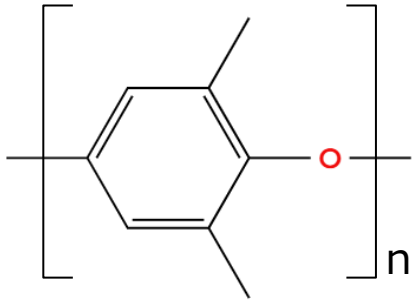
Modified PPE Resin

Iupiace™ LEMALLOY™

August 2026 Edition

GLOBAL POLYACETAL

About modified PPE resin



PPE
(Polyphenylene Ether)

+

Other Resins
- PS (Polystyrene)
- PA (Polyamide)
- PP (Polypropylene)

etc.

Alloy

Modified PPE Resin

Iupiace™

LEMALLOY™

Modified polyphenylene ether (modified PPE) is a general term for polymer alloys of PPE with other resins.

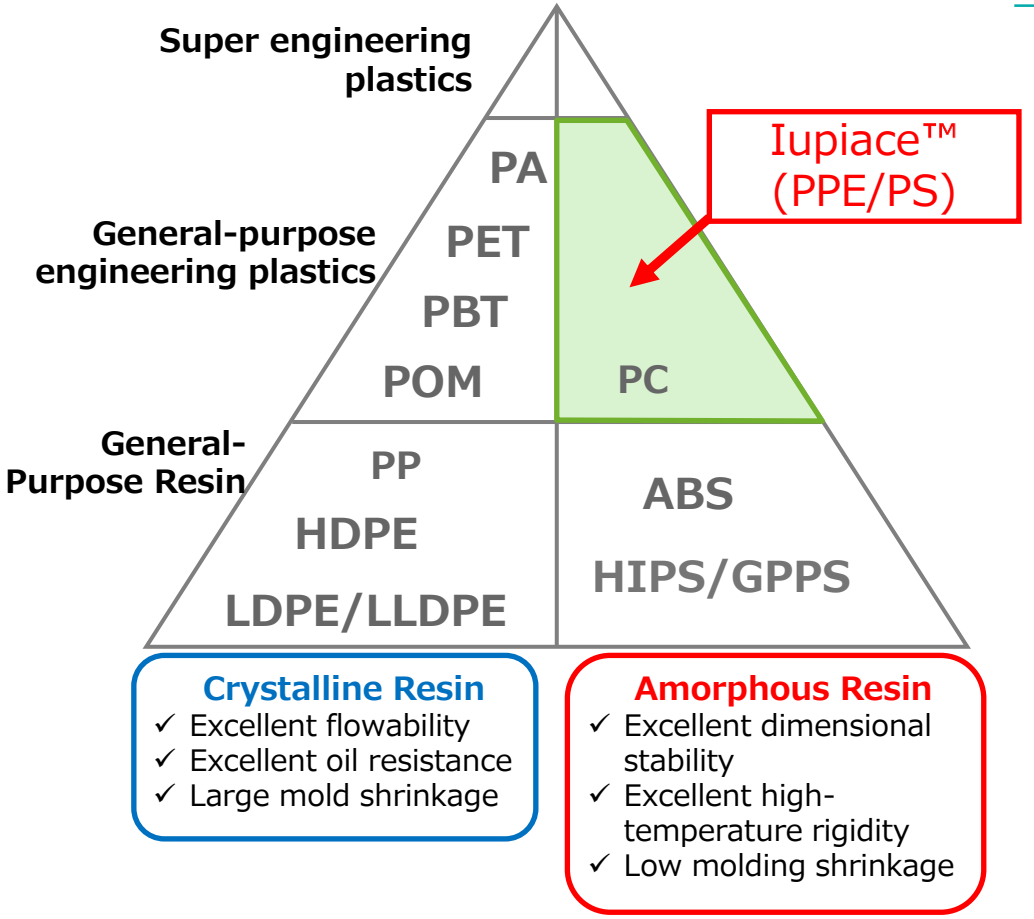
Global Polyacetal modified PPE product lineup

Iupiace™ : fully miscible, amorphous polymer alloy material of PPE and PS

LEMALLOY™: polymer alloy material of PPE and crystalline resins (PA, PP)

Modified PPE resin Iupiace™

Iupiace™ : fully miscible, amorphous polymer alloy of PPE and PS



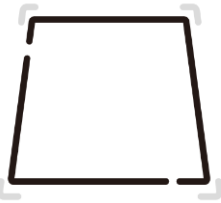
Features



Low Specific Gravity



Low Water Absorption



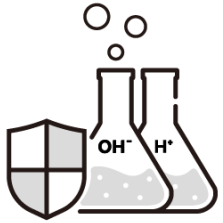
Dimensional Stability



Electrical Properties



Flame Retardancy



Water, Acid, Alkali Resistance

etc.

Drawbacks

Iupiace™ can exhibit inferior resistance to certain solvents (petroleum-based, halogen-based, ketone-based, etc.).
For applications requiring oil resistance, we recommend LEMALLOY™.

Features of Iupiace™ – Low specific gravity



Low Specific Gravity

Among general-purpose engineering plastics, Iupiace™ has the lowest specific gravity and contributes to weight reduction in components.

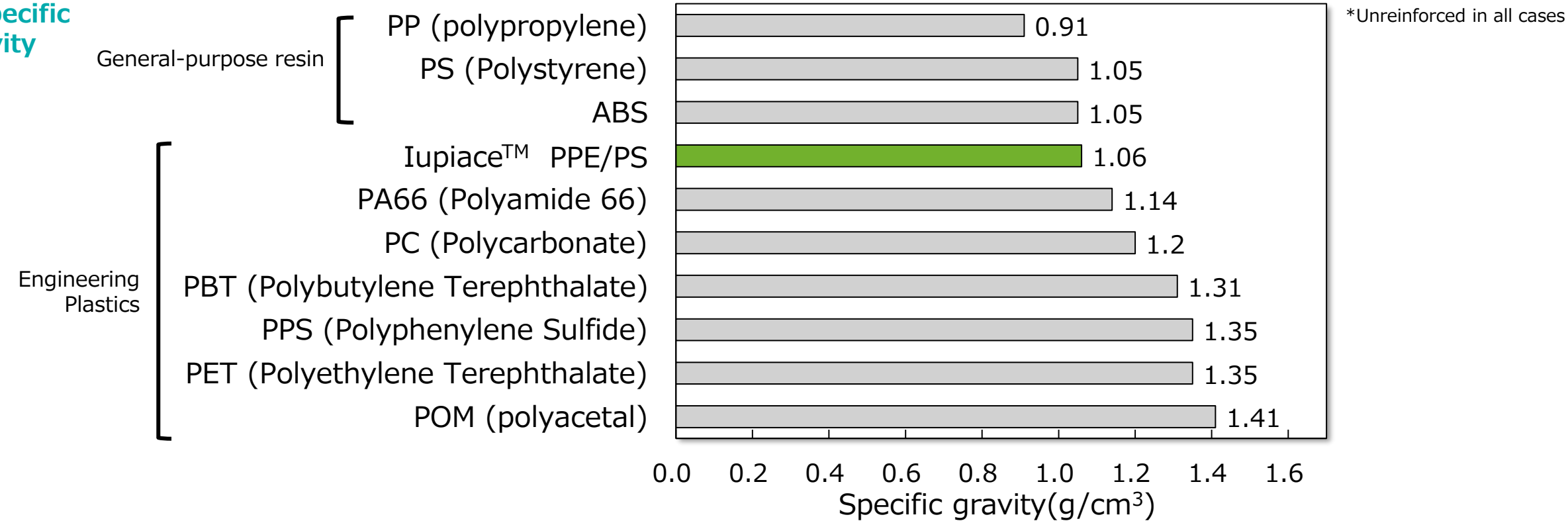


Fig. Specific gravity of Iupiace™ and other resins

The values described are typical values only.

Features of Iupiace™ – Low water absorption



Low Water Absorption

Iupiace™ has a low water absorption rate among general-purpose engineering plastics, leading to a reduction in dimensional and property changes caused by water absorption.

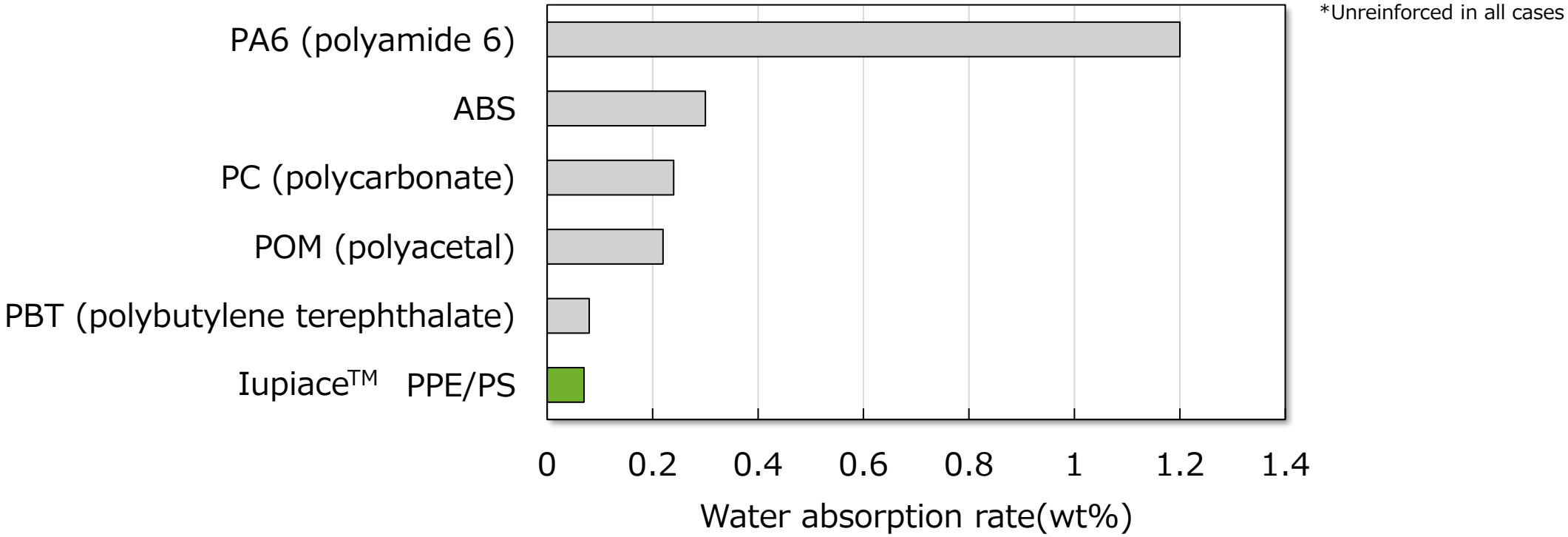
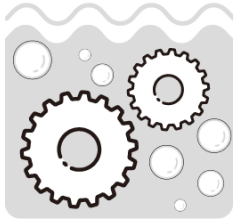


Fig. Water absorption rates of Iupiace™ and other resins (in water at 23°C, 24 hr)

The values described are typical values only.

Features of Iupiace™ – Water resistance and hot-water resistance



Water Resistance

Iupiace™ offers excellent water resistance and hot-water resistance, and maintains mechanical strength without undergoing hydrolysis or other degradation even in high-temperature, high-humidity environments.

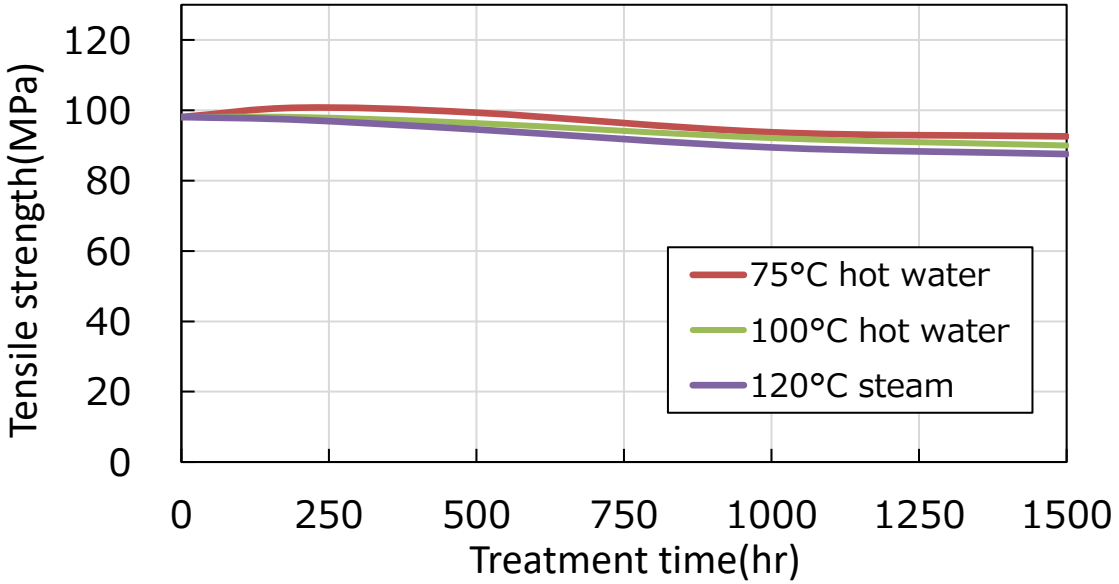


Fig. Iupiace™ GH20 (GF20% reinforced grade) tensile strength after hot water and steam treatment

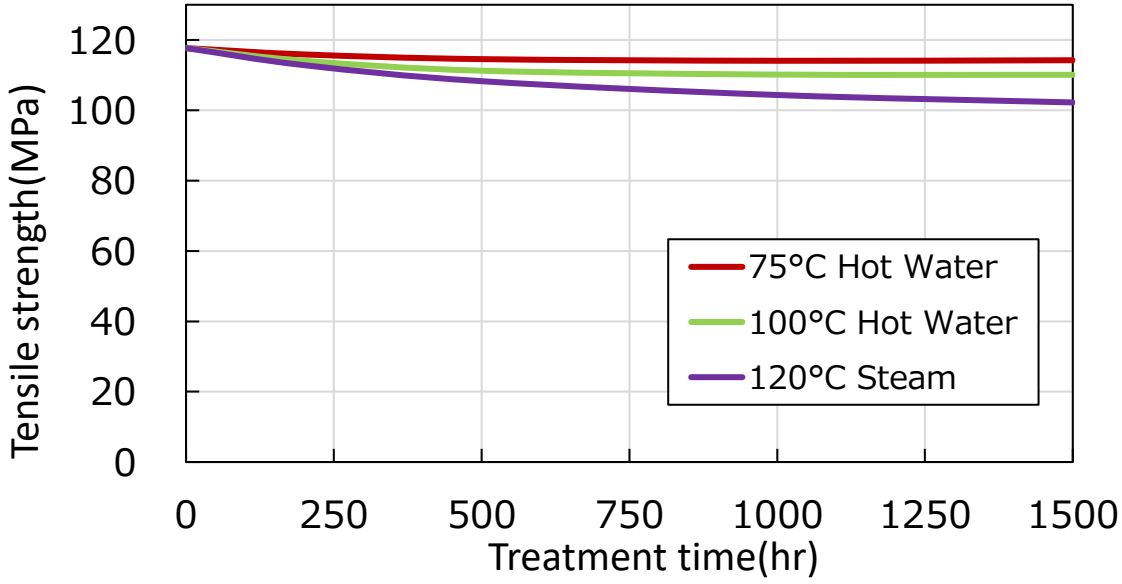
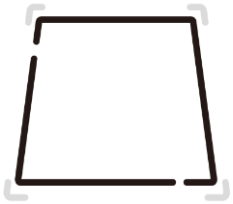


Fig. Iupiace™ GH30 (GF30% reinforced grade) tensile strength after hot water and steam treatment

The values described are typical values only.

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Features of Iupiace™ – Dimensional stability



Dimensional Stability

The coefficient of linear expansion of Iupiace™ is the smallest among general-purpose engineering plastics, delivering excellent dimensional accuracy.

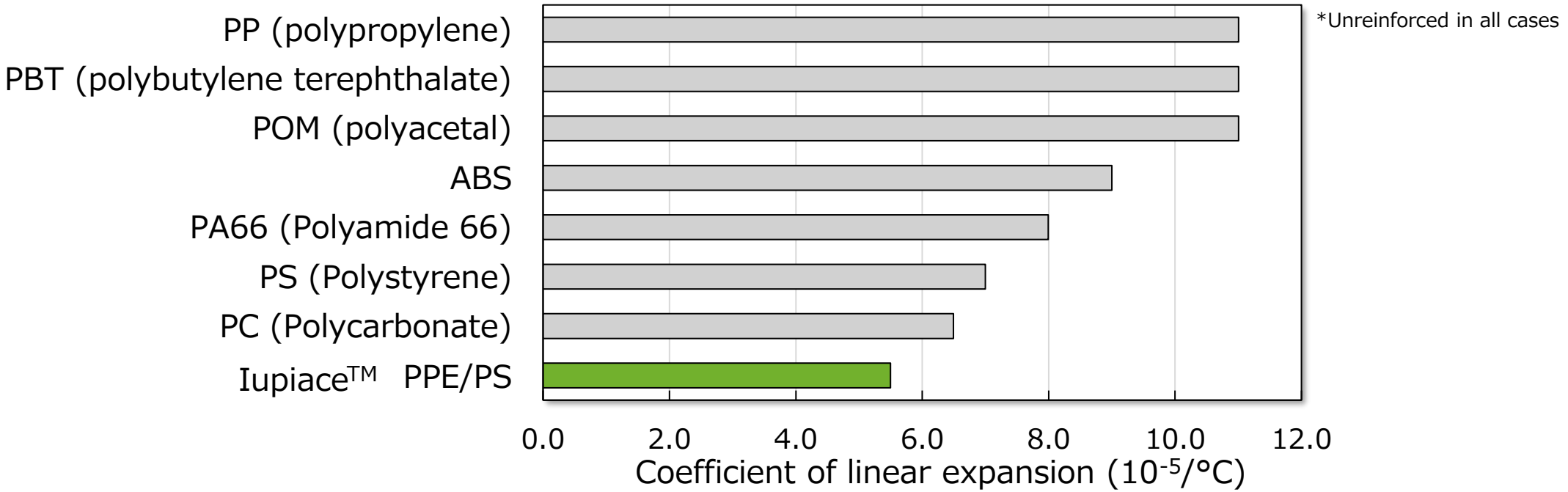


Fig. Coefficient of linear expansion of Iupiace™ and other resins

The values described are typical values only.

Features of Iupiace™ – Flame retardancy



Flame Retardant

Iupiace™ has a high oxygen index* and can be made flame-retardant with ease. A wide range of halogen-free flame-retardant grades is available to suit various flame-retardancy levels.

*Oxygen index: The minimum oxygen concentration required for a material to continue burning. The higher the oxygen index, the more difficult it is for the material to burn.

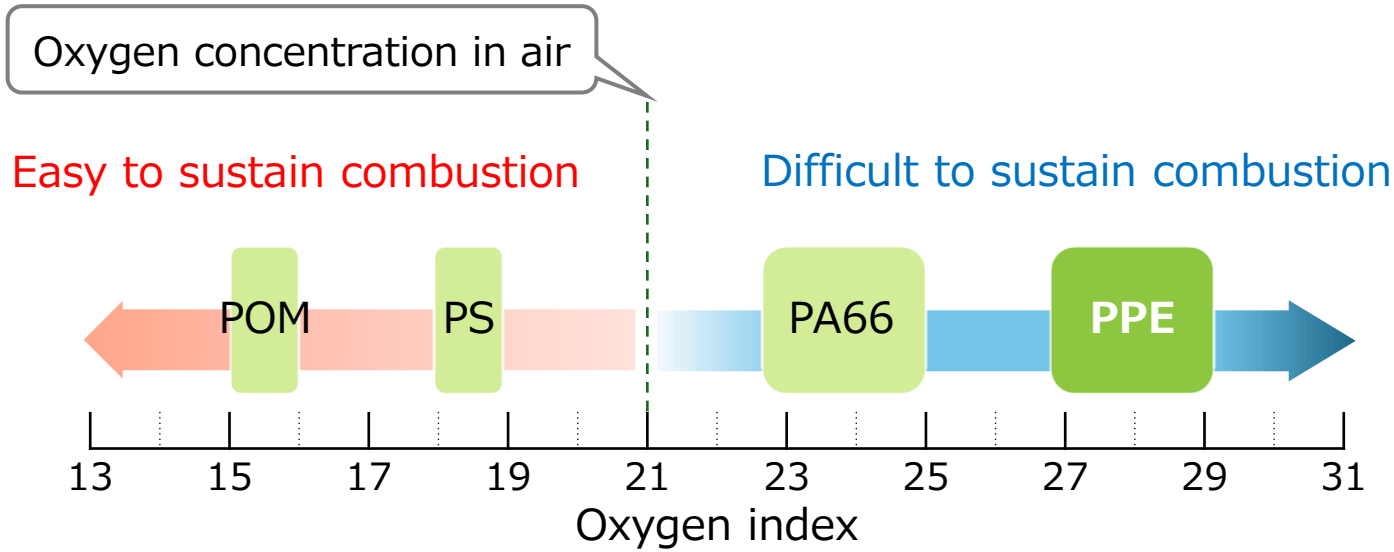
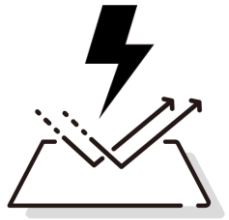


Fig. Oxygen index of Iupiace™ and other resins

The values described are typical values only.

Features of Iupiace™ – Electrical properties (Insulation properties / Dielectric properties)



Electrical Properties

Iupiace™ has the highest dielectric breakdown strength among general-purpose engineering plastics and offers excellent insulation properties.
Iupiace™ has the lowest relative permittivity and dissipation factor among general-purpose engineering plastics.

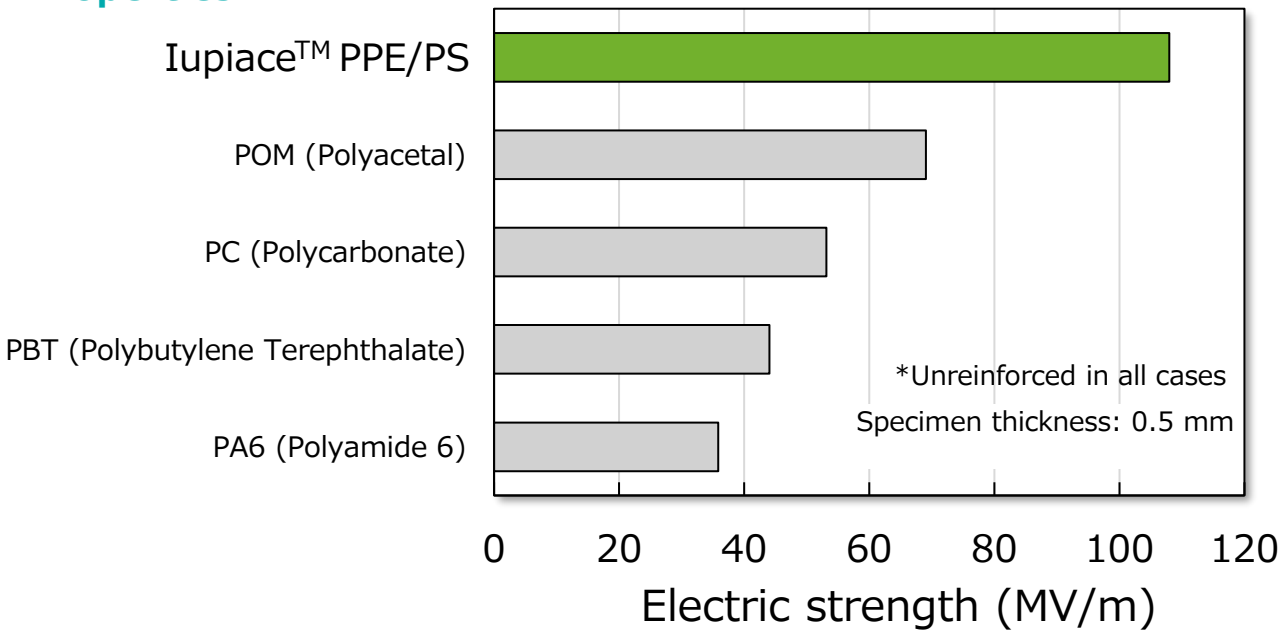


Fig. Electric strength of Iupiace™ and other resins

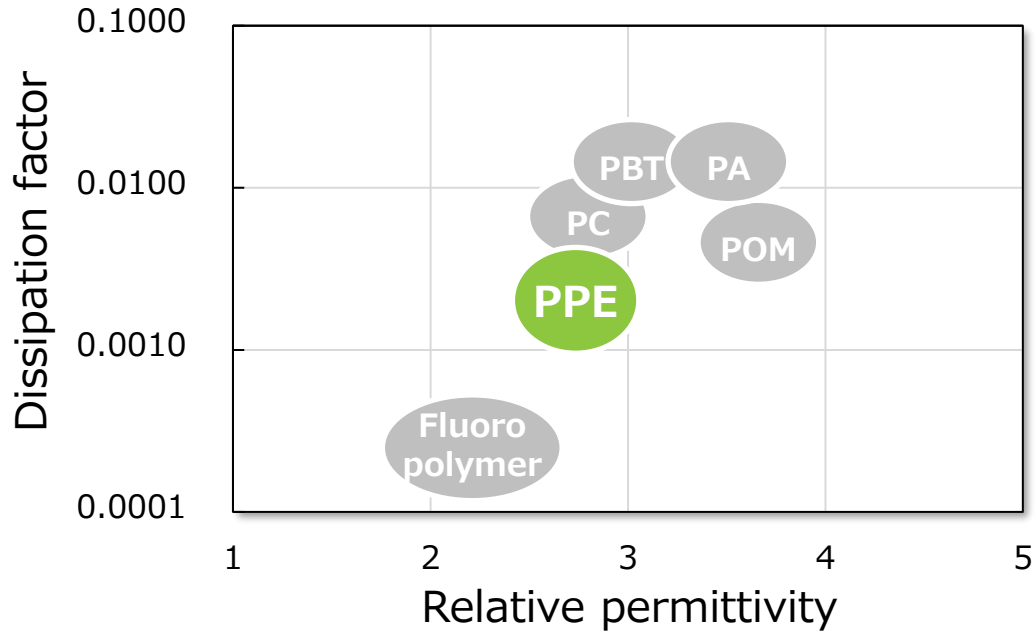


Fig. Dielectric properties of Iupiace™ and other resins

The values described are typical values only.

Iupiace™ grade selection

In addition to standard grades that cover a wide range of heat-resistant temperatures and flame-retardancy levels,
we offer a lineup of functional grades tailored to a variety of applications.

Unreinforced | Glass fiber reinforced | Glass fiber + filler reinforced | Filler reinforced

Unreinforced standard grade

UL94 V-0 Flame retardant
AN/LN Series

UL94 V-1 Flame retardant
AV/LV Series

UL94 HB Flame retardant
AH Series

Glass-fiber reinforced Standard grade

UL94 V-0 Flame retardant
GN Series

UL94 V-1 Flame retardant
GV Series

UL94 HB Flame retardant
GH Series

Functional grade

Flame retardant, High flow
AP/ANP Series

Flame retardant,
High flow, High rigidity
GX1050 / GX1210

Filler reinforced, Low warpage
TH/TX Series

Flame retardant,
High tracking resistance
HCT20V

Anti-static
EHM Series

Flame retardant,
Low warpage, High flow
LMX420N

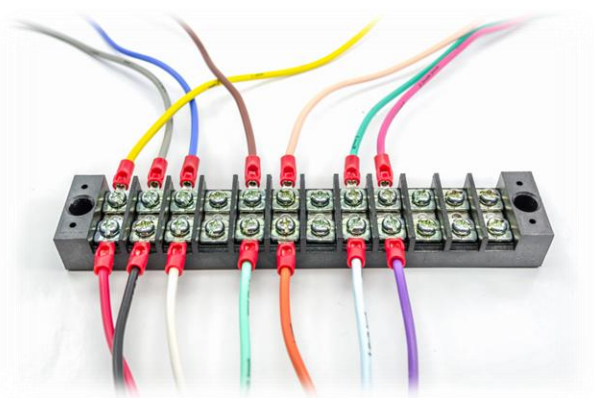
Examples of Iupiace™ applications – Electrical and electronic uses

Iupiace™ offers excellent electrical properties and flame retardancy, making it well suited for electrical and electronic components. We offer a lineup of flame-retardant grades that cover a broad range of heat resistance temperatures and can propose the optimal material according to the operating environment temperature and the component design.

Application Examples



AC Adapter



Terminal Block

Reasons for Adoption

- ✓ Electrical Insulation Properties
- ✓ Flame Retardancy

Applicable Grade

LV Series (unreinforced, V-1 flame retardant)
LN, AN Series (unreinforced, V-0 flame retardant)

Examples of Iupiace™ applications – Battery-related uses

Iupiace™ offers excellent insulation and flame retardancy, and provides high resistance to electrolyte, making it well suited for battery-related components such as battery manufacturing process trays and battery cases.

Applications

Battery manufacturing process tray
Battery case



Reasons for Adoption

- ✓ Electrical Insulation Properties
- ✓ Flame Retardancy
- ✓ Dimensional Stability
- ✓ Electrolyte Resistance

Applicable Grades

Battery Manufacturing Process Tray
LN80 (unreinforced, V-0 flame retardant), GN20 (GF reinforced, V-0 flame retardant)
Battery Case
AP6GM4, AP6GM2, CTGM6 (GF + filler reinforced, V-1 flame retardant),
HCT20V (high-tracking resistance, V-1 flame retardancy),
LV40 (unreinforced, V-1 flame retardancy)

Examples of Iupiace™ applications – Water applications

Iupiace™ offers high water resistance and high resistance to hot water, with minimal changes in properties upon contact with water, and can contribute to the resinification of water-contact components.
It also provides excellent acid and alkali resistance and can be used in applications involving contact with chemical solutions.

Applications



Pipe and Fitting Components



Washlet Components



Boiler Components

Reasons for Adoption

- ✓ Water Resistance and Hot-Water Resistance
- ✓ Acid and Alkali Resistance
- ✓ Dimensional Stability

Applicable Grades

Pipes, fittings, and washlet components
AH Series (unreinforced, HB flame-retardant)
Boiler components
GH Series (GF Reinforced, HB Flame-Retardant)

Examples of Iupiace™ applications – IC Trays

For IC trays that require anti-static functionality to prevent damage to electronic components caused by static electricity, the EHM series is ideal.

Application Example



IC tray

Reason for Adoption

- ✓ High heat resistance (HDT>150°C)
- ✓ Good conductivity (surface resistivity 10^3 to 10^6 Ω)
- ✓ Dimensional stability

Applicable Grades

EHM Series (unreinforced, anti-static)

LEMALLOY™ : polymer alloy material of PPE and crystalline resins (PA, PP)

The LEMALLOY™ morphology pairs a continuous crystalline resin matrix (PA or PP) with fine particles of dispersed PPE. This blend merges the chemical resistance and moldability of the crystalline base of the PA or PP with the dimensional stability and high-temperature stiffness of PPE.

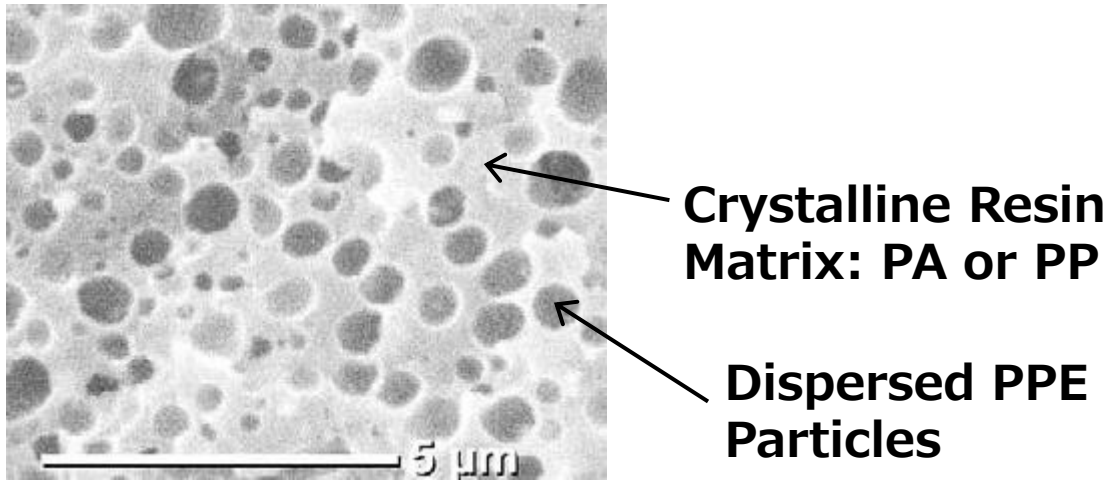


Fig. Cross-sectional SEM image of a LEMALLOY™ specimen

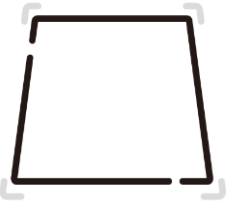
Features



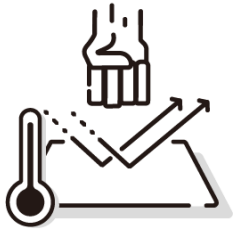
Low Specific Gravity



Low Water Absorption



Dimensional Stability



High-Temperature Rigidity



Chemical Resistance (Equivalent to Polyamide)

etc.

Features of LEMALLOY™ – Comparison with polyamide

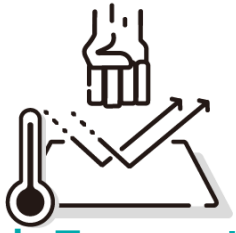
LEMALLOY™ has a lower water absorption rate than polyamides and offers excellent dimensional stability after water absorption.
LEMALLOY™ preserves high mechanical strength even after water absorption.

Item		LEMALLOY™ BX505 PPE/PA6	PA6	LEMALLOY™ C61HL PPE/PA66	PA66
Specific Gravity	g/cm3	1.09	1.14	1.10	1.15
Water Absorption (23°C, 50% RH)	%	1.4	3.1	1.2	2.7
Water absorption dimensional change (MD/TD)	%	0.1/0.2	0.4/0.4	0.1/0.1	0.3/0.4
Flexural strength	MPa	80 (47)	108 (38)	90 (71)	121 (54)
Flexural Modulus	MPa	2000 (1200)	2700 (860)	2300 (1700)	2900 (1300)

* Values in parentheses indicate property values at water absorption equilibrium at 23°C and 50% RH.

The values described are typical values only.

Features of LEMALLOY™ – High-temperature rigidity



High-Temperature Rigidity

LEMALLOY™ exhibits only minimal deterioration in properties at elevated temperatures and offers superior high-temperature rigidity compared with polyamide.

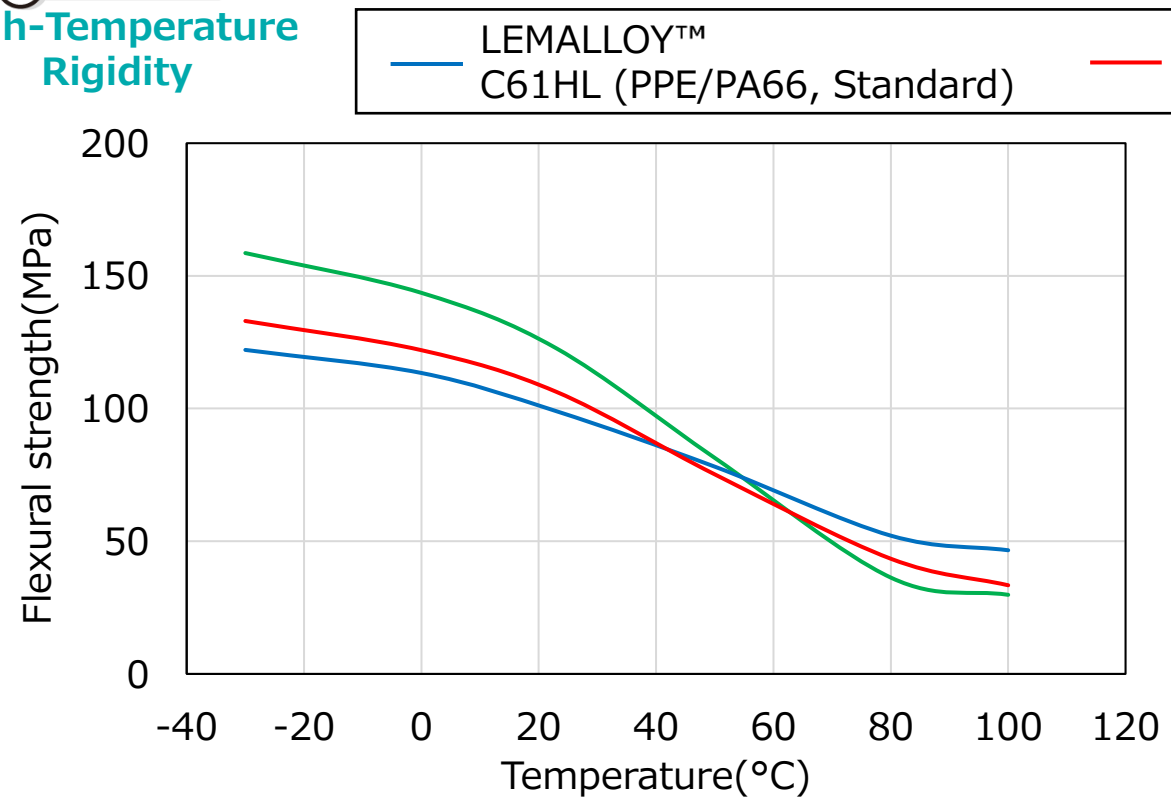


Fig. Temperature dependence of flexural strength

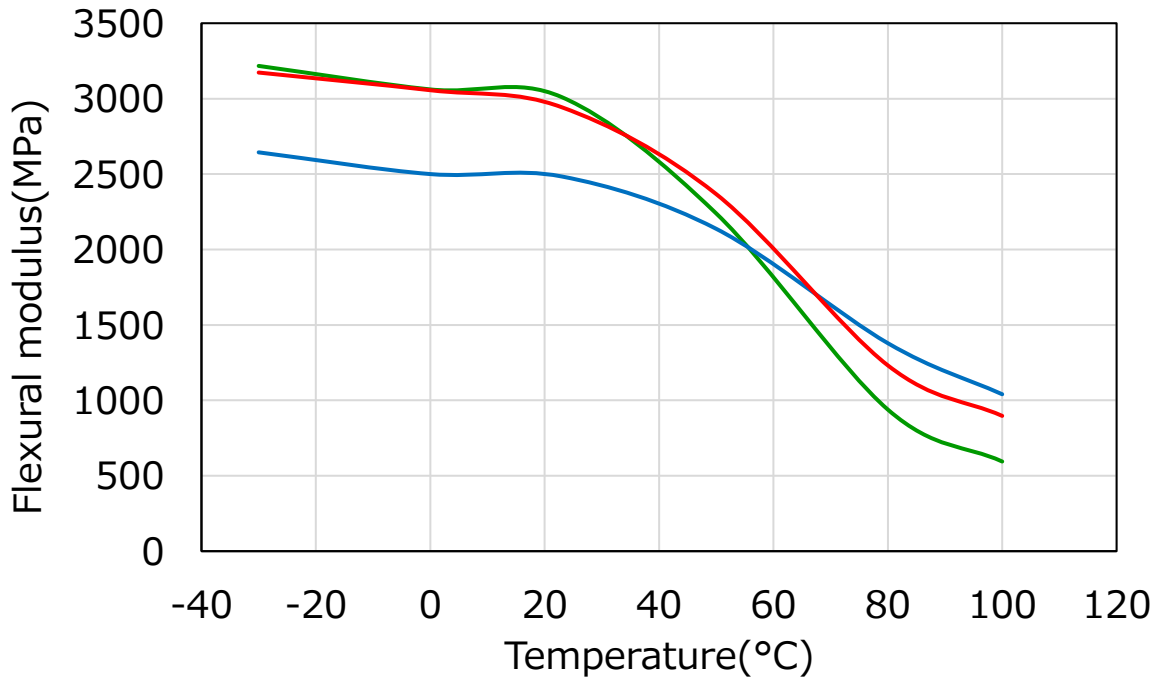
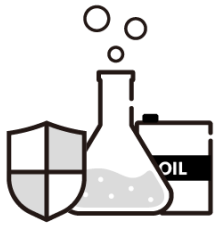


Fig. Temperature dependence of flexural modulus

The values described are typical values only.

Features of LEMALLOY™ – Chemical resistance



Chemical Resistance

LEMALLOY™ exhibits high resistance to oils and organic solvents. It can be suitably used for automotive parts requiring oil resistance.

Chemicals	Iupiace™ PPE/PS Alloy		LEMALLOY™ PPE/PA Alloy	
	Bending Stress 0 MPa	Bending stress 20 MPa	Bending stress 0 MPa	Bending stress 20 MPa
Gasoline	B	C	A	A
General mineral oil	B	C	A	A
Methanol, ethanol	A	A	A	A
Ethylene glycol	A	A	A	A
Chloroform	B	C	A	A
Ethyl acetate	C	C	A	A
Methyl ethyl ketone	C	C	A	A
15% aqueous sodium hydroxide solution	A	A	A	A
15% aqueous sulfuric acid solution	A	A	C	C
Saturated aqueous sodium chloride solution	A	A	A	A
Hypochlorous Acid Water	A	A	A	A
General-purpose Detergent	A	A	A	A
90°C hot water	A	-	A	-

Test Method

After immersion in the chemical for 48 hours at 23°C under bending stresses of 0 MPa and 20 MPa, the appearance was evaluated.

Test Results

A: No change in appearance
B: Swelling or dissolution
C: Cracking or breakage

The values described are typical values only.

PPE/PA6 alloy material LEMALLOY™ BX series

BX Series (PPE/PA6)

BX505 (unreinforced, standard)
BX528A-3 (unreinforced, high strength)
BX504D (filler-reinforced, high rigidity)

Features

Compared with PPE

- ✓ **Offers excellent oil resistance (almost equivalent to PA6)**

Compared with polyamide

- ✓ **High stiffness at elevated temperatures (compatible with paint baking)**
- ✓ **Approximately half the water absorption rate**

Application examples

Automotive exterior parts (hood scoops, steps), etc.



Hood Scoop

Reasons for selection: chemical resistance, dimensional stability, high-temperature rigidity

C Series (PPE/PA66, unreinforced)
C61HL (standard), C82HL (high flow), CN51HL (flame retardant, V-0)

Features
In addition to the features of the LEMALLOY™ BX Series (PPE/PA6 alloy), LEMALLOY™ C Series also offers even higher heat resistance (high-temperature rigidity), impact resistance, chemical resistance, and vibration resistance.

Application examples
Connector Components
Engine Compartment Junction Box



Connector Components
Reason for Selection: Chemical resistance, dimensional stability

Property table of Iupiace™ unreinforced V-0 grades

				V-0 Grades						High Flowability V-0 Grade
Properties	**Test Method**	**Terms**	**Units**	**LN23**	**LN30**	**LN40**	**LN60**	**LN80**	**LN91**	**AP4**
Physical properties										
Density	ISO 1183	-	g/cm^3	1.10	1.10	1.10	1.10	1.11	1.10	1.11
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Rheological properties										
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	32 300 2.16	16 300 2.16	14 300 2.16	9.5 300 2.16	6.5 300 2.16	4.0 300 2.16	85 280 5
Mold shrinkage (3mmt)	GPAC method	MD TD	%	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
Mechanical properties										
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	-	-	-	-	2400	-	2000
Yield stress			MPa	47	55	65	73	79	70	49
Yield strain			%	-	-	-	-	-	-	3.2
Nominal strain at break			%	25	25	25	25	20	55	45
Stress at break			MPa	-	-	-	-	-	-	-
Strain at break			%	-	-	-	-	-	-	-
Flexural strength	ISO 178	23℃	MPa	80	90	95	105	115	105	82
Flexural modulus			MPa	2400	2400	2500	2380	2400	2700	2000
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	-	-	-	-	-
Charpy notched impact strength			kJ/m^2	11	13	12	7	6	7	9
Thermal properties										
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	80 95	90 105	100 115	115 130	127 140	145 160	80 90
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	5.5.E-05 5.8.E-05	5.5.E-05 5.8.E-05	5.5.E-05 5.8.E-05	5.5.E-05 5.8.E-05	5.5.E-05 5.8.E-05	5.5.E-05 5.8.E-05	- -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- V-0 - -	V-0 - - 5VA	V-0 - - 5VA	V-0 - - 5VA	V-0 - - -	V-0 - - -	- V-0 - -
Electrical properties										
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω･m	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14
Surface resistivity	IEC 60093	-	Ω	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -	- -	- -	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-	-	-	-	-

The values described are typical values only.

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Property table of Iupiace™ unreinforced V-1, HB grades

				V-1 Grades			HB Grades				
Properties	**Test Method**	**Terms**	**Units**	**LV40**	**LV60**	**AV91**	**AH40**	**AH60**	**AH70**	**AH80**	**AH91**
Physical properties											
Density	ISO 1183	-	g/cm^3	1.10	1.09	1.08	1.06	1.06	1.07	1.07	1.07
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Rheological properties											
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	16 300 2.16	8.5 300 2.16	3.4 300 2.16	13 300 2.16	8.1 300 2.16	5.9 300 2.16	4.0 300 2.16	3.0 300 2.16
Mold shrinkage (3mmt)	GPAC method	MD TD	%	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
Mechanical properties											
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	-	-	2500	2500	2500	2500	2600	2700
Yield stress			MPa	60	60	73	40	50	58	63	70
Yield strain			%	-	-	6.5	3.2	5.0	5.4	5.5	5.5
Nominal strain at break			%	20	25	20	34	30	24	25	25
Stress at break			MPa	-	-	-	-	-	-	-	-
Strain at break			%	-	-	-	-	-	-	-	-
Flexural strength	ISO 178	23℃	MPa	97	100	109	76	95	102	110	118
Flexural modulus			MPa	2550	2650	2550	2500	2500	2500	2600	2700
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	-	153	119	NB	150	140
Charpy notched impact strength			kJ/m^2	12	12	13	14	16	20	18	15
Thermal properties											
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	100 115	115 130	141 -	95 110	115 130	125 140	135 150	145 160
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	6.3.E-05 6.6.E-05	6.3.E-05 6.6.E-05	- -	6.7.E-05 7.1.E-05	6.6.E-05 6.9.E-05	6.6.E-05 6.9.E-05	6.6.E-05 6.9.E-05	6.6.E-05 6.9.E-05
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	V-1 - - -	V-1 - - -	V-1 - - -	HB - - -	HB - - -	HB - - -	HB - - -	HB - - -
Electrical properties											
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	- -	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	- -	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω·m	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14
Surface resistivity	IEC 60093	-	Ω	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15	2.E+15
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -	38 20	- -	44 >65	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-	-	275	-	-	-

The values described are typical values only.

Property table of Iupiace™ glass fiber reinforced grades

Properties	Test Method	Terms	Units	Glass Fiber Reinforced V-0 Grades			Glass Fiber Reinforced V-1 Grades			Glass Fiber Reinforced HB Grades		
				GN10	**GN20**	**GN30**	**GV10**	**GV20**	**GV30**	**GH10**	**GH20**	**GH30**
				GF	GF	GF	GF	GF	GF	GF	GF	GF
				10%	20%	30%	10%	20%	30%	10%	20%	30%
Physical properties												
Density	ISO 1183	-	g/cm^3	1.17	1.24	1.33	1.15	1.22	1.31	1.14	1.22	1.31
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Rheological properties												
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	7.0 300 2.16	5.0 300 2.16	2.9 300 2.16	5.5 300 2.16	3.6 300 2.16	3.0 300 2.16	5.0 300 2.16	4.4 300 2.16	2.7 300 2.16
Mold shrinkage (3mmt)	GPAC method	MD TD	%	0.2 - 0.4 0.3 - 0.5	0.1 - 0.3 0.2 - 0.4	0.1 - 0.2 0.2 - 0.4	0.2 - 0.4 0.3 - 0.5	0.1 - 0.3 0.2 - 0.4	0.1 - 0.2 0.2 - 0.4	0.2 - 0.4 0.3 - 0.5	0.1 - 0.3 0.2 - 0.4	0.1 - 0.2 0.2 - 0.4
Mechanical properties												
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	4200	6700	9000	4200	6500	8400	4500	6600	8900
Yield stress			MPa	-	-	-	-	-	-	-	-	-
Yield strain			%	-	-	-	-	-	-	-	-	-
Nominal strain at break			%	-	-	-	-	-	-	-	-	-
Stress at break			MPa	83	99	110	83	103	110	75	89	103
Strain at break			%	2.5	2.5	1.5	2.5	2.5	1.5	2.6	1.5	1.3
Flexural strength	ISO 178	23℃	MPa	140	160	180	135	161	170	130	154	170
Flexural modulus			MPa	4000	6200	8500	4100	6300	8300	4000	6400	8400
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	-	-	-	-	-	-	-
Charpy notched impact strength			kJ/m^2	7	7	7	8	7	9	6	7	8
Thermal properties												
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	125 130	130 135	130 137	125 135	130 137	130 140	125 135	130 140	130 142
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	4.5.E-05 7.5.E-05	3.0.E-05 6.8.E-05	2.5.E-05 6.0.E-05	4.5.E-05 7.5.E-05	3.0.E-05 6.8.E-05	2.5.E-05 6.0.E-05	4.5.E-05 7.5.E-05	3.0.E-05 6.8.E-05	2.5.E-05 6.0.E-05
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	V-0 - 5VA -	V-1 V-0 5VA -	V-1 V-0 5VA -	V-1 - - -	V-1 - - -	V-1 - - -	HB - - -	HB equiv. - - -	HB - - -
Electrical properties												
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	3.4 3.3	- -	- -	3.2 3.2	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	0.0045 0.0055	- -	- -	0.0021 0.0027	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω·m	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14	3.E+14
Surface resistivity	IEC 60093	-	Ω	2.E+15	2.E+15	2.E+15	2.E+15	6.E+15	6.E+15	6.E+15	6.E+15	6.E+15
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	25 17	- -	- -	26 17	- -	34 20	32 17	30 17
Comparative tracking index	IEC 60112	-	V	200	225	200	200	200	200	175	175	150

The values described are typical values only.

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Property table of Iupiace™ reinforced high flowability grades

Properties	Test Method	Terms	Units	Reinforced High Flowability Grades (V-1)							Reinforced High Flowability Grades (V-0)	
				GX1050	**GX1210**	**AP6GM2**	**AP6GM4**	**AP4GM6**	**CTGM6**	**HCT20V**	**ANP6GM4**	**LMX420N**
				GF+Filler	GF+Filler	GF+Filler	GF+Filler	GF+Filler	GF+Filler	GF+Filler	GF+Filler	Filler
				20%	35%	10%	20%	30%	30%	20%	20%	20%
Physical properties												
Density	ISO 1183	-	g/cm^3	1.25	1.38	1.16	1.23	1.32	1.38	1.22	1.27	1.34
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Rheological properties												
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	24 300 2.16	9.0 300 2.16	28 280 5	31 280 5	25 280 5	27 280 5	26 280 5	29 280 5	40 280 5
Mold shrinkage (3mmt)	GPAC method	MD TD	%	0.2 - 0.4 0.3 - 0.5	0.1 - 0.3 0.2 - 0.4	0.3 - 0.5 0.3 - 0.5	0.2 - 0.4 0.3 - 0.5	0.1 - 0.3 0.2 - 0.4	0.3 0.4	0.5 0.7	0.2 - 0.4 0.3 - 0.5	0.2-0.4 0.2-0.4
Mechanical properties												
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	6100	10500	4000	5700	7800	-	-	6100	6000
Yield stress			MPa	-	-	-	-	-	-	-	-	-
Yield strain			%	-	-	-	-	-	-	-	-	-
Nominal strain at break			%	-	-	-	-	-	-	-	-	-
Stress at break			MPa	75	115	65	80	91	86	68	94	60
Strain at break			%	2.7	2.0	2.9	2.7	3.1	3.0	5.0	2.7	3.0
Flexural strength	ISO 178	23℃	MPa	122	175	116	132	145	140	108	140	105
Flexural modulus			MPa	6000	10500	3800	5500	7300	8000	3400	5800	6000
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	-	-	-	-	-	-	-
Charpy notched impact strength			kJ/m^2	5	5	6	6	6	5	6	5	2
Thermal properties												
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	105 -	115 -	95 -	115 -	115 -	109 -	117 -	121 -	105 -
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	3.7.E-05 6.8.E-05	- -	4.7.E-05 5.8.E-05	3.7.E-05 6.8.E-05	2.6.E-05 6.1.E-05	2.1.E-05 4.0.E-05	4.5.E-05 6.5.E-05	3.7.E-05 6.8.E-05	4.0.E-05 5.5.E-05
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- V-1 - 5VB	- V-1(1.0mm) - 5VB(2.7mm)	- V-1 - -	- V-1 - -	- V-1 - -	- V-1 - -	- V-1 - -	- V-0 - -	- V-0 - -
Electrical properties												
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	3.2 3.1	3.5 3.3	3.5 3.3	3.2 3.1	3.2 3.1	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -	0.0057 0.0067	0.0092 0.0077	0.013 0.0049	0.0090 0.0039	0.0057 0.0067	- -
Volume resistivity	IEC 60093	-	Ω·m	5.E+13	-	5.E+13	5.E+13	2.E+13	4.E+13	2.E+14	5.E+13	3.E+14
Surface resistivity	IEC 60093	-	Ω	1.E+15	-	1.E+15	1.E+15	3.E+15	7.E+14	1.E+16	1.E+15	2.E+15
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -	35 18	34 17	47 19	49 24	35 18	- -
Comparative tracking index	IEC 60112	-	V	175	-	200	200	150	175	600	200	-

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Property table of Iupiace™ filler reinforced grades

Properties	Test Method	Terms	Units	Filler Reinforced Grades		
				TX403	**TX903B**	**TH620**
				Low Warpage	Anticreep High Impact	Low Warpage
Physical properties						
Density	ISO 1183	-	g/cm^3	1.09	1.09	1.20
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.06	0.06	0.06
Rheological properties						
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	16 280 5	2.5 300 2.16	12 300 2.16
Mold shrinkage (3mmt)	GPAC method	MD TD	%	0.5 - 0.7 0.5 - 0.7	- -	0.3 - 0.4 0.3 - 0.4
Mechanical properties						
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	2600	2400	5200
Yield stress			MPa	51	60	-
Yield strain			%	2.6	-	-
Nominal strain at break			%	24	40	12
Stress at break			MPa	-	-	50
Strain at break			%	-	-	-
Flexural strength	ISO 178	23℃	MPa	80	90	100
Flexural modulus			MPa	2500	2350	5100
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	NB	NB	-
Charpy notched impact strength			kJ/m^2	20	32	4
Thermal properties						
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	95 100	145 -	115 -
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	6.0.E-05 6.0.E-05	- -	- -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	HB - - -	- - - -	HB - - -
Electrical properties						
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω·m	3.E+14	-	-
Surface resistivity	IEC 60093	-	Ω	2.E+15	-	-
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-

The values described are typical values only.

Property table of Iupiace™ anti-static grades

Properties	Test Method	Terms	Units	Anti-Static Grades		
				EHM1010A	EHM1000 9905M	EHM103R
				CB	CB	CB
Physical properties						
Density	ISO 1183	-	g/cm^3	1.16	1.14	1.16
Water absorption	GPAC method	23℃, 24hr, Underwater	%	-	-	-
Rheological properties						
Melt volume flow rate	ISO 1133	- Temperature Load	cm^3/10min ℃ kg	- - -	9.0 320 5	- - -
Mold shrinkage (3mmt)	GPAC method	MD TD	%	0.5 - 0.7 0.5 - 0.7	0.7 - 0.9 0.7 - 0.9	0.9 - 1.1 0.9 - 1.1
Mechanical properties						
Tensile modulus Yield stress Yield strain Nominal strain at break Stress at break Strain at break	ISO 527-1, 527-2	23℃	MPa MPa % % MPa %	3700 - - - 64 2.2	2500 - - - 60 9.0	2600 - - - 62 8.0
Flexural strength Flexural modulus	ISO 178	23℃	MPa MPa	110 3860	102 2500	105 2700
Charpy impact strength Charpy notched impact strength	ISO 179-1, 179-2	23℃	kJ/m^2 kJ/m^2	20 3	100 -	40 -
Thermal properties						
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	155 165	161 -	150 160
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	5.3.E-05 5.5.E-05	- -	- -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- - - -	- - - -	- - - -
Electrical properties						
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω·m	-	-	-
Surface resistivity	IEC 60093	-	Ω	6.E+05	1.E+04	2.E+03
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-

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Property table of Iupiace™ wear resistance, high dielectric grade

				High Friction/Wear Resistance		High Dielectric
Properties	**Test Method**	**Terms**	**Units**	**AHF6010B**	**GHF3010**	**HD7007**
				Unreinforced	Fiber Reinforced	-
				PTFE	PTFE+GF	-
				10%	10%+30%	-
Physical properties						
Density	ISO 1183	-	g/cm^3	1.12	1.37	1.32
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.06	0.10	0.10
Rheological properties						
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	4.5 300 2.16	1.9 300 2.16	6.5 300 5
Mold shrinkage (3mmt)	GPAC method	MD TD	%	0.5 - 0.7 0.5 - 0.7	0.1 - 0.2 0.2 - 0.4	- -
Mechanical properties						
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	2400	9000	4900
Yield stress			MPa	51	-	-
Yield strain			%	5.0	-	-
Nominal strain at break			%	15	-	-
Stress at break			MPa	-	90	60
Strain at break			%	-	1.8	2
Flexural strength	ISO 178	23℃	MPa	84	140	95
Flexural modulus			MPa	2500	9000	4800
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	12
Charpy notched impact strength			kJ/m^2	8	6	-
Thermal properties						
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	110 -	125 -	125 -
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	6.0.E-05 6.0.E-05	2.5.E-05 6.0.E-05	- -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- HB - -	- HB - -	- - - -
Electrical properties						
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- 8(1GHz)
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- 0.006(1GHz)
Volume resistivity	IEC 60093	-	Ω･m	3.E+14	2.E+14	-
Surface resistivity	IEC 60093	-	Ω	6.E+15	2.E+15	-
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-

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Property table of Iupiace™ PA alloy grades

Properties	Test Method	Terms	Units	Unreinforced PPE/PA6 Alloy	Fiber Reinforced PPE/PA6 Alloy	Unreinforced PPE/PA66 Alloy
				NX7000	**NXG7201 8240**	**NX9000**
				-	GF	-
				-	20%	-
				dry(50%RH)	dry(50%RH)	dry(50%RH)
Physical properties						
Density	ISO 1183	-	g/cm^3	1.10	1.26	1.11
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.6	0.5	0.5
Rheological properties						
Melt volume flow rate	ISO 1133	- Temperature Load	$cm^3/10min$ ℃ kg	5.5 275 2.16	6.0 275 2.16	1.8 275 2.16
Mold shrinkage (3mmt)	GPAC method	MD TD	%	1.2 - 1.4 1.1 - 1.3	0.3 - 0.5 0.4 - 0.6	1.1 - 1.3 1.1 - 1.3
Mechanical properties						
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	2500 (1600)	6000 (4100)	2500 (-)
Yield stress			MPa	65 (46)	- (73)	65 (-)
Yield strain			%	4.1 (9.9)	- (5.1)	4.5 (-)
Nominal strain at break			%	20 (143)	- (11)	50 (-)
Stress at break			MPa	-	97 (-)	-
Strain at break			%	-	2.2 (-)	-
Flexural strength	ISO 178	23℃	MPa	102 (59)	171 (73)	100 (-)
Flexural modulus			MPa	2500 (1500)	5700 (4100)	2500 (-)
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	-	-	-
Charpy notched impact strength			kJ/m^2	30 (77)	6 (9)	25 (-)
Thermal properties						
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	- 180	- 210	- 190
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	9.0.E-05 -	3.0.E-05 -	7.0.E-05 -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- - - -	- - - -	- - - -
Electrical properties						
Relative permittivity	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	- -	- -	- -
Volume resistivity	IEC 60093	-	Ω·m	-	-	-
Surface resistivity	IEC 60093	-	Ω	-	-	-
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	- -	- -	- -
Comparative tracking index	IEC 60112	-	V	-	-	-

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Property table of LEMALLOY™

				PPE/PA66 Alloy			PPE/PP Alloy
Properties	**Test Method**	**Terms**	**Units**	**C61HL**	**C82HL**	**CN51HL**	**PX603Y**
				Standards	High Flowability	V-0 Flame Returdance	-
				-	-	-	-
				dry(50%RH)	dry(50%RH)	dry(50%RH)	-
Physical properties							
Density	ISO 1183	-	g/cm^3	1.10	1.13	1.22	0.98
Water absorption	GPAC method	23℃, 24hr, Underwater	%	0.5	0.6	0.5	-
Rheological properties							
Melt volume flow rate	ISO 1133	- Temperature Load	cm^3/10min ℃ kg	31 280 5	100 280 5	23 280 5	55 280 5
Mold shrinkage (3mmt)	GPAC method	MD TD	%	1.1 - 1.3 1.1 - 1.3	1.1 - 1.3 1.1 - 1.3	1.3 1.3	1.0 - 1.2 1.1 - 1.3
Mechanical properties							
Tensile modulus	ISO 527-1, 527-2	23℃	MPa	2500 (1600)	2600 (1500)	3000 (2000)	1900
Yield stress			MPa	66 (51)	60 (45)	72 (52)	42
Yield strain			%	5.3 (11)	4.8 (19)	4.0 (7.8)	-
Nominal strain at break			%	42 (73)	47 (88)	17 (42)	-
Stress at break			MPa	-	-	-	-
Strain at break			%	-	-	-	-
Flexural strength	ISO 178	23℃	MPa	90 (71)	90 (60)	107 (70)	59
Flexural modulus			MPa	2300 (1700)	2400 (1500)	3000 (1900)	1900
Charpy impact strength	ISO 179-1, 179-2	23℃	kJ/m^2	NB (NB)	NB (NB)	-	NB
Charpy notched impact strength			kJ/m^2	20 (45)	20 (62)	5 (5)	5
Thermal properties							
Temperature of deflection under load	ISO 75-1, 75-2	1.80MPa 0.45MPa	℃	105 180	87 165	- 142	- 115
Coefficient of linear thermal expansion	ISO 11359-2	MD TD	1/℃	9.0.E-05 -	- -	7.7.E-05 8.1.E-05	- -
Flammability	UL94	0.75mmt 1.5mmt 2.0mmt 3.0mmt	- - - -	- - - -	- - - -	- V-0 - -	- - - -
Electrical properties							
Relative permittivity	IEC 60250	100Hz 1MHz	- -	3.3 3.2	3.4 3.2	3.6 3.2	- -
Dissipation factor	IEC 60250	100Hz 1MHz	- -	0.0040 0.0094	0.0050 0.012	0.011 0.015	- -
Volume resistivity	IEC 60093	-	Ω･m	1.E+14	2.E+13	5.E+13	-
Surface resistivity	IEC 60093	-	Ω	5.E+14	7.E+14	2.E+15	-
Electric strength	IEC 60243−1	1mmt 3mmt	MV/m	30 17	33 18	36 20	- -
Comparative tracking index	IEC 60112	-	V	600	-	550	-

The values described are typical values only.

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Notice

- The values described are typical values only.
- The usage examples indicated here do not guarantee results applicable to relevant uses of the products.
- It is the users' responsibility to investigate industrial property rights and the terms of use related to the uses and applications indicated here.
- For the handling (transport, storage, forming, disposal, etc.) of the products, it is advisable to refer to technical documents and the Safety Data Sheet (SDS) of the proper materials and grades. Please contact us for consultations when the products are used for the purpose of food containers and packaging, medical parts, safety equipment, and toys for children.
- In Japan, the colored products of each grade may contain chemicals subject to reporting requirements under the applicable law provided in Appendix 9 of Article 18-2 of the Enforcement Order, under Article 57-2 of the Industrial Safety and Health Act. For details, please contact us.
- For the export of our products and products incorporated with our products, please comply with the relevant laws and regulations, such as the Foreign Exchange and Foreign Trade Law.
- Please note that because of the chemical substance management systems in each country, the chemicals used in our products are subject to control, and separate applications might be required or are banned from imports and exports. It is advisable to inquire about the status of regulations in the relevant countries if you are exporting or importing our products.

*Please note that the contents of this document are subject to change without notice due to revisions.