

Topilene[®]

HYOSUNG Polypropylene

 **HYOSUNG CORPORATION**
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Topilene

HYOSUNG

Random Copolymer

Polypropylene

Impact Copolymer Small electric-appliances

Cap Pipe Speciality Film

Homopolymer



Medical

 **HYOSUNG**

HISTORY OF HYOSUNG

Hyosung has been the major driving force of the Korean economy for last half century. The history of Hyosung as a leader in a number of key industrial sectors in Korea is one of the most significant part of the path of Korea's economic development.



- 1971** Established R&D Center
- 1989** Entered the PP and propylene business
- 1991** Commenced production of the PP-I process at the Yongyeon plant
- 1996** Commenced production of the PP-II process at the Yongyeon plant
- 2004** Acquired PP/DH PU ISO 9001, ISO 14001 Certifications
- 2006** PP-R R200P won Korean World-class Product Award

- 1957. Hyosung Corporation founded
- 1966. Established Tongyang Nylon Co., Ltd.
- 1968. Completed the Ulsan Plant
- 1971. Established R&D Center, a first in Korea
- 1972. Exported tire cords to Southeast Asian countries for the first time
- 1973. Established Tongyang Polyester Co., Ltd.
Established Tongyang Dyeing Co., Ltd.
- 1975. Acquired Hanyoung Industries Co., Ltd. (formerly Hyosung Heavy Industry)
- 1977. Established the heavy industry plant in Changwon
- 1979. Started producing PET bottle at the Eonyang Plant
- 1983. Developed a Microfiber that combines nylon and polyester
- 1986. Developed POWER-5800 for office computers
- 1989. Entered the PP and propylene business
Established Hyosung EBARA Co., Ltd.
- 1990. Entered the Spandex business

- 1991. Commenced production at the PDH plant
Commenced production of the PP-I process at the Yongyeon plant
- 1992. Started producing Spandex at Anyang Plant
- 1995. Established PET bottle company in China, Established the Tile Carpet plant in Daejeon
- 1996. Commenced production of the PP-II process, Established the Nylon Film plant in Daejeon
- 1998. Developed PP-R pipe grade(R200P), a first in Asia
T&C, trading company, life industry, and heavy industry all merged into Hyosung Co., Ltd.
Developed 800kV GIS, a first in Korea, and only the 3rd time globally
- 1999. Acquired Korean Trade(KT) Marks for the Hyosung Computer, Ultra High Voltage GIS(Gas Insulated Switchgear), and Polyester Fiber(Aerocool)
- 2000. Established the spandex plant in Gumi
- 2001. Adopted ERP, Established the spandex plant in China
Concluded a contract with Beijing Coca Cola for the long-term supply of PET bottles
- 2002. IV Bottle Grade was certified to comply with USP class VI
Took over the Tire Cord Plant of Michelin in Scotsville, U.S.A.
Aerocool was selected as one of the world's best products

- 2003. The Class Hyosung was established
Hyosung Spandex(Guangdong) Co., Ltd. was established in Guangdong Province, China
Hyosung Film(Jiaxing) Co., Ltd. was established in Zhejiang Province, China
- 2004. Acquired PP/DH PU ISO 9001, ISO 14001 Certifications
Work for the spandex Plant in Zhuhai, China completed
Expanded the Nylon Film facilities at the Gumi 1 factory
Work for the transformer Plant in Baoding, China completed
The Tire Cord Plant in Jiaxing, China completed
Signed a supply contract for 750kV switchgear with Northwest Street Power Grid Corp, China
- 2005. Work for the Nylon Film Plant in Jiaxing, China completed
- 2006. PP-R R200P won Korean World-class Product Award
Contracted with Goodyear for the long-term supply of tire cords and contracted to take over four factories around the world
Acquired an Agfa Photo production facility in Germany
Acquired the Nantong Hyosung Transformer Co., Ltd. in China
Acquired Dongguk Trade's Spandex factory in China

- 2007. Renewal of ISO 9001, ISO 14001 Certifications
Construction of the NFs Plant was completed
Built facility for anti-bacterial filled PET bottles
Built a #1 Solar Energy Power Plant
- 2008. Work for the Spandex Plant in Turkey completed
Work for the Spandex Tire Cord Plant in Vietnam completed
Expanded the Nantong Hyosung Transformer Co., Ltd. factory in China
- 2009. Construction of the Aramid Fiber Plant was completed
Construction of the TAC Film Plant was completed
- 2010. Vietnam steel cord plant completed
- 2011. Brazil Spandex plant completed, Acquired Global Safety Textile (GST)
- 2012. Jeonju carbon fiber plant completed

BUSINESS OF HYOSUNG

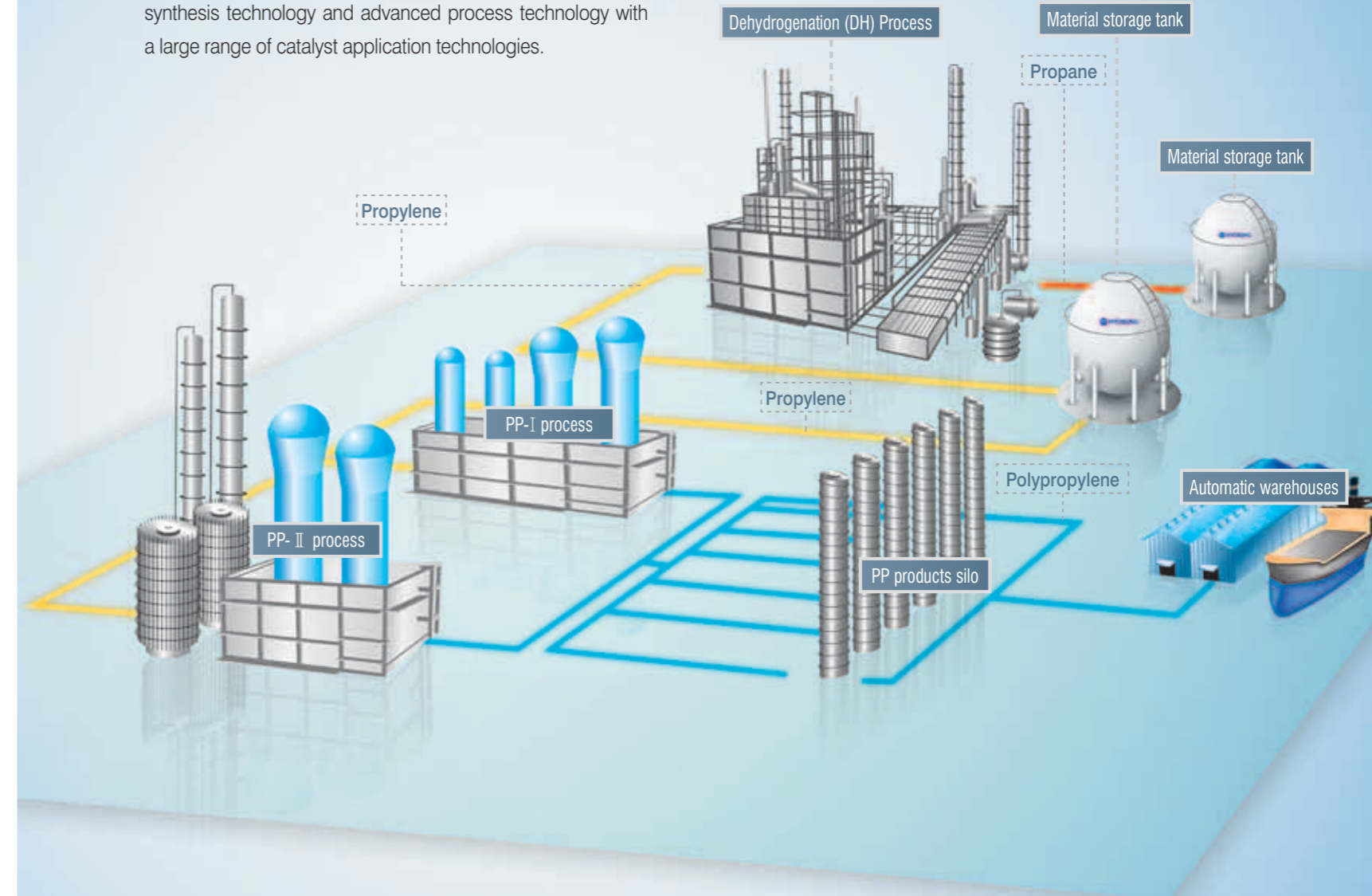
Hyosung has expanded its business sector into different fields based on solid experience in textile industrial and trade areas. Hyosung currently comprises 7 business groups (PG, Performance Group) of chemicals, fibers, industrial materials, power & industrial systems, construction, trade and information & communication with 24 affiliated business units (PU, Performance Unit).

As Hyosung's main products are semi-industrial materials required in the manufacture of finished consumer goods, Hyosung has pursued co-prosperity and built intimate relationships with its customers based on trust from the very early stages in its history. Now Hyosung is expanding its business not only into Asia but all around the world by its global network.



TOPILENE® PROCESS

HYOSUNG has secured a solid supply chain from Propane to Polypropylene using the world's most advanced propylene manufacturing process, Propane Dehydrogenation Process. TOPILENE, a trade mark of Hyosung Polypropylene, is the binding product that merges the company's polymer synthesis technology and advanced process technology with a large range of catalyst application technologies.



■ Yongyeon Plant PP Process



■ Production R&D Center



■ Yongyeon plant Propylene Ball Tank



■ Yongyeon plant DH Process

Specialized Use



For Small electric-appliances

Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength (23°C) (-10°C)		Application	Characteristics
			D256 kg · cm/cm			
HJ801R	11	22,000	3.5	-	Toaster, Coffee maker, Steam iron	High stiffness, Long term heat resistance, UL 746B
J801R	18	22,000	3.5	-	Toaster, Coffee maker, Steam iron	High stiffness, Long term heat resistance, UL 746B
HJ800R	18	17,500	8	4	Toaster, Coffee maker, Steam iron	High stiffness, Impact strength, Long term heat resistance, UL 746B

For Pipes



Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength (23°C) (-10°C)		Application	Characteristics
			D256 kg · cm/cm			
R200P R200P-#### (Color Grade)	0.25	8,500	N.B	4.5	Hot and cold water supplying pipe	Pressure resistance, High impact, Long term heat stability
R200P-G20N (GF PPR)	0.3	20,000	14	8	Hot and cold water supplying pipe (PPR composite with Glass fiber)	Pressure resistance, High impact, Long term heat stability
HB240P	0.3	15,000	N.B	8	Sewage / Drainage Pipe	High stiffness, Long term heat stability
HB242P	0.3	18,000	N.B	8	Sewage / Drainage Pipe	Very high stiffness, Long term heat stability

For Caps & Closures



Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength (23°C) (-10°C)		Application	Characteristics
			D256 kg · cm/cm			
HJ541CP	6.5	16,000	11	5.5	PET bottle cap	Stiffness, Good processibility, Impact strength

For Medical applications



Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength (23°C)		Application	Characteristics
			D256 kg · cm/cm			
R530A	2	9,500	8		IV Bottle	Transparency, USP Class VI, EP § 3.1.6, FDA DMF 21499
R530	6	9,500	6		IV Bottle	Transparency, USP Class VI, SFDA, FDA DMF 21499
J800S	20	18,500	3		Disposable syringe (Hub, Cap, Plunger)	High stiffness, High slip, FDA DMF 21499
J801	25	16,500	3.5		Disposable syringe (Barrel), Transparent product	Transparency, High stiffness, USP class VI, FDA DMF 21499

For Speciality films



Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength (23°C) (-10°C)		Application	Characteristics
			D256 kg · cm/cm			
J351F	2.6	14,000	10	3	Retort CPP film	Low Fisheye, High impact
J440F	4.5	14,000	9	2.5	Protective CPP film	Very Low Fisheye, Medium Haze
J460F	4.5	14,000	9	2.5	Protective CPP film	Very Low Fisheye, High Haze
J410F	4.5	12,000	7	2.5	Protective CPP film	Very Low Fisheye, Low Haze
J640F	8.5	14,000	7	2	Protective CPP film	Very Low Fisheye, High Haze

The properties listed are highly dependent on the test specimen preparation followed ASTM D618 and testing protocols. A similar protocol may generate substantially different values. This information is furnished conditional upon the persons receiving the material making their own determinations as to its suitability for their own particular purpose only.

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General Use

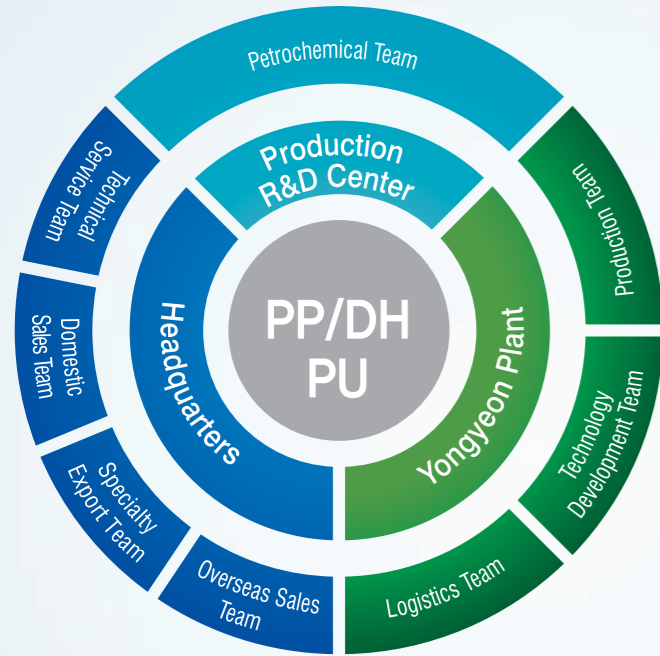
Impact Copolymer / Random Copolymer / Homopolymer

Property ASTM Method Unit	Melt Flow Index D1238 g/10min	Tensile Strength (at Yield) D638 kg/cm ²	Flexural Modulus D790 kg/cm ²	IZOD Impact Strength		Rockwell Hardness D785 R-scale	Heat Deflection Temperature D648 °C	Application	Characteristics
				(23°C)	(-10°C)				
					D256 kg · cm/cm				
Impact Copolymer									
HB240T	0.5	300	14,500	N.B	7	80	115	General sheet, Vacuum forming sheet	High stiffness, High impact strength, Vacuum forming
HJ340	1.0	300	15,000	15	7	80	120	Sheet, Industrial appliances	High stiffness, High impact strength
J340	1.7	270	12,500	15	6.5	70	105	Crate, Container, Battery case, Toy	High impact strength, UL 94HB
J440	4	270	12,500	13	5.5	75	105	Crate, Container, Battery case, Toy	High impact strength, UL 94HB
J640	10	270	13,000	10	5	80	105	Battery case, Electric appliances, Home appliances, Parts of an automobile	Impact strength, Flowability, UL 94HB
J642	10	290	16,000	10	5	85	120	Home appliances, Electric appliances	Impact strength, High stiffness, UL 94HB
J640A	18	270	13,500	9.5	4.5	80	105	Large article - Industrial appliances, Home appliances, Electric appliances, Parts of an automobile	Impact strength, Flowability, UL 94HB
J740	25	270	13,500	8.5	4	80	110	Large article - Industrial appliances, Home appliances, Electric appliances, Parts of an automobile	Impact strength, Flowability, UL 94HB
J742	25	290	16,500	8	4.5	87	120	Large article - Industrial appliances, Home appliances, Electric appliances	Impact strength, Flowability, High stiffness, UL 94HB
J842	45	280	15,000	6.5	4	85	120	Very large article - Home appliances, Industrial appliances	High flowability, High stiffness, UL 94HB
J945	55	280	15,000	6	3.5	85	120	Very large article - Home appliances, Industrial appliances	High flowability, High stiffness, UL 94HB
F801L	28	330	14,500	3	-	93	100	Extrusion coating (PP woven bag, Sandwich bag)	Low neck-in, High speed processability, Good adhesive
Random Copolymer									
R301	1.5	320	12,000	10	-	80	100	Extrusion blow molding, Thermoforming sheet	High transparency, Stiffness, Stretchability
Homopolymer									
J700	11	370	17,000	3.5	-	95	110	General injection	Processibility, Stiffness, UL 94HB
J800	25	370	17,000	3	-	100	110	General injection	Processibility, Stiffness

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HYOSUNG POLYPROPYLENE

With the world's most advanced PP manufacturing technology along with the HYPOL process of Japan's MITSUI Petrochemical Co., Ltd. and the advanced UNIPOL Process technology of US-based Union Carbide, Hyosung has developed a manufacturing system that satisfies different customer needs and supplies the best products to each of our processing companies.



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