



creativity inspired

HYOSUNG

LIFE VALUE UP WITH
HYOSUNG VINA CHEMICALS
Polypropylene

HYOSUNG VINA CHEMICALS

01 HYOSUNG CHEMICAL PP History

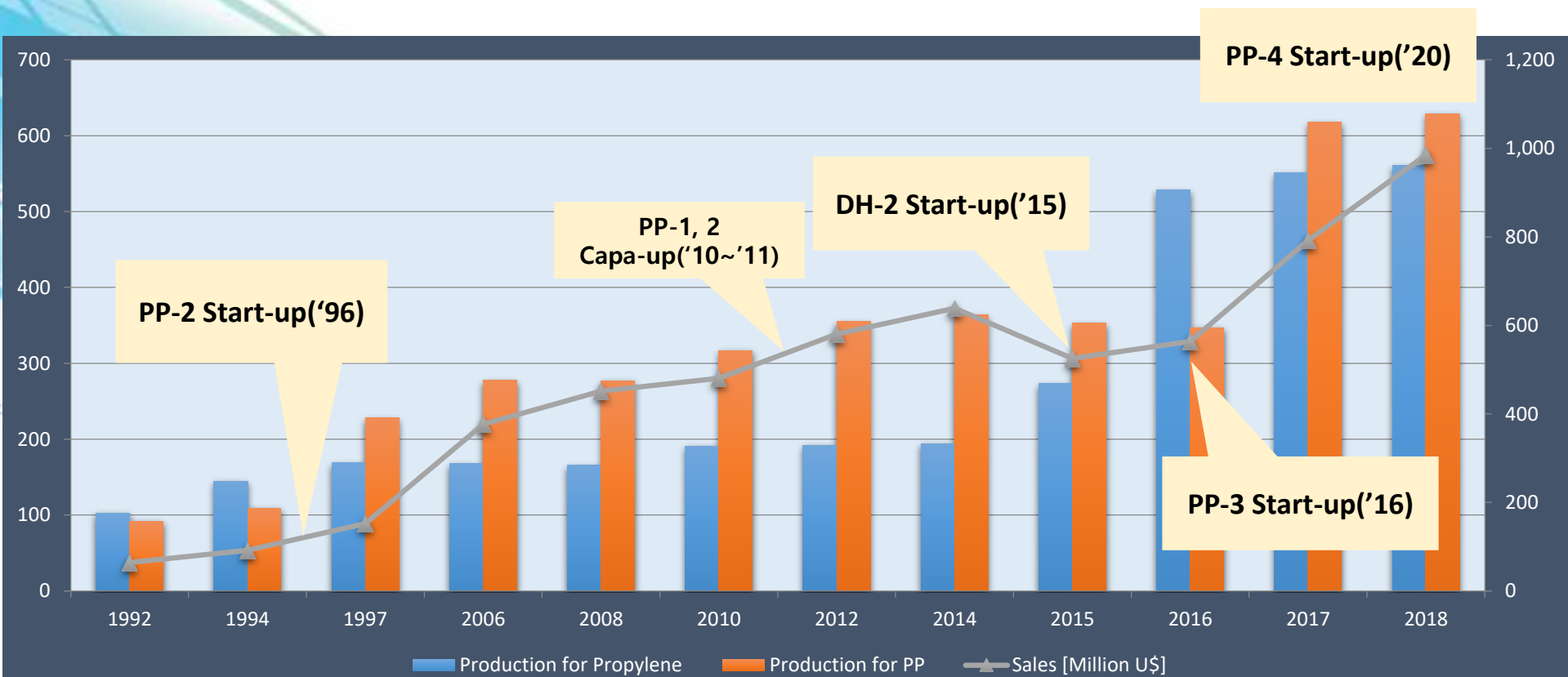
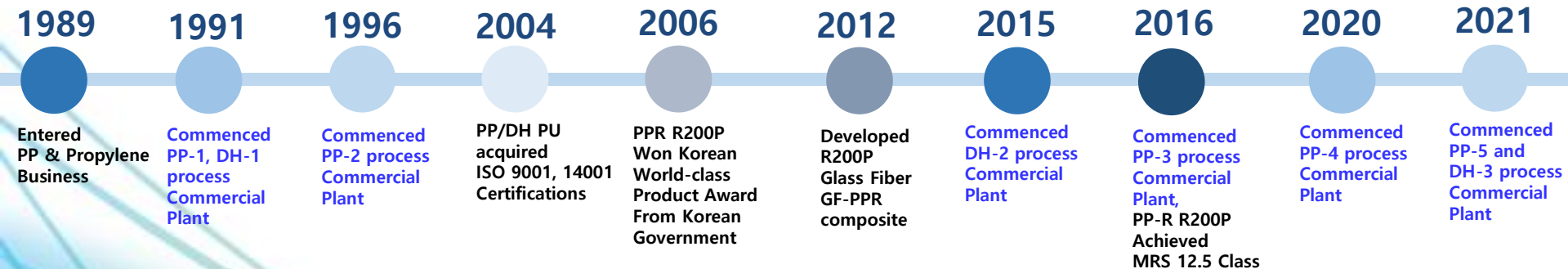
02 HYOSUNG CHEMICAL PP Business

03 HYOSUNG VINA CHEMICAL Plant Overview

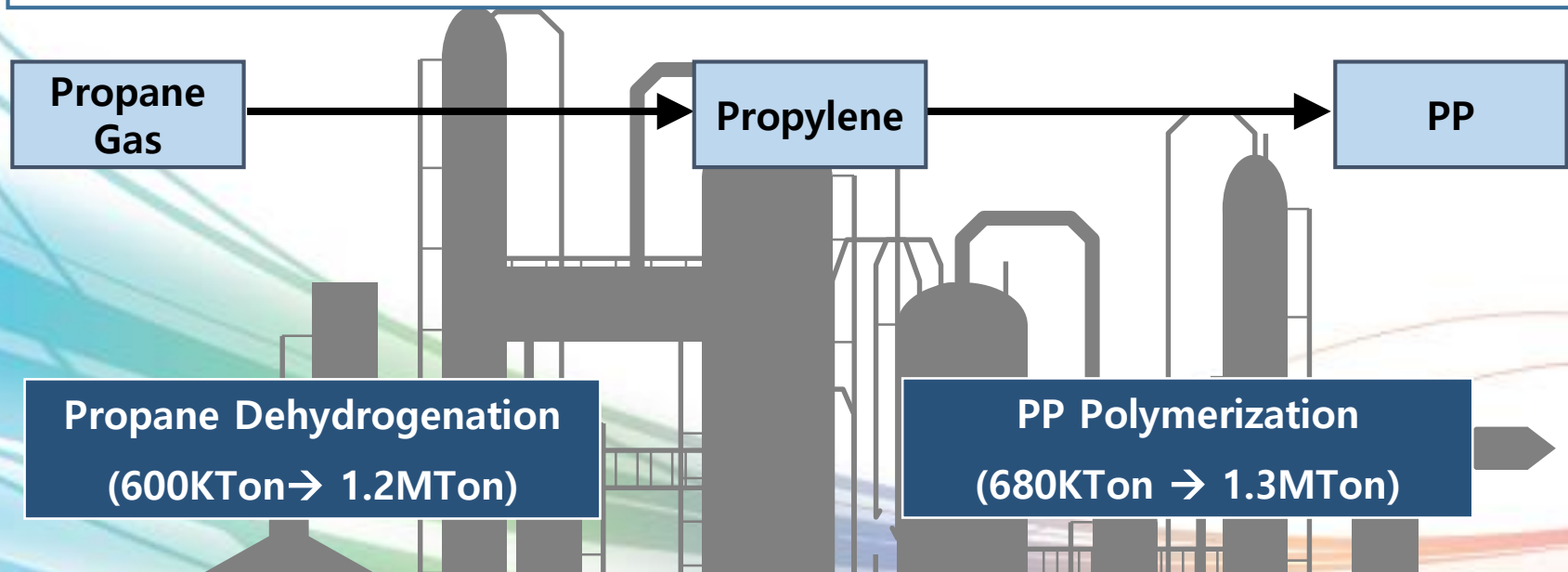
04 PP-4 Products Line-up



History of HYOSUNG PP Business



Topilene[®] PROCESS : Integrated Stable Production System
from high purity Propylene to high quality Polypropylene



	PDH-1	PDH-2	PDH-3
Process	OLEFLEX	HYOSUNG	HYOSUNG
Start-Up	1991	2015	2021
Products	High purity(99.7%) Propylene		

	PP-1	PP-2	PP-3	PP-4	PP-5
Process	HYPOL	UNIPOL		SPHERIPOL	SPHERIPOL
Start-Up	1991	1996	2016	2020	2021
Capacity(MT)	140,000	200,000	340,000	300,000	300,000
Location	Korea			Vietnam	

Hyosung Vina Chemicals Overview

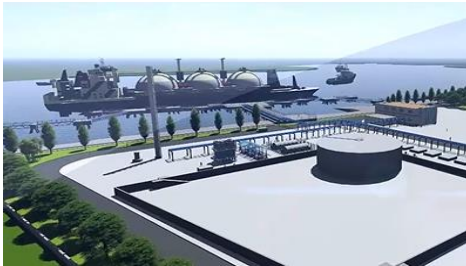
HYOSUNG VINA CHEMICALS



Hyosung Vina Chemicals Overview

HYOSUNG VINA CHEMICALS

- ❖ **Location:** Vietnam, Ba Ria-Vung Tau
- ❖ **Facilities: PP/OL-1 process with LPG Storage includes;**
 - Port: VLGC (Very Large Gas Carrier)
 - LPG Cavern: 240KT (Propane 170KT, Butane 70KT)
 - OL-1 (Propane De-Hydrogenation & Ethane Cracker):
 - Propylene 600KTA
 - Ethylene 55KTA
 - PP (Poly Propylene): 600KTA (PP-4: 300KTA, PP-5: 300KTA)
 - Utility Area
 - Auto Warehouse
- ❖ **Completion Plan:** 1st Stage: 2020 (PP-4, Port),
2nd Stage: 2021 (Cavern, OL-1, PP-5)

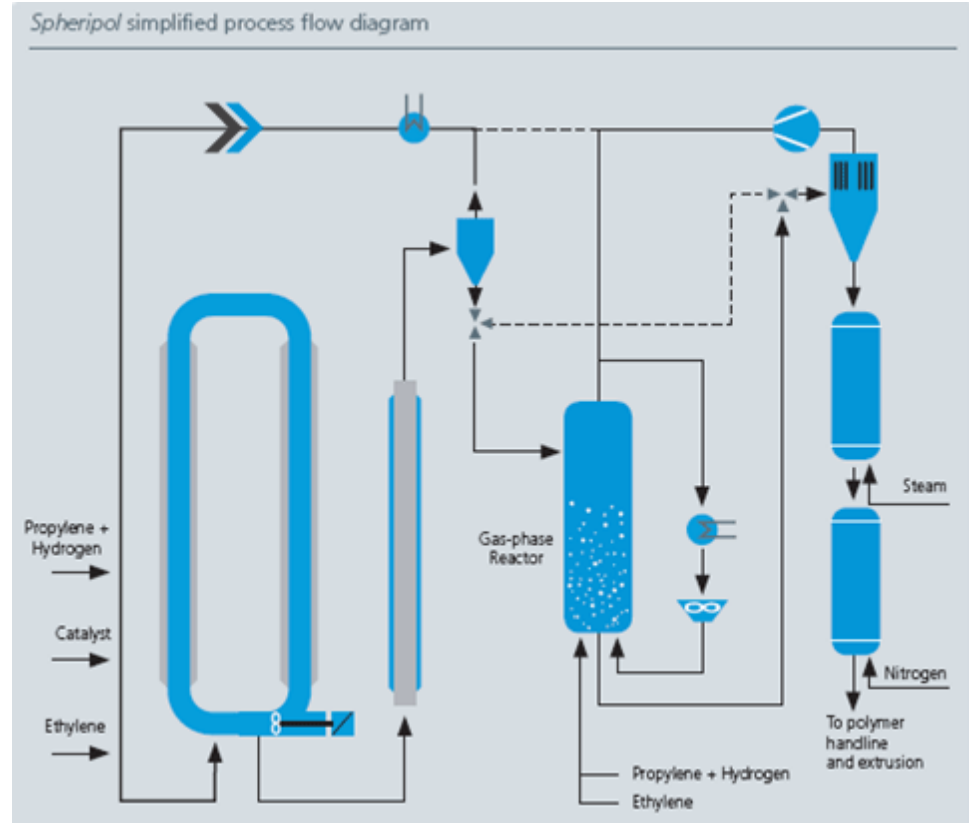


❖ Spheripol PP Process:

- ▷ LyondellBasell Process
- ▷ Two Loop (bulk) Reactors
- ▷ One Gas Phase Reactor
- ▷ Three main process steps:
 - (1) Catalyst and raw material feeding
 - (2) Bulk Polymerization
 - (3) Finishing and pelletizing

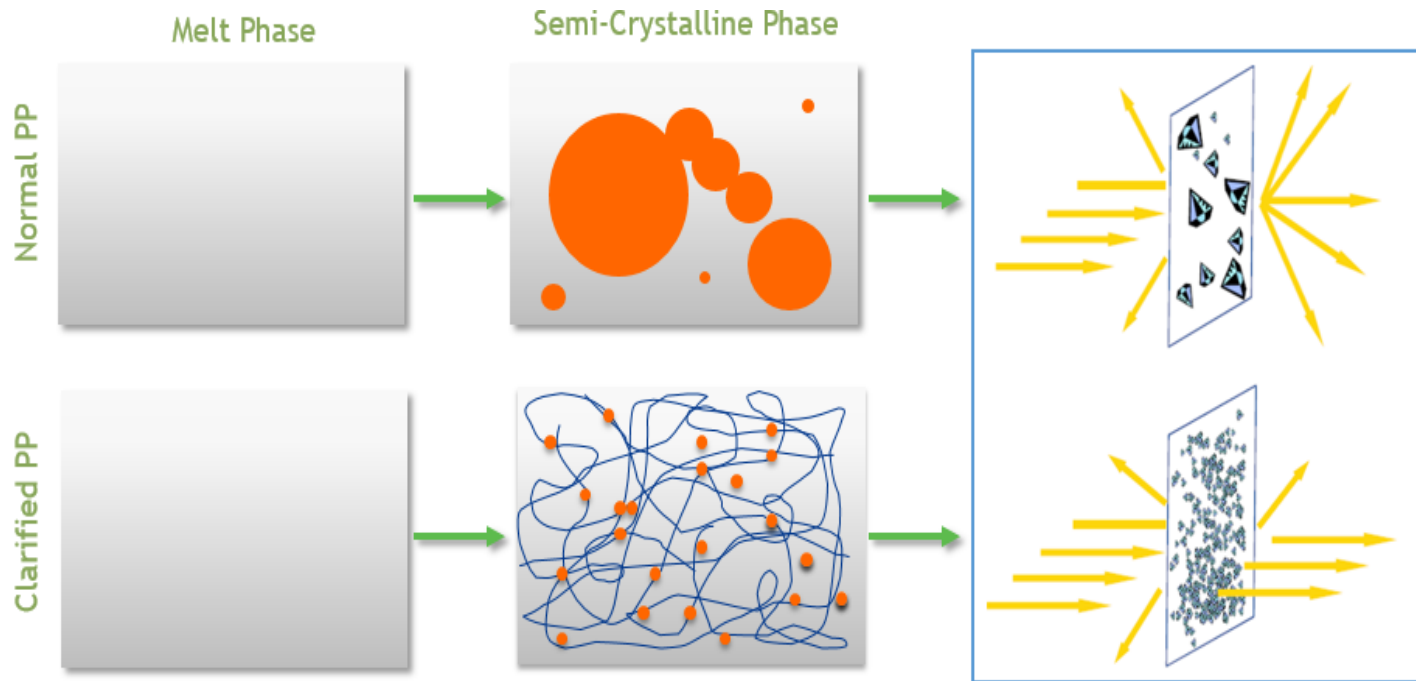
❖ Characteristics of PP resin:

- ▷ Homo polymer:
 - Wide range of melt flow index (from pipe extrusion to melt blown)
- ▷ Random copolymer
 - Good optical properties
 - Low catalyst residue
- ▷ Block copolymer
 - Excellent low-temperature impact strength
 - Variety item portfolio including pipe, automotive bumpers, high flow, TWIM

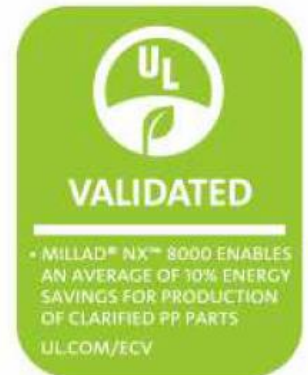


❖ Hyosung Vina Chemical High Clarity (High transparent) PP

- Clarity in container means the container is clean or transparent
- With Hyosung's new technology and Milliken new clarity agent, the size of crystalline can be made small that it enables to make PP more transparent



Milliken
Millad[®] NX[™] 8000
The New Standard In Clear Polypropylene



❖ Application of High Clarity PP

Housewares, Transparent containers, Thin wall packaging



Baby bottles, Water bottles, Cups



Disposable syringes, Medical vials, Storage box

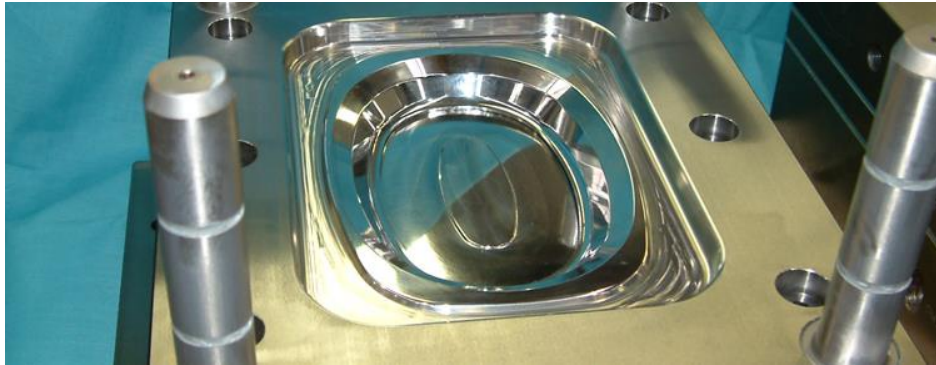


❖ Properties of High Clarity PP

Properties		Unit	R601N	R701N	R801N
Melt Index		g/10min	12	20	30
Flexural Modulus		kg/cm ²	11,000	11,000	11,000
Izod Impact Strength (Notched)	23°C	kg cm/cm	7	7	7
Tensile Strength at Yield		kg/cm ²	290	290	290
Hardness		R-scale	85	85	85
Heat Deflection Temperature		°C	90	90	90
Crystallization Temperature		°C	120	120	120
Haze	1mm thickness	%	12	12	12
	2mm thickness		20	20	20

❖ Hyosung Vina Chemical PP for Thin-Wall Injection Molding

- Good processability with 60 g/10min MFR
- A thin-wall & Light products like disposable cups, trays, and containers
- Increased productivity with faster cycle time by increasing crystallization temperature



❖ Properties

Properties	Method	Unit	J1105T	J1145T
Type	-	-	Homo	Block
Melt Flow Index	ASTM D1238	g/10min	60	60
Flexural Modulus	ASTM D790	kg/cm ²	18,000	13,000
Izod Impact Strength (Notched, 23°C)	ASTM D256	kg-cm/cm	3.0	8.0

❖ Application of TWIM

Food containers

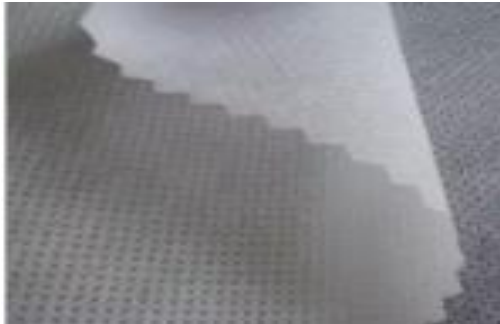


Disposable cups



❖ Hyosung Vina Chemical Spunbond PP

- Uniform properties by making with very narrow molecular distribution
- Phthalate free products (Non-phthalate catalyst is applied)
- High tensile strength at yield
- Low TVOC(Total Volatile Organic Compounds)



❖ Properties

Properties	Method	Unit	S805
Type	-	-	Homo
Melt Flow Index	ASTM D1238	g/10min	36
Flexural Modulus	ASTM D790	kg/cm ²	15,000
Tensile Strength at Yield	ASTM D638	kg/cm ²	360
Catalyst	-	-	Non-phthalate

❖ Application of Spunbond

Wipes



Diaper



Shopping Bag



❖ Hyosung Vina Chemical PP for coating application

- It has excellent durability due to high elongation at break
- Good printability
- Low Neck-in (LDPE added)
- High-speed processability & Uniform coated thickness
- Protects fabrics against wind, water, cold, and chemicals



❖ Properties

Properties	Method	Unit	F801C
Type	-	-	Homo
Melt Flow Index	ASTM D1238	g/10min	25
Flexural modulus	ASTM D790	Kg/cm ²	14,000
Additives	-	-	LDPE added

❖ Application of Coating

Coating PP



❖ Hyosung Vina Chemical PP for lamination application

- It has excellent adhesive property which can combine extruded layer in between Fabrics
- Low Neck-in (LDPE added)
- Good heat sealability in the low temperature



❖ Properties

Properties	Method	Unit	R701C	R801C
Type	-	-	Random	Random
Melt Flow Index	ASTM D1238	g/10min	20	30
Flexural modulus	ASTM D790	Kg/cm ²	8,500	8,500
Additives	-	-	LDPE added	LDPE added

❖ Application of Lamination

Lamination PP



❖ Hyosung Vina Chemical High impact block PP

- By controlling and increasing the propylene ethylene rubber content with Spheripol process, it leads to make the impact strength property of “No Break” level
- Suitable for Injection molding like paint pail and crates required for high impact resistance

Characteristics	Method	Unit	J446H	J646H
Physical				
Melt Index (230°C, 2.16kg)	ASTM D1238	g/10min	4	9
Density	ASTM D792	g/cm ³	0.9	0.9
Mechanical				
Tensile Strength at Yield	ASTM D638	kg/cm ²	220	220
Flexural Modulus	ASTM D790	kg/cm ²	12,500	12,000
Notched Izod Impact Strength(23°C)	ASTM D256	kg·cm/cm	N.B (50)	N.B (50)
Rockwell Hardness	ASTM D756	R-scale	90	90
Thermal				
Vicat Softening point (1kgf)	ASTM D1525	°C	150	150
Heat Deflection Temperature (4.6kgf/cm ²)	ASTM D648	°C	105	105

❖ Hyosung Vina Chemical general block PP

- With uniform particles under the Spheripol process, it leads to high performance properties, Flexural modulus / impact strength balance
- Suitable for Injection molding like Housewares, Electric appliances, battery case and extrusion molding like danpla sheets

Characteristics	Method	Unit	HJ340N	J340N	J440N	J640N	J740N	J642N	J742N	J842N	J945N
Physical											
Melt Index (230°C, 2.16kg)	ASTM D1238	g/10min	1	1.7	4	10	30	10	30	44	53
Density	ASTM D792	g/cm ³	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Mechanical											
Tensile Strength at Yield	ASTM D638	kg/cm ²	280	280	260	280	280	300	300	280	300
Flexural Modulus	ASTM D790	kg/cm ²	16,000	13,500	13,000	13,500	14,000	15,500	15,000	15,000	15,000
Notched Izod Impact Strength(23°C)	ASTM D256	kg-cm/cm	12	25	10	10	7	10	7	5	5
Rockwell Hardness	ASTM D756	R-scale	90	90	90	90	90	95	95	95	95
Thermal											
Vicat Softening point (1kgf)	ASTM D1525	°C	150	150	150	150	150	150	150	150	150
Heat Deflection Temperature (4.6kgf/cm ²)	ASTM D648	°C	105	105	105	105	105	105	105	105	105
Remark							Higher Flexural modulus Block PP				

❖ Hyosung Vina Chemical general homo PP, Fiber, Yarn

- Fiber / Yarn grades have a balanced morphology, rheology and additivation to secure optimal spinning and enhanced thermos bonding performance
- Homo injection grades features high stiffness, good flowability and balanced mechanical properties

Characteristics	Method	Unit	Fiber / Yarn		Injection	
			F501N	S600	J700N	J800N
Physical						
Melt Index (230°C, 2.16kg)	ASTM D1238	g/10min	3.7	10	12	25
Density	ASTM D792	g/cm ³	0.9	0.9	0.9	0.9
Mechanical						
Tensile Strength at Yield	ASTM D638	kg/cm ²	370	350	380	380
Flexural Modulus	ASTM D790	kg/cm ²	17,000	16,000	17,000	17,000
Notched Izod Impact Strength(23°C)	ASTM D256	kg-cm/cm	4.0	3.5	3.0	2.5
Rockwell Hardness	ASTM D756	R-scale	105	105	105	105
Thermal						
Vicat Softening point (1kgf)	ASTM D1525	°C	155	155	155	155
Heat Deflection Temperature (4.6kgf/cm ²)	ASTM D648	°C	110	110	110	110

❖ Application of Fiber / Yarn

Woven



Non Woven



THANK YOU

