	280	280	275

Flame Characteristics

Flammability	UL94	HB	mm	1.5, 3.0	1.5,3.0						
		V-0				0.4	0.4-3.2				

Other Properties

Yellow Index	ASTM D1925	3.2mm	-	5↓	5↓						
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Super Structural EP

				PA, PPA					PPS	
Properties	Test Method	Condition	Unit	HM-4300G	HM-4500G	HM-4650G	MKD-1016	HM-4650LW	XP-2130A	XP-2140C

Physical Properties

Specific Gravity	ASTM D792	-	-	1.41	1.58	1.79	1.64	1.78	1.65	1.66
Melt Flow Index	ASTM D1238	300°C, 1.2kg	g/10min	10					115	55
		315.5°C, 5kg								
		316°C, 5kg								
		330°C, 2.16kg		25	20					
	ISO 1133	275°C, 2.16kg		13					115	55
		300°C, 1.2kg		10						
		315.5°C, 5kg								
		316°C, 5kg								
		330°C, 2.16kg	25	20						
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.3-0.6	0.2-0.5	0.1-0.4	0.2-0.5	0.1-0.4	0.3-1.2	0.3-1.2
		X-Flow at 3.2mm(TD)		0.7-0.9	0.4-0.7	0.4-0.7	0.3-0.6	0.4-0.7	0.3-1.2	0.3-1.2

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²	2,000	2,500	2,800	2,700	2,800	1,400	1,900
	ISO 527	5mm/min	MPa	200	250	280	260	280	128	180
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	2,500	3,500	3,100	3,400	3,900	2,000	2,700
	ISO 178	2mm/min	MPa	250	350	310	330	390	190	260
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	95,000	150,000	190,000	156,000	200,000	100,000	130,000
	ISO 178	2mm/min	MPa	10,000	15,000	19,000	16,000	20,000	10,000	13,400
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf·cm/cm	8	13	10	12	15	8	9
		1/8inch at 23°C		8	13	13	13	15	9	10
	ISO 180 1A	at 23°C, 4mm	KJ/m²	8	13	13	17	15	11	11
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²							
				8	13		17	15	11	13
Rockwell Hardness	ASTM D785	R-scale	-	120	120	120	121	120	120	121
	ISO 2039-2			120	120	120	121	120	116	121

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	295	240	248	250	245	275	270
		4.6kgf/cm², 6.4mm							282	282
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		295	240	248	250	245	275	267
		0.45MPa, 4.0mm							289	283

Flame Characteristics

Flammability	UL94	HB	mm	0.8-3.0	0.8, 3.0	0.8, 3.0	0.8,1.5,3.0	0.8, 0.3		
		V-0							0.75	0.9



Metal Adhesion, LDS Materials

				Metal Adhesion		LDS (Laser Direct Structuring)					
Properties	Test Method	Condition	Unit	JS-5406	JS-5207LD	LP-1025	LP-3105	LP-3305	LP-3303	LP-1010	LP-1011

Physical Properties

Specific Gravity	ASTM D792	-	-	1.57	1.37	1.28	1.33	1.43	1.47	1.19	1.21
Melt Flow Index	ASTM D1238	250°C, 10kg	g/10min					26		28	36
		280°C, 2.16kg		15	20						
		300°C, 1.2kg				24	20	14	17	15	17
		250°C, 10kg						26		28	36
	ISO 1133	300°C, 1.2kg				24	20	14	17	15	17
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.2 - 0.5	0.5-0.8	0.4-0.7	0.3-0.6	0.1-0.4	0.1-0.3	0.4-0.7	0.4-0.7
		X-Flow at 3.2mm(TD)		0.4 - 0.7	0.6-0.9	0.4-0.7	0.4-0.7	0.3-0.6	0.3-0.6	0.4-0.7	0.4-0.7

Mechanical Properties

Tensile Strength at yield	ASTM D638	5mm/min	kgf/cm²	1,200	1,000		750	900	960		
		50mm/min				580				530	530
	ISO 527	5mm/min	MPa	120	98		78	90	100		
		50mm/min				55				55	55
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	1,900	1,700	840	1,100	1,300	1,400	800	800
	ISO 178	2mm/min	MPa	190	166	82		130	120	75	75
		2.8mm/min					110				
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	96,000	57,000	22,000	35,000	54,000	69,000	23,000	25,000
	ISO 178	2mm/min	MPa	9,500	5,590	2,200		5,400	6,500	2,300	2,500
		2.8mm/min					3,500				
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf-cm/cm	11	11	15	9	8	10	47	25
		1/8inch at 23°C		11	11	22	10	10	11	60	50
	ISO 180 1A	at 23°C, 4mm	kJ/m²	11	11	20	10	10	10	60	50
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²	11	11	15	8		11	63	55
Rockwell Hardness	ASTM D785	R-scale	-	112	112	118	116		115	113	116
	ISO 2039-2			112	111	118	116		115	113	116

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kg/cm², 6.4mm	°C	211	208		119	121	125	110	115
		4.6kgf/cm², 6.4mm						132	125	124	
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		211	208		117	119	124	108	115
		0.45MPa, 4.0mm							133	124	124
VICAT Softening Temperature	ISO 306	B/50	°C				133		126	127	126

Flame Characteristics

Flammability	UL94	HB	mm			0.8, 3.0				0.8, 3.0	0.8,3.0
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Medical Solution

				EtO Sterilization		Γ-ray Sterilization		
Properties	Test Method	Condition	Unit	ML-1010R	ML-1020R	MR-1005	MR-1015	MR-1020

Physical Properties

Specific Gravity	ASTM D792	-	-	1.2	1.2	1.2	1.2	1.2
Melt Flow Index	ASTM D1238	300°C, 1.2kg	g/10min	11.5	22	7.5	18	23
	ISO 1133	300°C, 1.2kg		11.5	22	7.5	18	23
Mold Shrinkage	ASTM D955	Flow at 3.2mm(MD)	%	0.5-0.7	0.5-0.7	0.4-0.7	0.4-0.7	0.4-0.7
	ASTM D955	X-Flow at 3.2mm(TD)		0.5-0.7	0.5-0.7	0.4-0.7	0.4-0.7	0.4-0.7

Mechanical Properties

Tensile Strength at yield	ASTM D638	50mm/min	kgf/cm²	640	640	660	640	640
	ISO 527	50mm/min	MPa	64	64	66	64	64
Flexural Strength	ASTM D790	2.8mm/min	kgf/cm²	920	920	920	920	920
	ISO 178	2mm/min	MPa	92	92	92	92	92
Flexural Modulus	ASTM D790	2.8mm/min	kgf/cm²	23,000	23,000	23,000	23,000	23,000
	ISO 178	2mm/min	MPa	2,300	2,300	2,300	2,300	2,300
Izod Impact Strength (notched)	ASTM D256	1/4inch at 23°C	kgf-cm/cm	15	10	10	10	10
		1/8inch at 23°C		87	75	90	80	75
	ISO 180 1A	at 23°C, 4mm	kJ/m²	80	65	85	30	65
Charpy Impact Strength (V-notched)	ISO 179 1eA	at 23°C, 4mm	KJ/m²	75	60	80	25	60
Rockwell Hardness	ASTM D785	R-scale	-	120	120	120	120	120
	ISO 2039-2			120	120	120	120	120

Thermal Properties

Heat Deflection Temperature	ASTM D648	18.56kgf/cm², 6.4mm	°C	127	125	125	123	122
		4.6kgf/cm², 6.4mm		137	136	135	133	132
	ISO 75-2 (Unannealed)	1.8MPa, 4.0mm		125	123	123	121	120
		0.45MPa, 4.0mm		134	133	132	130	129
VICAT Softening Temperature	ISO 306	B/50	°C	146	145	143	138	140

Flame Characteristics

Flammability	UL94	V-2	mm	0.8-3.0	0.8-3.0	0.8, 3.0		
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About **LOTTE**

A global group creating a better life for all, **LOTTE** endeavors to realize this ambitious dream.



New Today,
Better Tomorrow

MISSION

We enrich people's lives by providing superior products and services that our customers love and trust.

VISION

Lifetime
Value
Creator

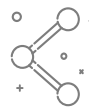
Major Business Unit Portfolio



About **LOTTE CHEMICAL**

LOTTE Chemical's technologies help to enrich our daily lives.

Field of Business



Basic Chemicals	Basic/Intermediate Petrochemicals	Ethylene, Propylene, BD, SM, OX, C5
	Polymer Monomer	PE, PP, PET EO/EG/GE, EOA, PIA/PTA/MMA
Advanced Materials	High Performance Plastic Materials	STOREx Styrene & general product ABS, ABS Alloy, ASA, PP INFINO Engineering plastics PC, PC Alloy & High Performance EP Performance materials PP Compound, TPE, Modified adhesive resin, LFT, EPP
	Construction Materials	Acrylic solid surface, Engineered stone, Porcelain surface
	Water Treatment Membrane	

Capacity
(Unit: KTA)



BASIC
CHEMICALS

BASIC CHEMICALS	EL	4,513
	PL	1,697
MONOMER	BD	450
	BZ	766
POLYMER	TL	339
	MX	139
SPECIALTY	HDPE	1,605
	LLDPE	490
SPECIALTY	LDPE/EVA	360
	PP	1,820
SPECIALTY	PET	520
	ABS	670
SPECIALTY	PC	460
	EPDM	96
SPECIALTY	MMA	260
	PMMA	110
SPECIALTY	S-SBR	100
	EOA	330
SPECIALTY	Acrylic solid surface	970k sheets
	Engineered stone	440k sheets

Sales & Production Sites



HQ/R&D	
HQ	Seoul
R&D	Uiwang, Daejeon
PRODUCTION PLANT	
Asia	Malaysia, Uzbekistan, Pakistan, South Korea, China, Vietnam, India, Indonesia
Europe	Hungary, Turkey (E-stone)
America	U.S, Mexico

22 Countries

26 Production bases

Employees Worldwide



Including major subsidiaries
(Domestic & Overseas)

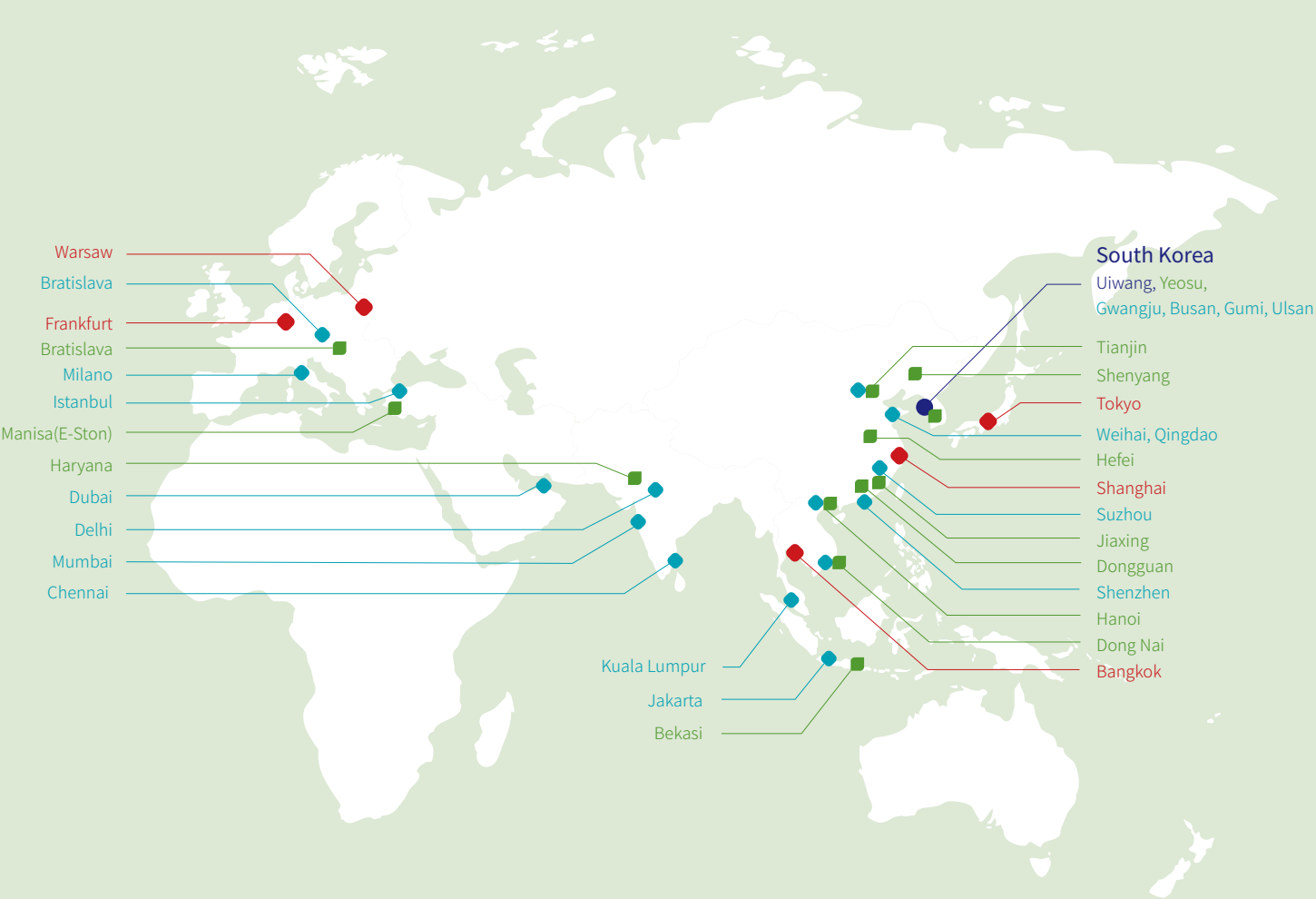
10,765

Business Performance(2020) (Unit: KRW)



Sales 18,120 billion
Capital 17,137 billion

Global **Network** [Advanced Materials]



SOUTH KOREA	Sales Corporation	Production Plant
Uiwang (Advanced Materials) Tel. +82-31-596-3114	Los Angeles, U.S.A. Tel. +1-714-443-0907	ASIA
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Gwangju Service Office Tel. +82-62-945-1353	Shanghai, China Tel. +86-21-6270-3000	Dongguan, China Tel. +86-769-8300-9852
Busan Service Office Tel. +82-51-465-6829	Tokyo, Japan Tel. 81-3-6369-6429	Shenyang, China Tel. +86-198-2402-0134
Gumi Sales Office Tel. +82-54-468-2811	Bangkok, Thailand Tel. +66-2-624-6726	Hefei, China Tel. +86-186-0573-0711
Ulsan Sales Office Tel. +82-52-267-9804	Warsaw, Poland Tel. +48-506-760-890	Jiaxing, China Tel. +86-185-0573-7977
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		Haryana, India Tel. +91-88001-02170
		Bekasi, Indonesia Tel. +62-21-5099-8896



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ASIA		EUROPE
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Qingdao, China Tel. +86-532-8577-9681	Chennai, India Tel. +91-44-4299-4255	Milano, Italy Tel. +39-02-02 0069-7182
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Tianjin, China Tel. +86-22-2836-4258	Mumbai, India Tel. +91-22-6110-0177	AMERICA
Weihai, China Tel. +86-631-5666-812		Detroit, U.S.A. Tel. +1-248-509-7458
Hanoi, Vietnam Tel. +84-243-227-2071	MIDDLE EAST	San Diego, U.S.A. Tel. +1-619-551-7000
Dong Nai, Vietnam Tel. +84-251-351-4390	Dubai, U.A.E. Tel. +971-4-245-1400	
Kuala Lumpur, Malaysia Tel. +60-3-2283-3714		