KOREA PETROCHEMICAL IND. CO., LTD

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YUHWA POLYPRO® YUHWA HIDEN®

Advance Your Life

YUHWA KOREA PETROCHEMICAL IND. CO., LTD.

YUHWA KOREA PETROCHEMICAL IND. CO., LTD.

**70% of our body is made up of water,
70% of our belongings are made up of
petrochemical products!**

Petrochemical products give us pleasure, convenience and safety,
and they are a life-time partner at every time and in every place.
Petrochemicals help us to realize higher life values in preserving the environment
by substituting for limited natural resources and sharing abundant resources with
more people.

A happier and richer world than today for you…
This is exactly what KPIC, as a company specializing in petrochemicals,
is dreaming of.

Advance your life with KPIC*!*

PLASTICITY

Another FUTURE

Taking off as a first-class global company by virtue of customers' affection and trust,
KPIC will become a much beloved company by accomplishing sustainable development
through constant improvement, innovations in management and by creating
new values for the petrochemical industry.

Kpic,
which pioneered
korean petrochemials,
is now beginning
a rich future.

The Best Polymer, The Best Partner

Founded in 1970, KPIC established a synthetic resins production plant in Korea for the first time, thereby laying the foundation for the petrochemical industry in Korea. World-class technology and quality competitiveness give KPIC a world-class reputation as one of the best partners in the world. KPIC makes every effort to achieve sustainable growth and development by not only strengthening key businesses but also by exploring new businesses for growth and acquiring new engines for the future growth. Becoming a first class global company, KPIC will concentrate its own capacity on heightening the company's reputation and maximizing customer satisfaction through constant management renewal, research and development. At the same time, KPIC will reward customers' trust and love by assuming social responsibilities as a company whose philosophy requires respect for human beings.

History

1970's

Jun. 1970	KPIC Founded
Oct. 1972	The 1st Plant Constructed (PP)
Oct. 1975	The 2nd Plant Constructed (PP/HDPE)
Jan. 1979	The 3rd Plant Constructed (HDPE)

1980's

Jun. 1983	Waste Water Disposal Facility Constructed
Nov. 1984	The 4th Plant Constructed (PP)
Sep. 1986	C.K Plant Constructed (Mixed Resin)
Mar. 1987	Awarded Gold Tower Order of Industrial Service Merit
Apr. 1987	The 5th Plant Constructed (PP/HDPE)
Jun. 1988	The 6th Plant Constructed (PP/HDPE)
Mar. 1989	The 7th Plant Constructed (HDPE)

1990's

Nov. 1991	Onsan Naphtha Cracking Center Constructed
Jun. 1994	ISO 9002 Quality Management System Certification Acquired (Changed to ISO 9001 in 2003)
Nov. 1996	ISO 14001 Environmental Management System Certification Acquired
Nov. 1996	Terpolymer, HCPP and Random Copolymer Technology Imported
Dec. 1996	Exclusive Dock Operated
Aug. 1999	Listed on the Korea Stock Exchange

2000's

Mar. 2001	Shanghai Office in China Opened
Mar. 2001	Onsan Tank Terminal Co., Ltd. (Currently, Odfjell Terminal Korea Co., Ltd.) Founded
Jul. 2003	Headquarters Building Constructed
Nov. 2003	200 Million USD Export Tower Award
Aug. 2004	Gwangzhou Office in China Opened
Nov. 2004	300 Million USD Export Tower Award
Jul. 2005	Korea Air-tech Co., Ltd. Founded
Nov. 2005	400 Million USD Export Tower Award
Mar. 2006	OCU Plant Constructed
Nov. 2007	500 Million USD Export Tower Award
Oct. 2008	BTX Plant Constructed
Nov. 2008	600 Million USD Export Tower Award
Dec. 2012	800 Million USD Export Tower Award
Dec. 2014	EO/EG Plant Constructed
Jun. 2017	NCC Expansion constructed

Another **VALUE**

Our production infrastructure can effectively and flexibly cope with customers' various needs. It is the start point for customer satisfaction. KPIC is making every effort to reward customers' trust by constantly maintaining global technology leadership and quality competitiveness even in rapidly changing management environments.

With our high-tech infrastructure and high quality products, we create the future values of customers.

High-Tech Production Infrastructure

KPIC is operating verticalized production plants ranging from naphtha cracking to synthetic resins at petrochemical complexes in Ulsan and Onsan. We are also strengthening the high valuation of our products through constant facility investment for constructing OCU, BTX and EO/EG plants, and we are enlarging our business into various basic materials fields.
The Naphtha Cracking Center in Onsan produces basic derivatives such as ethylene and propylene, and supplies them downstream to domestic/overseas customers. Our resin manufacturing plant in Ulsan produces synthetic resins such as polypropylene and high-density polyethylene and provides them to customers worldwide.
More specifically, our resin manufacturing plant in Ulsan operates eight production lines that can frequently change catalysts and operating conditions. It can therefore produce and supply products for uses and to standards required by customers and adequately cope with any small amount of urgent orders.

Capacity

Polypropylene **470,000** M/T	High Density Polyethylene **530,000** M/T	Ethylene **800,000** M/T
Propylene **510,000** M/T	Benzene **180,000** M/T	Toluene **70,000** M/T
M-Xylene **40,000** M/T	HPEO/EG **200,000** M/T	

Strict Quality Management System

KPIC has the firm belief that the way to reward the love and trust of customers is to heighten customers' competitiveness and the company's reputation by providing high quality products.
KPIC operates Quality Management System (ISO 9001) for the whole range of management activities of raw materials purchase, production, testing, sales, shipment, transportation and after-sales management, and conducts systematic and constant quality management activities.
Also customers worldwide consider KPIC their best partner because of our constant management renewal and process enhancement for the purposes of quality improvement. In the future, KPIC will provide the best products and services through quality competitiveness and technology renovation that can take the lead in satisfying customers' various needs and expectations.

Another **PASSION**

KPIC suggests a new industrial paradigm with technology that makes a better quality of life. KPIC R&D Center's development of functional high value products and new materials and technologies allows KPIC to secure a competitive advantage in core technology and create unlimited value for the petrochemical industry.

Imagine a greater world. We'll realize it through our passion

R&D Center

Founded in 1977, KPIC R&D Center has accomplished outstanding achievements through our constant investment and development endeavors for core technologies, and its competitiveness is well acknowledged domestically and overseas through its successful commercialization.
Based on a highly advanced research infrastructure and with skilled researchers, KPIC R&D Center has accomplished 100% self-sufficiency and 100% high activation by developing catalysts, the core technology in the petrochemical industry, and is contributing to improving productivity and enhancing competitiveness in our main businesses by developing new processes and making processes more efficient.
In particular, such products as the only Korean made high purity capacitor film resin, UHMWPE, PP/PE resin for LiBS, Matt resin for film, PP ultra high-pressure pipe resin and PE adhesive resin for steel pipe coating were selected as Korean World-class product thanks to the love of customers worldwide. KPIC R&D Center has realized the high value-added PE and PP through development of products such as the next generation pipe grades. With the passion with which KPIC has developed the Korean economy by pioneering the petrochemical industry in Korea, KPIC R&D Center will accomplish our dreams and a rich future.

R&D Performances

1977 - 1999

Jun. 1977	Developed KPC Catalyst for HDPE
Feb. 1980	Developed HDPE Thin Film
Nov. 1982	Developed LLDPE Process
Sep. 1983	Developed Supported-Catalyst for HDPE and Deashing Process
Jun. 1984	Developed Impact Resistance PP and PP for Non-woven Clothes
Oct. 1985	Developed Supported-Catalyst for PP
May. 1986	Acquired UL mark of Flame Retardant Grade
Oct. 1986	Constructed Compounding Resin Plant for Special Grade
Apr. 1987	Developed PE Pipe for Hot Water Service and Under-floor Heating Systems
Jul. 1988	Developed a High Speed, Wide, Stretched PP
Apr. 1989	Developed PE Pipe Grade for Water Supply
Apr. 1993	Developed a High Activity Catalytic Process for PP Products
May. 1994	Developed Plastic Sheet Substitute for Wood
Oct. 1994	Developed Silane type Co-catalyst for PP
Nov. 1995	Developed HDPE for Pallet
Dec. 1996	Introduced Technologies in HCPP, HSPP and Terpolymer
Dec. 1996	Developed PE Polymerization Catalyst with Uniform Particle Distribution
Dec. 1999	US Patent: Preparation Method of Supported-Metallocene Catalyst for Olefin Polymerization

2000 - 2009

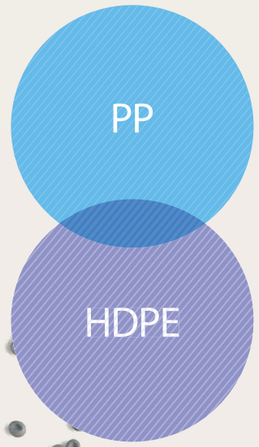
Jun. 2001	Korean Patent: Preparation Method of Propylene/Ethylene Block Co-polymer Using Heterogeneous Catalyst
Dec. 2002	Korean Patent: Preparation Method of Olefin Co-polymer Containing a Large Percentage of Polar Monomer, and Olefin Co-polymer Ionomer Containing Metal-Salt
Jan. 2003	Developed PPR Pipe Grade for Hot Water Service/Under-floor Heating System and Acquired of PPR112 Class
Apr. 2003	Developed PE Adhesive Resin for Steel Pipe Coating and Resin for Jacket of Wire & Cable
Oct. 2003	Developed PP Adhesive Resin for Steel Pipe Coating and Resin for Jacket of Wire & Cable
Dec. 2003	Developed High purity PP for Capacitor Film
Mar. 2004	Developed PEXb Products
Jul. 2004	Developed High purity PP for Semiconductor Wafer Carrier Box
Oct. 2004	Korean Patent: Preparation Method of a Catalyst for Ethylene Polymerization and Ethylene Co-Polymerization
Dec. 2004	Matt Resin for Film awarded as Korean World-class Product
Dec. 2005	PP Ultra High-Pressure Pipe Resin awarded as Korean World-class Product
Dec. 2005	PE Adhesive Resin for Steel Pipe Coating awarded as Korean World-class Product
Aug. 2006	Developed manufacturing process of high purity thermal resistant resin grade for capacitor film
Apr. 2007	Developed PP resin for the use of Melt Blown with Pellet Type Ultra High Flowability for the first time in Asia
Mar. 2009	Developed own manufacturing process of UHMWPE grade
Nov. 2009	Developed high stiffness PP-B Pipe grade for drain pipe
Dec. 2009	High purity PP for Capacitor film awarded as Korean World-class Product

2010 - 2018

Feb. 2010	Developed VHMWPE grade for LiBS
Dec. 2011	U(V)HMWPE grade awarded as Korean World-class Product for next generation
Feb. 2012	Developed PP grade for optical fiber loose tube (substitute for PBT)
Dec. 2013	PP resin for LiBS awarded as Korean World-class Product
Dec. 2015	U(V)HMWPE awarded as Korean World-class Product
Mar. 2017	Developed HDPE grade for LiBS dry process
May. 2018	Developed high tenacity HDPE yarn grade
May. 2018	Developed polymerized HDPE Wax by slurry process
Aug. 2018	Developed PE-RT Pipe Grade by Metallocene

PRODUCTS INTRODUCTION

KPIC is all around you.
YUHWA POLYPRO® and YUHWA HIDEN® are with our customers worldwide.
We are found everywhere, from the daily necessaries of home appliances, electric and electronic parts and packaging materials, to construction materials and automobile parts.
And as basic materials in the high tech industry, they open up a more convenient and rich future.



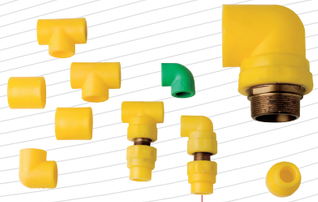
PP
YUHWA POLYPRO®

* **HCPP** : High Crystallinity Polypropylene
* **HSPP** : High Stereoregularity Polypropylene

HDPE
YUHWA HIDEN®

PRODUCTS
INTRODUCTION

PP | YUHWA POLYPRO® 12–26p HDPE | YUHWA HIDEN® 27–39p



Pipe (Fittings)

Blow

Pipe

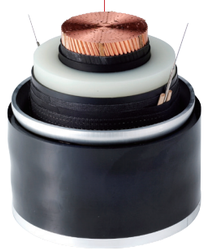
Injection

Fiber

Stretched Tape

Sheet

Wire & Cable



Film

INJECTION | General Homo PP

Description

General Homo PP products for injection molding are made through the Slurry process and they are used in home appliances, agricultural materials and industrial equipment parts.

Features

- High Flowability
- Good Mechanical Strength
- Good Processability

Features and Uses per product

Grade	MI	Features		Uses
4017	8.5	General Purpose	UL, RoHS	Home Appliances, Agricultural Materials and Industrial Equipment Parts
4017M	14	High Flowability	UL, RoHS	Home Appliances, Agricultural Materials and Industrial Equipment Parts
4018	19	High Transparency		Airtight Containers, Stationery Uses, Syringe

Properties

Properties	Test Methods	Units	4017	4017M	4018
Melt Index	ASTM D1238	g/10min.	8.5	14	19
Density	ASTM D1505	g/cm³	0.90	0.90	0.90
Mold Shrinkage	KPIC Method	%	1.0-2.0	1.0-2.0	1.0-2.0
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	350	340	420
Elongation at Break	ASTM D638	%	>500	>500	<100
Flexural Modulus	ASTM D790	kg_f/cm^2	15,000	13,500	17,000
Hardness (Rockwell)	ASTM D785	R Scale	108	108	110
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	4	3	3
Melting Point	ASTM D3418	℃	165	165	167
Softening Point (Vicat)	ASTM D1525	℃	153	153	155
Heat Deflection Temperature	ASTM D648	℃	110	110	135

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* For UL, RoHS, EN71, MSDS, FDA and other certificates, please visit our website.

INJECTION | HCPP Homo Polymer

Description

HCPP Homo Polymer products for injection molding have such good heat resistance, stiffness, scratch resistance and dimensional stability that they are fit for parts of electric and electronic products and automobiles, and for housings of electronic appliances.

Features

- Good Heat Resistance
- High Scratch Resistance
- High Stiffness

Features and Uses per product

Grade	MI	Features		Uses
HJ4006	6	Heat Resistance, High Stiffness, Processability, Scratch Resistance and Tapping Strength, All Color 94HB	UL, RoHS	Automobile Parts, Electric and Electronic Product Parts, Household Goods and Home Appliance Housings
HJ4012	14	Long Term Heat Resistance, High Stiffness, Processability, Scratch Resistance and Tapping Strength, UL746B, RTI 125℃, All Color 94HB	UL, RoHS, EN71	Automobile Parts, Electric and Electronic Product Parts, Household Goods and Home Appliance Housings
HJ4045	45	High Flowability, Scratch Resistance, Heat Resistance and Tapping Strength, All Color 94HB	RoHS	Electric and Electronic Product Parts, Household Goods, Home Appliance Housings and PP Compound Base Resin

Properties

Properties	Test Methods	Units	HJ4006	HJ4012	HJ4045
Melt Index	ASTM D1238	g/10min.	6	14	45
Density	ASTM D1505	g/cm³	0.91	0.91	0.91
Mold Shrinkage	KPIC Method	%	1.4-1.8	1.4-1.8	1.4-1.8
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	420	410	400
Elongation at Break	ASTM D638	%	50	50	40
Flexural Modulus	ASTM D790	kg_f/cm^2	21,000	21,000	21,000
Hardness (Rockwell)	ASTM D785	R Scale	113	113	113
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	4	4	3
Melting Point	ASTM D3418	℃	168	168	167
Softening Point (Vicat)	ASTM D1525	℃	156	156	156
Heat Deflection Temperature	ASTM D648	℃	140	140	140

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INJECTION | HCPP Block Copolymer

Description

- HCPP Block Copolymer products maintain the good impact resistance of Block Copolymers, and have much higher stiffness and heat resistance than those of General Homo PP.
- These products are fit for electric and electronic product parts, automobile parts and PP compound base resin. They can also substitute for composite resin.

Features

- Good Heat Resistance
- Good Dimensional Stability
- High Gloss
- Good Scratch Resistance

Features and Uses per product

Grade	MI	Features		Uses
CB5108	10	High Stiffness, Impact Resistance, Heat Resistance, High Gloss, Scratch Resistance, All Color 94HB	UL, RoHS	Automobile Parts, Electric and Electronic Product Parts, Home Appliance Housings, PP Compound Base Resin
CB5108H	10	RTI 125℃, High Stiffness, Impact Resistance, Long Term Heat Resistance, High Gloss, Scratch Resistance, UL746B	UL, RoHS	Automobile Parts, Electric and Electronic Product Parts, Home Appliance Housings, PP Compound Base Resin
CB5230	30	High Stiffness, Impact Resistance, High Gloss, Heat Resistance, All Color 94HB	UL, RoHS	Automobile Parts, Electric and Electronic Product Parts, Home Appliance Housings, PP Compound Base Resin
CB5260	60	High Gloss, Ultra High Flowability, Heat Resistance, All Color 94HB, Peroxide Free		Industrial Articles, Automobile Parts (Door Trim), PP Compound Base Resin
CB5290	100	High Gloss, Ultra High Flowability, Heat Resistance, Scratch Resistance, Low-Pressure Injection Formability, All Color 94HB, Peroxide Free	UL, RoHS	Industrial Articles, Automobile Parts (Door Trim), PP Compound Base Resin
CB5290H	110	High Gloss, Ultra High Flowability, Heat Resistance, Scratch Resistance, Low-Pressure Injection Formability, All Color 94HB, Peroxide Free		Industrial Articles, Automobile Parts (Door Trim), PP Compound Base Resin

Properties

Properties		Test Methods	Units	CB5108	CB5108H	CB5230	CB5260	CB5290	CB5290H
Melt Index		ASTM D1238	g/10min.	10	10	30	60	100	110
Density		ASTM D1505	g/cm³	0.91	0.91	0.91	0.91	0.91	0.91
Mold Shrinkage		KPIC Method	%	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
Tensile Strength at Yield		ASTM D638	kg_f/cm^2	320	320	330	330	330	320
Elongation at Break		ASTM D638	%	>200	>200	>200	<100	30	<100
Flexural Modulus		ASTM D790	kg_f/cm^2	17,000	17,000	18,000	18,000	17,000	17,000
Hardness (Rockwell)		ASTM D785	R Scale	105	105	108	108	108	109
Impact Strength (Izod with notch)	25℃	ASTM D256	kg_fcm/cm	10	10	7	7	6	6
	-20℃			3.5	3	2.5	2.5	1.5	1.5
Melting Point		ASTM D3418	℃	167	167	167	166	166	166
Softening Point (Vicat)		ASTM D1525	℃	153	153	153	153	153	153
Heat Deflection Temperature		ASTM D648	℃	135	135	135	136	137	138

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INJECTION | HSPP Block Copolymer

Description

HSPP Block Copolymer products have good balance of stiffness and impact resistance, so that these are fit for industrial parts, household goods, electric and electronic product parts, automobile parts and PP compound base resin.

Features

- Good Balance of Impact Resistance and Stiffness
- High Gloss
- Good Compatibility with Inorganic Materials and Rubber

Features and Uses per product

Grade	MI	Features		Uses
SB9108	10	High Gloss, Impact Resistance, High Stiffness, All Color 94HB	UL, RoHS	Electric and Electronic Product Parts, Automobile Parts, PP Compound Base Resin
SB9108H	10	RTI 125℃, High Gloss, Impact Resistance, High Stiffness, All Color 94HB, UL746B	UL, RoHS	Electric and Electronic Product Parts, Automobile Parts, PP Compound Base Resin
SB9230	30	High Gloss, High Flowability, Impact Resistance, High Stiffness, All Color 94HB	UL, RoHS	Interior Trims for Automobile Parts, PP Compound Base Resin
SB9302	2	High Impact Strength, Good Compatibility with Filler and Rubber, Compounding	RoHS	Battery Case, Household Goods, Office Supplies, PP Compound Base Resin
SB9304	4	High Impact Strength, Good Compatibility with Filler and Rubber, Compounding	RoHS	Battery Case, Industrial Articles, Household Goods, Office Supplies, PP Compound Base Resin
SB9310	10	High Impact Strength, Good Compatibility with Filler and Rubber	RoHS	Battery Case, Electric Appliances and Glocery, PP Compound Base Resin

Properties

Properties		Test Methods	Units	SB9108	SB9108H	SB9230	SB9302	SB9304	SB9310
Melt Index		ASTM D1238	g/10min.	10	10	30	2	4	10
Density		ASTM D1505	g/cm³	0.91	0.91	0.91	0.91	0.91	0.91
Mold Shrinkage		KPIC Method	%	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
Tensile Strength at Yield		ASTM D638	kg_f/cm^2	300	300	290	270	270	280
Elongation at Break		ASTM D638	%	>200	>200	>200	>500	>500	>500
Flexural Modulus		ASTM D790	kg_f/cm^2	15,000	15,000	15,000	12,000	12,000	12,500
Hardness (Rockwell)		ASTM D785	R Scale	97	97	102	95	95	99
Impact Strength (Izod with notch)	25℃	ASTM D256	kg_f cm/cm	10	10	10	60	50	15
	-20℃			3	3	3	6	5	4.5
Melting Point		ASTM D3418	℃	166	166	166	165	166	165
Softening Point (Vicat)		ASTM D1525	℃	152	152	152	152	152	152
Heat Deflection Temperature		ASTM D648	℃	130	130	131	100	110	122

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INJECTION | Random Copolymer

Description

- Random Copolymer products for injection molding have high transparency and are fit for transparent airtight containers and stationery.
- RJ6308 can be produced by KPIC's own process. This product is suitable for semiconductor wafer carrier boxes that require ensuring a clean environment because this has a minimum of catalyst residue and ash.

Features

- Good Impact Resistance
- High Transparency
- Ultra high purity(RJ6308)

Features and Uses per product

Grade	MI	Features		Uses
8088	7.5	Impact Resistance		Stationery Uses
6019	19	Impact Resistance, High Transparency	RoHS	Transparent Airtight Containers, Video/CD/DVD Cases, Stationery Uses
RJ6428	28	High Flowability , Impact Resistance, High Transparency	RoHS	Transparent Airtight Containers, Video/CD/DVD Cases, Stationery Uses
RJ6308	10	Ultra High Purity, Impact Resistance	RoHS	Semiconductor Wafer Carrier Box

Properties

Properties	Test Methods	Units	8088	6019	RJ6428	RJ6308
Melt Index	ASTM D1238	g/10min.	7.5	19	28	10
Density	ASTM D1505	g/cm³	0.9	0.9	0.9	0.9
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	250	330	330	300
Elongation at Break	ASTM D638	%	>500	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	7,500	12,000	12,000	11,500
Hardness (Rockwell)	ASTM D785	R Scale	87	90	90	87
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	6	6	6	6
Melting Point	ASTM D3418	℃	147	147	147	145

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YARN | General Homo PP

Description

- General Homo PP products for Yarn have good processing properties over a wide range of process conditions.
- These products have good productivity due to ability to stretch well and fast crystallization and good processability due to high abrasion strength and little cracking when stretching.
- These products are mainly used for bags, fishing nets, and ropes.
- 5012U and 5014U are suitable for outdoor products since they have good weatherability against ultraviolet rays.

Features

- High Tenacity and Good Tensile Properties
  These products maintain their properties and processability at high draw ratio as well as low draw ratio due to high tenacity and tensile properties.
- Good Weatherability
  These products show constant properties when used for fishing nets, ropes and bands due to good weatherability.

Features and Uses per product

Grade	MI	Features		Uses
5012	2	High Tenacity, General Purpose		Woven Bags, Ropes, Bands, Packaging Tapes
5014	3.2	General Purpose	RoHS	Fishing Nets, Ropes, Bands, Packaging Tapes
5014U	3.5	Weatherability		Fishing Nets, Ropes, Bands, Packaging Tapes

Properties

Properties	Test Methods	Units	5012	5014	5014U
Melt Index	ASTM D1238	g/10min.	2	3.2	3.5
Density	ASTM D1505	g/cm³	0.9	0.9	0.9
Mold Shrinkage	KPIC Method	%	1.0-2.0	1.0-2.0	1.0-2.0
Water Absorption	ASTM D570	%	<0.01	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	360	360	360
Elongation at Break	ASTM D638	%	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	15,000	15,000	15,000
Hardness (Rockwell)	ASTM D785	R Scale	96	96	96
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	4	4	4
Melting Point	ASTM D3418	℃	161	161	161
Softening Point (Vicat)	ASTM D1525	℃	152	152	152
Heat Deflection Temperature	ASTM D648	℃	105	105	105

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FILM | General Homo PP

Description

- General Homo PP products for film show good properties of transparency, gloss and stiffness due to molecular design and stereo regularity control fit for OPP, CPP and IPP.
- These products not only have good mechanical properties, processability, thickness stability and good productivity, but can be used under various process conditions and maintain good quality in the processing, being fit for general packing film for food , clothes and high-quality film.

Features

– **High Transparency and Gloss**
These products are transparent to the naked eye due to high transparency and add elegance to products due to high gloss.

– **High Heat Resistance and Good Stiffness**
These products show stable processability and productivity due to dimensional stability at high temperature.
These work especially well when applied to a core layer for metallization and to packaging film that requires high stiffness and low curling.

– **Good Mechanical Strength and Processability**
OPP film grades have suitable film properties for various uses and show good stretch over a wide range of temperature.

Features and Uses per product

Grade	MI	Features		Uses
1077M	8	CPP, For Metallization, Low Heat Shrinkability, High Stiffness, Good Heat Resistance, Good Bonding Strength		General Packaging, Metallized Core Layer
1088	10	IPP, General Purpose, Transparency	RoHS	Food Packaging, Clothes Packaing, General Packaging
1088A	10	IPP, High Transparency, Low Slippery		Food Packaging, Clothes Packaing, General Packaging
1088B	10	IPP, High Slippery	RoHS	Food Packaging, Clothes Packaing, General Packaging
5014L	3	OPP, For Metallization, High Speed Processability		Food Packaging, Clothes Packaing, General Packaging, Cigarette Packaging
	2	OPP, General Purpose, For Printing		Food Packaging, Clothes Packaing, General Packaging, Cigarette Packaging

Properties

Properties	Test Methods	Units	1077M	1088	1088A	1088B	5014L	
Melt Index	ASTM D1238	g/10min.	8	10	10	10	3	2
Density	ASTM D1505	g/cm³	0.91	0.9	0.9	0.9	0.9	0.9
Mold Shrinkage	KPIC Method	%	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0
Water Absorption	ASTM D570	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	400	360	360	360	340	360
Elongation at Break	ASTM D638	%	>500	>500	>500	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	17,500	16,000	16,000	16,000	16,000	16,000
Hardness (Rockwell)	ASTM D785	R Scale	103	100	100	100	97	96
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	3	4	4	4	3.5	4
Melting Point	ASTM D3418	℃	167	163	163	163	161	161
Softening Point (Vicat)	ASTM D1525	℃	158	152	152	152	150	152
Heat Deflection Temperature	ASTM D648	℃	125	110	110	110	105	105

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FILM | Resin for ultra-high purity condenser film (Capacitor)

Description

- The resin for ultra-high purity condenser film of KPIC is for ultra-high purity PP Films that have been removed from catalyst residues and various impurities through a special refining process independently designed.
- By optimizing ultra-high purity, heat resistance, solidity, and molecular weight distribution, the material is suitable for application as a super thin film of the condenser. It is applied to a wide range of large condensors such as small electronics, electric vehicles and hybrid cars.

Features

– **Ultra High Purity and Low Ash Content**
These products have excellent electric resistance and low dissipation factor due to minimized catalyst residue and ash.

– **Excellent mechanical strength and processability**
These products have thickness stability and wide processing window because molecular weight distribution is controlled during the polymerization process. Therefore, These products are easily applied as a thin film at high speed.

– **High Heat resistance and Good stiffness**
5014L HPT-1 is fit for film used for heat resistant capacitors which require low heat shrinkage and heat & electric resistance because molecules are designed corresponding to the use of capacitors. (5014L HPT-1, HPT-S)

Features and Uses per product

Grade	MI	Features		Uses
5014L HPT	3.2	BOPP, Ultra High Purity, Electric Resistance, Ultra Thin Film Formability	RoHS	Capacitor Film (General Purpose, for Metallization)
5014L HPT-1	3.2	BOPP, Ultra High Purity, Heat & Electric Resistance, Ultra Thin Film Formability	RoHS	Capacitor Film (Heat Resistance, for Metallization)
5014L HPT-S	3.2	BOPP, Ultra High Purity, Heat & Electric Resistance, Ultra Thin Film Formability, High Crystallinity	RoHS	Capacitor Film (Heat Resistance, for Metallization)
5014L HPT-R	3.2	BOPP, Ultra High Purity, Rough-surface Film		Capacitor Film (Roughness)

Properties

High Crystallinity	Test Methods	Units	5014L HPT	5014L HPT-1	5014L HPT-S	5014L HPT-R
Melt Index	ASTM D1238	g/10min.	3.2	3.2	3.2	3.2
Density	ASTM D1505	g/cm³	0.9	0.9	0.9	0.9
Al content (XRF)	KPIC Method	ppm	1-3	1-3	1-3	1-3
Cl content (XRF)	KPIC Method	ppm	1-3	1-3	1-3	1-3
Total Ash Content (XRF)	KPIC Method	ppm	10-20	10-20	10-20	10-20
Isotactic Index	KPIC Method	%	96	98	98	96
Melting Point	ASTM D3418	℃	162	166	166	162
Dielectric Constant	KPIC Method	–	2.25	2.25	2.25	2.25

Certification and Other Special Features

Grade	Certification	Institute of validation
High Purity PP for Capacitor Film	Korean World-class Product of 2009	The Ministry of Knowledge Economy

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* For UL, RoHS, EN71, MSDS, FDA and other certificates, please visit our website.

FILM | PP for LiBS Dry Process

Description

- PP for LiBS Dry Process can be produced by KPIC's own process.
- These products are minimized the catalyst residue and ash. Therefore, the specific properties of PP and processability are optimized.
- Adulteration risks from the catalyst purification and polymerization can be minimized with our slurry process which enables our final products contain the least amount Total Ash Content.
- These products are specially designed for LiBS applications with outstanding heat and electric resistance.

Features

– **Ultra High Purity and Low Ash Content**
Excellent electric resistance and long term stability due to minimized catalyst residue and ash.

– **Processability/Strength Balance**
Outstanding processability, pore uniformity and physical properties can be achieved due to molecular distribution control during polymerization process.

– **Heat Resistance**
Long term stability can be secured along with outstanding heat resistance and durability due to optimized molecular design control for LiBS uses.

Features and Uses per product

Grade	MI	Features	Uses
S801	3	Ultra High Purity, Processability/Strength Balanced, Heat Resistance	Dry Process uniaxial LiBS (Lithium 2nd Battery Seperator) Mono-layer or 3-layer (PP/PE/PP)
S802H	2.5	Ultra High Purity, High Strength, Processability, High Heat Resistance, Outstanding pore-forming	
S802M	2	Ultra High Purity, High Strength, High Heat Resistance, Outstanding pore-forming	
S800	1.4	Ultra High Purity, High Strength, Thin film, High Heat Resistance, Outstanding pore-forming	

Properties

Properties	Test Methods	Units	S801	S802H	S802M	S800
Melt Index	ASTM D1238	g/10min.	3	2.5	2	1.4
Density	ASTM D1505	g/cm³	0.9	0.9	0.9	0.9
Al content (XRF)	KPIC METHOD	ppm	1-3	1-3	1-3	1-3
Cl content (XRF)	KPIC METHOD	ppm	0-2	0-2	0-2	0-2
Total Ash Content (XRF)	KPIC METHOD	ppm	0-10	0-10	0-10	0-10
Isotactic Index	KPIC METHOD	%	98	98	98	98
Melting Point	ASTM D3418	℃	166	167	167	167

Certification and Other Special Features

Grade	Certification	Institute of validation
PP for LiBS Dry Process	Korean World-class Product of 2013	The Ministry of Trade, Industry and Energy

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FILM | PP Master Batch

Description

Master Batch is a polypropylene based resin which used as an additive depending on final application by additing specificities like matt, slip, anti-blocking, anti-static etc.

Features

– **When added, it provides matt, slip, anti-blocking, anti-static characteristics.**

Features and Uses per product

Grade	MI	Features	Carrier Resin	Uses
5014L MAT	3.6	BOPP, matt	PP Homo	Lamination, Printing, Advanced Packaging
5014L MAT-1	6	BOPP, matt, Processability, Heat Sealability at Low Temperature	PP Copo'	Lamination, Printing, Advanced Packaging
5014L AS310	6	Anti-static	PP Homo	BOPP
5014L AB305	17	Anti-blocking, High Slippery	PP Homo	BOPP, CPP, IPP
5014L AB605	6	Anti-blocking	PP Homo	BOPP, CPP, IPP
5014L AB605C	10	Anti-blocking	PP Copo'	BOPP, CPP
5014L AB1005C	10	Anti-blocking, Super Slippery	PP Copo'	BOPP, CPP
5014L SL205	6	Slippery	PP Homo	BOPP, CPP

Certification and Other Special Features

Grade	Certification	Institute of validation
5014L MAT	Korean World-class Product of 2004	The Ministry of Commerce, Industry and Energy

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FIBER | General Homo PP

Description

- General Homo PP products for fiber have high processability for high-speed melt spinning by optimizing molecular weight and distribution for processing conditions.
- These products have good tenacity, gloss and color stability suitable for various fiber purposes.

Features

– **High Tenacity**
These products have high tenacity and mechanical strength.

– **Weatherability**
To be applied to textile, clothes and carpets, the weatherability is enhanced to maintain constant properties.

– **High Flowability**
By controlling rheology, these products have high flowability and constant spinnability suitable for non-woven clothes.

Features and Uses per product

Grade	MI	Features		Uses
5010	10	High Tenacity	RoHS	Textile, Clothes, Carpets, Wadding
5016S	15	General Purpose		Textile, Clothes, Carpets, Wadding
5030	40	High Flowability		Non-woven Clothes

Properties

Properties	Test Methods	Units	5010	5016S	5030
Melt Index	ASTM D1238	g/10min.	10	15	40
Density	ASTM D1505	g/cm³	0.9	0.9	0.9
Mold Shrinkage	KPIC Method	%	1.0-2.0	1.0-2.0	1.0-2.0
Water Absorption	ASTM D570	%	<0.01	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	350	340	310
Elongation at Break	ASTM D638	%	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	14,000	15,000	14,000
Hardness (Rockwell)	ASTM D785	R Scale	96	97	98
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	4	4	4
Melting Point	ASTM D3418	℃	161	161	162
Softening Point (Vicat)	ASTM D1525	℃	150	150	150
Heat Deflection Temperature	ASTM D648	℃	110	110	105

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PIPE | HCPP Block Copolymer

Description

BP2000 has good stiffness and impact strength at low temperature, and is fit for cold water and drain pipes.

Features

– **Good Creep Resistance**
– **High Stiffness and Impact Resistance at Low Temperature**

Features and Uses per product

Grade	MI	Features		Uses
BP2000	0.3	High Stiffness and Impact Resistance at Low Temperature, Creep Resistance, Good Chemical Resistance, Color : Natural	RoHS	Water Supply and Drain Pipes
BP2200	0.3	High Modulus, Excellent Stiffness and Impact Resistance at Low Temperature, Creep Resistance, Good Chemical Resistance		Drain and Sewer Pipes

Properties

Properties	Test Methods	Units	BP2000	BP2200
Melt Index	ASTM D1238	g/10min.	0.3	0.3
Density	ASTM D1505	g/cm³	0.91	0.91
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	240	340
Elongation at Break	ASTM D638	%	>600	>300
Flexural Modulus	ASTM D790	kg_f/cm^2	13,000	18,000
Hardness (Rockwell)	ASTM D785	R Scale	80	95
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	NB	NB
Softening Point (Vicat)	ASTM D1525	℃	153	160
Oxidation Induction Time at 200℃	ASTM D3895	min	>30	>30
Heat Deflection Temperature	ASTM D648	℃	100	128

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PIPE | Random Copolymer

Description

- RP2400, the first PP112 class product in the world, is a Random Copolymer product for high-pressure.
- This is used for pressure pipes and hot water and floor heating pipes due to good processability, flexibility and pressure resistance.

Features

- Ultra High Pressure Resistance and Good Processability
- High Flexibility and Heat Resistance

Features and Uses per product

Grade	MI	Features		Uses
RP2400	0.25	Processability, High Pressure Rating, Good Flexibility, Color : Natural, White, Gray, Green, Dark Green	RoHS	Pressure Pipes, Hot Water and Floor Heating Pipes

Properties

Properties	Test Methods	Units	RP2400
Melt Index	ASTM D1238	g/10min.	0.25
Density	ASTM D1505	g/cm³	0.9
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	230
Elongation at Break	ASTM D638	%	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	9,000
Hardness (Rockwell)	ASTM D785	R Scale	72
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	NB
Melting Point	ASTM D3418	℃	139
Softening Point (Vicat)	ASTM D1525	℃	133
Oxidation Induction Time at 200℃	ASTM D3895	min	>30
Heat Deflection Temperature	ASTM D648	℃	85
Minimum Require Strength	ISO 9080	Mpa	11.2

Certification and Other Special Features

Grade	Certification	Institute of validation
RP2400	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
	Material Test	中国国家化学建筑材料测试中心
	Sanitary Test	中国预防医学院环境卫生监测所
	WRAS (for hot & cold water)	WRc-NSF
	Korean World-class Product of 2005	The Ministry of Commerce, Industry and Energy

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SHEET | HSPP Block Copolymer

Description

SB1930H is fit for corrugated cardboards and sheets due to good balance of stiffness and impact resistance.

Features

- Good Mechanical Strength and Heat Resistance
- High Impact Resistance

Features and Uses per product

Grade	MI	Features	Uses
SB1930H	0.75	High Impact Strength, High Stiffness	Corrugated Cardboards, General Sheets, Stationery Sheets, Packaging Sheets, Vacuum Molding Sheets

Properties

Properties	Test Methods	Units	SB1930H
Melt Index	ASTM D1238	g/10min.	0.75
Density	ASTM D1505	g/cm³	0.91
Water Absorption	ASTM D570	%	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	270
Elongation at Break	ASTM D638	%	>400
Flexural Modulus	ASTM D790	kg_f/cm^2	13,000
Hardness (Rockwell)	ASTM D785	R Scale	84
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	70
Softening Point (Vicat)	ASTM D1525	℃	154
Heat Deflection Temperature	ASTM D648	℃	100

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WIRE & CABLE | HCPP Block Copolymer

Description

- This HCPP Block Copolymer product for cable is optimized for the extrusion process which maintains the good balance between impact resistance and stiffness.
- This resin is suitable for high speed extrusion, especially loose tube for optical fiber cable application.

Features

- High slip property
- Excellent processability

Features and Uses per product

Grade	MI	Features	Uses
CB2203	2.7	High Stiffness, Impact Resistance, Heat Resistance, High Gloss, Scratch Resistance, Slippery	Loose Tube

Properties

Properties	Test Methods	Units	CB2203
Melt Index	ASTM D1238	g/10min.	2.7
Density	ASTM D1505	g/cm³	0.91
Mold Shrinkage	KPIC Method	%	1.4-1.8
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	300
Elongation at Break	ASTM D638	%	>200
Flexural Modulus	ASTM D790	kg_f/cm^2	16,000
Hardness (Rockwell)	ASTM D785	R Scale	100
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	≥20
Melting Point	ASTM D3418	℃	167
Softening Point (Vicat)	ASTM D1525	℃	153
Heat Deflection Temperature	ASTM D648	℃	135

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INJECTION | HDPE

Description

- HDPE products for injection molding have high stiffness and impact resistance, and are fit for pallets and containers.
- These products are fit for general articles and thin walled products due to good flowability.

Features

- High Stiffness
- Good Impact Resistance
- High Flowability

Features and Uses per product

Grade	MI	Density	Features		Uses
M680	6	0.958	Impact Resistance, High Flowability	RoHS	Silicon Cartridges, Picnic Tables, Bottle Caps
M690	12	0.962	High Stiffness, Flowability	RoHS	General Articles, Thin Walled Products
M830	2.8	0.962	High Stiffness, Impact Resistance	RoHS	Industrial Parts, General Articles, Containers
M850	4.7	0.965	High Stiffness, Impact Resistance	RoHS	Industrial Materials, General Articles, Containers

Properties

Properties	Test Methods	Units	M680	M690	M830	M850
Melt Index	ASTM D1238	g/10min.	6	12	2.8	4.7
Density	ASTM D1505	g/cm³	0.958	0.962	0.962	0.965
Mold Shrinkage	KPIC Method	%	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	280	280	280	280
Elongation at Break	ASTM D638	%	>500	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	11,000	12,000	11,000	12,000
Hardness (Rockwell)	ASTM D785	R Scale	70	70	70	75
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	7	5	20	10
Melting Point	ASTM D3418	℃	135	135	135	135
Softening Point (Vicat)	ASTM D1525	℃	124	124	125	126

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BLOW | HDPE

Description

- HDPE products for blow molding have good properties such as rigidity, impact strength, processability, colors, elegant surfaces and drawdown resistance. Therefore, these are fit for unified quality of blow molding products such as mid and large sized containers and chemical containers.
- In addition, with good chemical resistance and ESCR, these are ideal for manufacturing high-speed forming products.

Features

- Good physical properties and enhanced moldability.
- With outstanding chemical resistance, durability and ESCR, these are fit for industrial and chemical containers.

Features and Uses per product

Grade	MI	Density	Features		Uses
B500	0.2	0.958	Drawdown Resistance, Impact Resistance, Chemical Resistance		Mid & Large Containers (Industrial Uses), Medical supply containers
B502	0.28	0.958	Good Processability, Good Surface	RoHS	Mid & Large Containers (Industrial Uses), Traffic Signs, Toys

Properties

Properties	Test Methods	Units	B500	B502
Melt Index	ASTM D1238	g/10min.	0.2	0.28
Density	ASTM D1505	g/cm³	0.958	0.958
Mold Shrinkage	KPIC Method	%	1.5-2.5	1.5-2.5
Water Absorption	ASTM D570	%	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	310	320
Elongation at Break	ASTM D638	%	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	10,500	12,000
Hardness (Rockwell)	ASTM D785	R Scale	50	51
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>300	>30
Melting Point	ASTM D3418	℃	134	135
Softening Point (Vicat)	ASTM D1525	℃	122	126
Heat Deflection Temperature	ASTM D648	℃	68	71
Brittleness Temperature	ASTM D746	℃	<–70	<–70

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YARN | HDPE

Description

- HDPE products for Yarn are divided into products for mono-filament, flat yarn and wool pack.
- These products can be handled under various processing conditions due to high tenacity and good tensile properties and can be used for fishing nets, ropes, shade nets, wool bags and stretched tapes.
- These products have good chemical resistance, electric properties, weatherability and flexibility as a product with the good processability.
- E308T is a suitable grade for tarpaulin production (best applies with T-Die)
- HT304 is a product for high tenacity fibers (application in ropes, fishing net and fiber for safety gloves) that have three times the degree of tenacity compared to PE fiber grade E308 (based on multi-filament) based on high drawn ratio.

Features

- High Tenacity and Tensile Properties
  These products maintain their properties and processability at high draw ratio as well as low draw ratio due to high tenacity and good tensile properties.
- These products show constant properties when used for shade nets, fishing nets and ropes due to good weatherability.
- Good Processability
- HT304 is designed with a molecular structure suitable for high-tenacity PE mono and multi-filaments to ensure excellent working performance in producing PE fibers with varying strengths.

Features and Uses per product

Grade	MI	Density	Features	Uses
E308	0.85	0.956	Good Stretch, High Tenacity	Fishing Nets, Ropes, Insect Nets
E308T	1	0.956	Good Stretch, High Tenacity	Tarpaulin, Stretched Tapes
E308U	0.85	0.956	Good Stretch, High Tenacity, Weatherability	Shade Nets
HT304	0.55	0.960	High Stretch, High Tenacity	High-strength fibers (Fishing Nets, Ropes, Safety gloves) Tarpaulin, Stretched Tapes

Properties

Properties	Test Methods	Units	E308	E308T	E308U	HT304
Melt Index	ASTM D1238	g/10min.	0.85	1	0.85	0.55
Density	ASTM D1505	g/cm³	0.956	0.956	0.956	0.960
Mold Shrinkage	KPIC Method	%	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5
Water Absorption	ASTM D570	%	<0.01	<0.01	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	250	245	250	300
Elongation at Break	ASTM D638	%	>500	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	9,000	8,500	9,000	11,000
Hardness (Rockwell)	ASTM D785	R Scale	46	45	46	54
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50	>50	>50	>50
Melting Point	ASTM D3418	℃	134	134	134	134
Softening Point (Vicat)	ASTM D1525	℃	123	123	123	124
Heat Deflection Temperature	ASTM D648	℃	69	69	69	70
Brittleness Temperature	ASTM D746	℃	<–70	<–70	<–70	<–70

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FILM | HDPE

Description

- HDPE products for film are bimodal products with ideal distribution of molecular weight, have good processability and are fit for high-quality film.
- Due to good mechanical properties and processability, these are used for shopping bags and packaging film of all types.
- F600M grade, having high weatherability, is most fit for agricultural mulching film.

Features

– **Bubble Stability**

These products have good bubble stability, so that they are useful for producing films with constant thickness and wide-width films.

– **High Stiffness and Tear Strength**

As a bimodal product designed as a high molecular weight, these products have good stiffness, tear strength, extrusion processability and productivity.

– **Low Die-deposit**

These products have good productivity and are fit for film with good surfaces by reducing die-deposits in the extrusion processing.

Features and Uses per product

Grade	MI	Density	Features		Uses
F500	0.07	0.956	High Stiffness, Low Die-Deposit		Shopping Bags, General Purpose, Industrial Uses
F600	0.035	0.957	High Stiffness, High Tear Strength	RoHS	Shopping Bags, General Purpose, Industrial Uses
F600M	0.035	0.957	High Stiffness, High Tear Strength, Weatherability		Agricultural Uses

Properties

Properties	Test Methods	Units	F500	F600	F600M
Melt Index	ASTM D1238	g/10min.	0.07	0.035	0.035
Density	ASTM D1505	g/cm³	0.956	0.957	0.957
Mold Shrinkage	KPIC Method	%	1.5-2.5	1.5-2.5	1.5-2.5
Water Absorption	ASTM D570	%	<0.01	<0.01	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	370	400	400
Elongation at Break	ASTM D638	%	>500	>500	>500
Flexural Modulus	ASTM D790	kg_f/cm^2	10,000	10,000	10,000
Hardness (Rockwell)	ASTM D785	R Scale	46	47	47
Impact Strength (Izod with notch)	ASTM D256	kg_f cm/cm	>50	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>1,000	>1,000	>1,000
Melting Point	ASTM D3418	℃	134	134	134
Softening Point (Vicat)	ASTM D1525	℃	123	123	123
Heat Deflection Temperature	ASTM D648	℃	70	62	62
Brittleness Temperature	ASTM D746	℃	<−70	<−70	<−70

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PIPE | HDPE PE100

Description

- P600 series are High Density Polyethylene products with good processability, developed through KPIC's own technology.
- These products are fit for pressure pipes such as gas pipes, water supply and drain pipes due to high pressure resistance of PE100 level.

Features

– **PE100 classification-classified as MRS 10 material at 20℃, 50 years according to ISO9080**
– **Bimodal products with wide range of molecular weight distribution**
– **Large-diameter Pipe Production**
– **Excellent Creep Resistance and Processing Stability**

Features and Uses per product

Grade	MI	Density	Features	Uses
P600	0.22 (5kg)	0.952	PE100, Excellent Creep Resistance, SCG, RCP, Color : Natural	Gas Pipes, Water Supply and Drain Pipes
P600 BL	0.23 (5kg)	0.961	PE100, Excellent Creep Resistance, SCG, RCP, Color : Black	

Properties

Properties	Test Methods	Units	P600	P600 BL
Melt Index	ASTM D1238	g/10min.	0.22 (5kg)	0.23 (5kg)
Density	ASTM D1505	g/cm³	0.952	0.961
Water Absorption	ASTM D570	%	<0.01	–
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	230	230
Elongation at Break	ASTM D638	%	>600	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	9,000	9,500
Hardness (Rockwell)	ASTM D2240	Shore D	62	62
Impact Strength (Izod with notch)	ASTM D256	kg_f cm/cm	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>5,000	>5,000
Melting Point	ASTM D3418	℃	130	130
Softening Point (Vicat)	ASTM D1525	℃	124	124
Oxidation Induction Time at 200℃	ASTM D3895	min	>60	>60
Heat Deflection Temperature	ASTM D648	℃	65	65
Brittleness Temperature	ASTM D746	℃	<−70	<−70
Carbon Black Content	ISO 6964	%	–	2.3
Carbon Black Dispersion	ISO 18553	Grade	–	<3

Certification and Other Special Features

Grade	Certification	Institute of validation
P600	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
P600 BL	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
	Notch Pipe Test - Slow Crack Growth (ISO 13479)	Bodycote Polymer
	Rapid Crack Propagation - S4 (ISO 13477)	Bodycote Polymer
	The Resistance to Gas Constitutent Condensate Test	Bodycote Polymer
	WRAS	WRc-NSF
	Austrailian WQC	Water Quality Centre
	Sanitary Test	中国预防医学院环境卫生监测所

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PIPE | HDPE PE80

Description

- P301E series are High Density Polyethylene products, developed through KPIC's own technology.
- These, as products with high pressure resistance of PE80 level, have good ESCR and creep resistance. These are fit for water supply and drain pipes, industrial pipes and gas pipes.

Features

- Classified as MRS 8 material at 20℃, 50 years according to ISO9080
- Good Processability due to wide range of molecular weight distribution
- Excellent Mechanical Properties and Long Term Durability
- Good Processability and High Output in Extrusion

Features and Uses per product

Grade	MI	Density	Features		Uses
P301E	0.12	0.948	PE80, Creep Resistance, SCG, Color : Natural	RoHS	Water Supply and Drain Pipes, Industrial Pipes
P301E BL	0.12	0.958	PE80, Creep Resistance, SCG, RCP Color : Black		

Properties

Properties	Test Methods	Units	P301E	P301E BL
Melt Index	ASTM D1238	g/10min.	0.12	0.12
Density	ASTM D1505	g/cm³	0.948	0.958
Water Absorption	ASTM D570	%	<0.01	–
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	220	220
Elongation at Break	ASTM D638	%	>600	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	8,000	8,500
Hardness (Rockwell)	ASTM D2240	Shore D	60	60
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>5,000	>5,000
Melting Point	ASTM D3418	℃	129	129
Softening Point (Vicat)	ASTM D1525	℃	122	122
Oxidation Induction Time at 200℃	ASTM D3895	min	>40	>40
Heat Deflection Temperature	ASTM D648	℃	60	60
Brittleness Temperature	ASTM D746	℃	<–70	<–70
Carbon Black Content	ISO 6964	%	–	2.3
Carbon Black Dispersion	ISO 18553	Grade	–	<3

Certification and Other Special Features

Grade	Certification	Institute of validation
P301E	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
	Sanitary Test	中国预防医学院环境卫生监测所
	Notch Pipe Test - Slow Crack Growth (ISO 13479)	Bodycote Polymer
P301E BL	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
	Notch Pipe Test - Slow Crack Growth (ISO 13479)	Bodycote Polymer
	Rapid Crack Propagation - S4 (ISO 13477)	Bodycote Polymer
	WRAS	WRc-NSF
	Austrailian WQC	Water Quality Centre

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PIPE | MDPE PE80

Description

- P502 series are Medium Density Polyethylene products, developed through KPIC's own technology.
- These products have good processing stablility and pressure resistance and are fit for gas pipes and drinking water pipes.

Features

- Classified as MRS 8 material at 20℃, 50 years according to ISO9080
- Good Processability due to wide range of molecular weight distribution
- Excellent Mechanical Properties and Long Term Durability
- Good Processability and high output in extrusion
- Good Flexibility

Features and Uses per product

Grade	MI	Density	Features	Uses
P502	0.15	0.939	PE80, Creep Resistance, Flexibility, SCG, RCP, Color : Natural	Gas Pipes and Drinking Water Pipes
P502 YE	0.15	0.941	PE80, Creep Resistance, Flexibility, SCG, RCP, Color : Yellow	

Properties

Properties	Test Methods	Units	P502	P502 YE
Melt Index	ASTM D1238	g/10min.	0.15	0.15
Density	ASTM D1505	g/cm³	0.939	0.941
Water Absorption	ASTM D570	%	<0.01	–
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	195	195
Elongation at Break	ASTM D638	%	>600	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	6,000	6,000
Hardness	ASTM D2240	Shore D	58	58
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>5,000	>5,000
Melting Point	ASTM D3418	℃	127	127
Softening Point (Vicat)	ASTM D1525	℃	120	120
Oxidation Induction Time at 200℃	ASTM D3895	min	>40	>40
Heat Deflection Temperature	ASTM D648	℃	57	57
Brittleness Temperature	ASTM D746	℃	<–70	<–70
Linear Thermal Expansion Coefficient	ASTM D696	10^{-4}cm/cm℃	1.5	1.5
Pigment Dispersion	ISO 18553	Grade	–	<3

Certification and Other Special Features

Grade	Certification	Institute of validation
P502 YE	Long Term Hydrostatic strength (ISO 9080)	Bodycote Polymer
	Notch Pipe Test - Slow Crack Growth (ISO 13479)	Bodycote Polymer
	Rapid Crack Propagation - S4 (ISO 13477)	Bodycote Polymer
	The Resistance to Gas Constitutent Condensate Test	Bodycote Polymer

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PIPE | HDPE For Drain Pipes

Description

- P301 is High Density Polyethylene product, developed through KPIC's own technology.
- This product has good stiffness and processability and is fit for drain pipes.

Features

– Good Stiffness and Processability

Features and Uses per product

Grade	MI	Density	Features		Uses
P301	0.12	0.957	High Stiffness	RoHS	Electric Cable Pipes, Industrial Drain Pipes

Properties

Properties	Test Methods	Units	P301
Melt Index	ASTM D1238	g/10min.	0.12
Density	ASTM D1505	g/cm³	0.957
Water Absorption	ASTM D570	%	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	270
Elongation at Break	ASTM D638	%	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	10,000
Hardness (Rockwell)	ASTM D2240	Shore D	63
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>200
Melting Point	ASTM D3418	℃	132
Softening Point (Vicat)	ASTM D1525	℃	126
Heat Deflection Temperature	ASTM D648	℃	69
Brittleness Temperature	ASTM D746	℃	<–70

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WIRE & CABLE | HDPE

Description

- P603H BL is Medium and High Density Polyethylene product, developed through KPIC's own technology.
- This product has good weatherability, abrasion resistance, ESCR, and is fit for the wire & cable jackets.

Features

– Excellent Mechanical Properties and Long Term Durability
– Good Processability and High Output in Extrusion
– Good ESCR, UV Resistance and Heat Resistance

Features and Uses per product

Grade	MI	Density	Features		Uses
P603H BL	0.33	0.956	SCG, Heat Resistance, Long term Properties, UV Resistance, ESCR, Color : Black	RoHS	Wire & Cable Jacket

Properties

Properties	Test Methods	Units	P603H BL
Melt Index	ASTM D1238	g/10min.	0.33
Density	ASTM D1505	g/cm³	0.956
Mold Shrinkage	KPIC Method	%	1.5-2.5
Water Absorption	ASTM D570	%	–
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	210
Elongation at Break	ASTM D638	%	>700
Flexural Modulus	ASTM D790	kg_f/cm^2	8,000
Hardness	ASTM D2240	Shore D	62
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>5,000
Melting Point	ASTM D3418	℃	129
Softening Point (Vicat)	ASTM D1525	℃	122
Heat Deflection Temperature	ASTM D648	℃	59
Brittleness Temperature	ASTM D746	℃	<–80
Carbon Black Content	ISO 6964	%	2.6
Carbon Black Particle Size	–	nm	<20

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STEEL PIPE COATING | HDPE

Description

- P601 series are Medium and High Density Polyethylene products developed through KPIC's own technology and are used as top coating resin of 3-layer steel pipes.
- They have good SCG, ESCR, mechanical strength and abrasion resistance, compared to general-use HDPE.

Features

- Excellent Mechanical Properties and Long Term Durability
- Good Processability and High Output in Extrusion
- Good ESCR and UV Resistance

Features and Uses per product

Grade	MI	Density	Features	Uses
P601 HUBL	0.33	0.954	Abrasion Resistance, Weatherability, UV Stability, Color : Black	Steel Pipe Coating
P601 KUBLR	0.43	0.949	Abrasion Resistance, Weatherability, UV Stability, Color : Black	
P603H U	0.33	0.944	Abrasion Resistance, Weatherability, UV Stability	

Properties

Properties	Test Methods	Units	P601 HUBL	P601 KUBLR	P603H U
Melt Index	ASTM D1238	g/10min.	0.33	0.43	0.33
Density	ASTM D1505	g/cm³	0.954	0.949	0.944
Water Absorption	ASTM D570	%	–	–	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	210	200	200
Elongation at Break	ASTM D638	%	>600	>600	>600
Flexural Modulus	ASTM D790	kg_f/cm^2	7,700	7,500	7,000
Hardness	ASTM D2240	Shore D	62	60	58
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	>50	>50	>50
Environment Stress Cracking Resistance	ASTM D1693	hr.Cond.B.10%	>5,000	>5,000	>5,000
Melting Point	ASTM D3418	℃	129	127	128
Softening Point (Vicat)	ASTM D1525	℃	122	121	121
Heat Deflection Temperature	ASTM D648	℃	58	58	58
Brittleness Temperature	ASTM D746	℃	<–70	<–70	<–70
Carbon Black Content	ISO 6964	%	2.3	2.3	–

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ADHESIVE | MDPE

Description

- A015E IS is Medium Density Adhesive resin product, developed through KPIC's own technology.
- This is adhesive resin product for steel pipe coating that is produced by grafting polar maleic anhydride to general-use PE. So this has both strong adhesive properties and properties of general-use PE.

Features

- Excellent Adhesive Properties
- Outstanding Processability and High Output in Extrusion

Features and Uses per product

Grade	MI	Density	Features	Uses
A015E IS	1.5	0.935	Excellent Adhesive Power, Outstanding processability	PE Adhesive Resin for Steel Pipe Coating

Properties

Properties	Test Methods	Units	A015E IS
Melt Index	ASTM D1238	g/10min.	1.5
Density	ASTM D1505	g/cm³	0.935
Mold Shrinkage	KPIC Method	%	1.5-2.5
Water Absorption	ASTM D570	%	<0.01
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	150
Elongation at Break	ASTM D638	%	>700
Hardness	ASTM D2240	Shore D	50
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	60
Melting Point	ASTM D3418	℃	125
Softening Point (Vicat)	ASTM D1525	℃	110
Brittleness Temperature	ASTM D746	℃	<–80
Oxidation Induction Time at 210℃	ASTM D3895	min	>20

Certification and Other Special Features

Grade	Certification	Institute of validation
A015E	Certified as Gas Pipe Materials	Russia VNIGAS Ltd.
	Korean World-class Product of 2005	The Ministry of Commerce, Industry and Energy

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U(V)HMWPE | HDPE

Description

- U(V)HMWPE is KPIC invented Ultra High Molecular Weight Polyethylene.
- U(V)HMWPE is a suitable grade for various applications such as compression molding, sheet, profile/block extrusion and ultra high strength/porous fibers.

Features

- Wear resistance: Best among plastics, better than steel
- Impact resistance: Best among plastics, similar to steel
- Low coefficient of friction: Similar to PTFE, self-lubricative
- Chemical resistance: Stable to most chemicals
- No moisture absorption
- Harmless to human body, excellent electric insulation

Features and Uses per product

Grade	Average Mv (10^6g/mol)	HLMI (g/10min)	Features	Uses
VH245	(0.3)	2.3	Good Processing Balance, Contraction percentage reduction	Wet process LiBS (Lithium 2nd Battery Seperator)
VH095	(0.4)	1.0		
VH035	(0.6)	0.47	Good property & Processibility balance	
VH100U	(1)	0.14	High Strength, Good processability	
VH150U	1.5	–	High Strength, Thin Film	
VH300U	2.5	–		
U010 PE500	0.6	–	Particle size uniformity, Ultra High Impact Strength, Excellent wear resistance	Diverse Application (Compression Molding, Ram Extrusion. Etc)
U050 H	3.7	–	Ultra High Impact Strength, Good Processing Balance, Excellent wear resistance	Diverse Application (Compression Molding, Ram Extrusion. Etc)
U040 F	4	–	Very Good Processing Balance, High Tenacity	Ultra high-strength fibers
U050	5	–	Higher wear resistance than U010	Compression Molding, Ram Extrusion, Batterry Separators
U050 F	5.5	–	Good Processing Balance, Very High Tenacity	Ultra high-strength fibers
U070	7	–	Higher wear resistance than U050	Compression Molding, Ram Extrusion, Batterry Separators
U090	9	–	Higher wear resistance than U070	
U090L H	9	–	Large particle size	Compression Molding, Ram Extrusion

Properties

Properties	Test Methods	Units	VH245	VH095	VH035	VH100U	VH150U	VH300U
Density	ASTM D1505	g/cm³	0.954	0.951	0.95	0.945	0.94	0.93
HLMI	ASTM D1238	g/10min.	2.3	1.0	0.47	0.14	–	–
Average Mv	KPIC Method[1)]	10^6 g/mol	(0.3)	(0.4)	(0.6)	(1)	1.5	3
Bulk Density	ISO 60	g/cm³	0.49	0.49	0.49	0.49	0.49	0.49
Average Particle Size	Laser PSA	㎛	125	125	125	125	125	125
Melting Point	ASTM D3418	℃	135	135	135	135	135	135

Properties

Properties	Test Methods	Units	U010 PE500	U050 H	U040 F	U050 (F)	U070	U090	U090L H
Density	ASTM D1505	g/cm³	0.95	0.93	0.93	0.93	0.93	0.93	0.93
Average Mv	KPIC Method[1)]	10^6 g/mol	0.6	3.7	4	5.5	7	9	9
Bulk Density	ISO 60	g/cm³	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Average Particle Size	Laser PSA	㎛	125	125	125	125	125	125	190
Tensile Strength at Yield	ASTM D638	kg_f/cm^2	≥170	≥170	≥170	≥170	≥170	≥170	≥170
Elongation at Break	ASTM D638	%	≥300	≥300	≥300	≥300	≥300	≥300	≥300
Hardness	ASTM D2240	Shore D	66	60	64	62	61	60	59
Impact Strength (Izod with notch)	ASTM D256	kg_fcm/cm	No Break	No Break	No Break	No Break	No Break	No Break	No Break
Charpy Impact Strength (Double Notched)	ISO 11542-2	kJ/m²	25	200	120	70	60	50	110
Abrasion Resistance	ISO 15527	U050 (=100)	250	105	105	100	90	80	80
Melting Point	ASTM D3418	℃	135	133	135	135	135	135	133
Heat Deflection Temperature	ASTM D648	℃	79	–	79	79	79	79	–

[1)] KPIC Method : Margolies' eg. ([η]ISO 1628-3)

Certification and Other Special Features

Grade	Certification	Institute of validation
U(V)HMWPE	Korean World-class Product of 2015	The Ministry of Trade, Industry and Energy

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