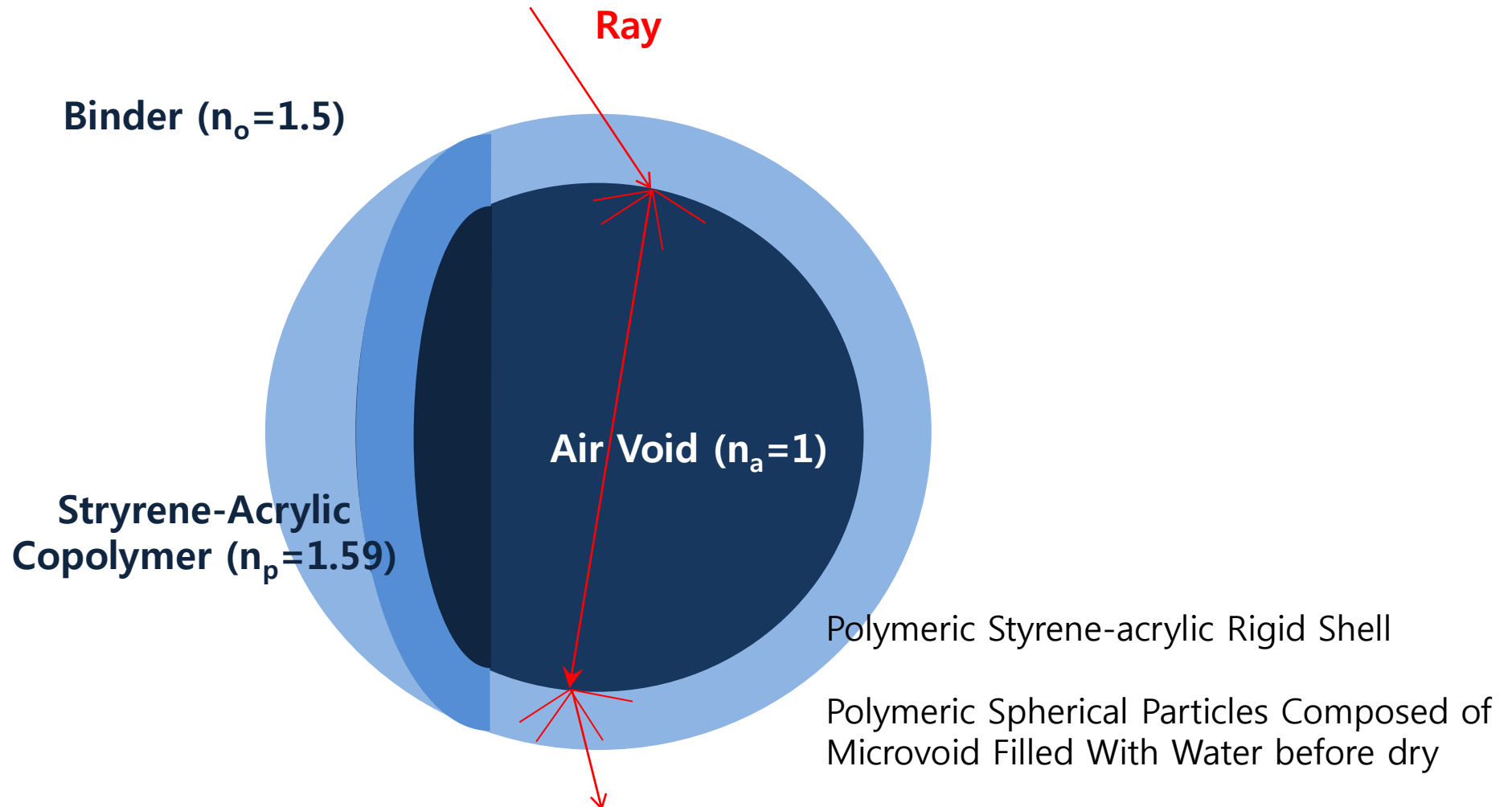


What is **Hollow Plastic Pigment?**

(Opaque Polymer)

Structure of Hollow Plastic Pigment



Main Purpose of Using HPP.

- **Improving Gloss in Coated Paper**
- **Improving the Opacity / Whiteness / Brightness
in Gloss / Board Paper**
- **Bulkiness in Light Weight Coated Papers (LWC)**
- **ADIABATIC Property in Thermal paper**

Main Purpose of Using HPP.

– Gloss / Printability

- Paper Coating Formulations Containing **HPP** can Provide The Coating Layer with The **Cushion** during Calendaring Process. (Sphere to ellipsoidal shape).
- **With the Lower Temperature & Pressure Calendaring Condition,** Easily Deformable Hollow Sphere Pigment can fill The Interstitial Air Voids among Inorganic Pigments,
And Average Air Void Size Decreases, which Enables Higher Paper/Ink Gloss.

– Opacity / Whiteness

- **Opacity or Whiteness** in Paper originates from The Air Void in Paper Coating Formulations.
- After Coating/Drying Process,
The Hollow Sphere has Small Air Void (Diameter Of 800Nm) in each Polymeric Particles, and Can Supply Many **Scattering Site Of Light** without Loss Of Film Strength

■ High Bulk

- HPP has a High Opacity with Very Low Density (Dry Density About 0.5), which is **1/8 Of The Titanium Dioxide(TiO_2)** and **1/5 Of $CaCO_3$ and Clay.**
- This Characteristic can be used in making The Light Weight Coated Paper (LWC) with High Opacity and Bulkiness.

■ Thermal Property

- To get this Property, The Thermal Paper Makers use Hollow Sphere Plastic Pigment which has Large Number of Air Voids in each Particles showing **ADIABATIC Property (Air has high heat capacity)** without The Loss of Picking Strength.
- When using Porous Inorganic Pigments The Open Channel make The Weaker Pick-Strength-Coating Layer.

Guidelines for Hollow Plastic Pigment use in Paper Coating Formulations.

■ For Art Paper

	Control	Ex.1	Ex.2	Ex.3	Ex.4	Solid(%)
CaCO ₃	437.00	470.00	470.00	470.00	470.00	75.00
Clay	410.00	320.00	320.00	320.00	320.00	71.00
Blue	0.90	0.90	0.90	0.90	0.90	0.02
Violet	2.00	2.00	2.00	2.00	2.00	0.02
SBP-252 (EN-TECH)		80.00				52.00
SHP-60 (EN-TECH)			70.00			29.50
SHP-100 (EN-TECH)				70.00		26.50
HP-1055 (Rohm&Hass)					70.00	26.50
SB Latex	136.00	136.00	136.00	136.00	136.00	50.00
Insolubilizer (PAPU)	9.00	9.00	9.00	9.00	9.00	35.00
Lubricant	9.00	9.00	9.00	9.00	9.00	50.00
PVA	20.00	20.00	20.00	20.00	20.00	10.00
OBA	7.00	7.00	7.00	7.00	7.00	20.00
Water	10.00					
Thickener / Structure Modifier	4.00	4.00	4.00	4.00	4.00	30.00
Total	1,044.90	1,057.90	1,047.90	1,047.90	1,047.90	
Solid (%)	66.91	66.31	64.95	64.75	64.75	

■ **For Board Paper**

	Control	Ex.1	Ex.2	Ex.3	Ex.4	Solid(%)
CaCO₃	496.00	500.00	500.00	500.00	500.00	75.00
Clay	349.00	280.00	280.00	280.00	280.00	71.00
Blue	0.90	0.90	0.90	0.90	0.90	0.02
Violet	2.00	2.00	2.00	2.00	2.00	0.02
SBP-252 (EN-TECH)		90.00				52.00
SHP-60 (EN-TECH)			80.00			29.50
SHP-100 (EN-TECH)				80.00		26.50
HP-1055 (Rohm&Hass)					80.00	26.50
SB Latex	136.00	136.00	136.00	136.00	136.00	50.00
Insolubilizer	9.00	9.00	9.00	9.00	9.00	35.00
Lubricant	9.00	9.00	9.00	9.00	9.00	50.00
Starch	20.00	20.00	20.00	20.00	20.00	20.00
OBA	7.00	7.00	7.00	7.00	7.00	20.00
Water	20.00					
Co-Binder	20.00	20.00	20.00	20.00	20.00	45.00
Thickener / Structure Modifier	2.00	2.00	2.00	2.00	2.00	30.00
Total	1,070.90	1,075.90	1,065.90	1,065.90	1,065.90	
Solid (%)	66.34	65.27	63.71	63.48	63.48	

Paper Properties

- Use in Art Paper**

	Control	Ex.1	Ex.2	Ex.3	Ex.4
Coating Weight	18.85	18.85	19.10	18.75	18.90
Roughness (micron)	0.90	0.81	0.76	0.83	0.84
Paper Gloss (%)	75.20	83.00	85.50	84.70	84.30
Smoothness (sec)	1,310.00	1,050.00	983.00	1,025.00	1,038.00
K&N (%)	17.00	16.60	16.80	17.20	17.20
Dry Pick (m/s)	1.48	1.50	1.62	1.60	1.61
Ink Gloss (%)	91.80	94.80	95.70	95.40	95.30
Water repellent	4.80	4.50	4.60	4.80	4.80
Mottle	4.50	5.00	5.00	5.00	5.00
Brightness (%)	86.00	90.50	92.50	91.20	91.20
Whiteness (CIE)	105.20	110.60	116.30	114.50	114.40

■ **Use in Board Paper**

	Control	Ex.1	Ex.2	Ex.3	Ex.4
Coating Weight	20.30	20.20	20.30	20.10	20.10
Roughness (micron)	1.05	0.94	0.96	0.97	0.97
Paper Gloss (%)	64.20	69.80	70.20	70.40	70.30
Smoothness (sec)	1,408.00	1,170.00	1,155.00	1,178.00	1,176.00
Ink Gloss (%)	90.00	92.80	93.50	92.80	92.70
Mottle	4.50	5.00	5.00	5.00	5.00
Brightness (%)	86.00	90.40	92.40	91.80	91.60
Whiteness (CIE)	104.00	111.20	115.80	114.70	114.60

PVC (Pigment Volume Concentration) Calculation



		Volume	Pig Vol.
CaCO3	80.0	30.1887	37.7358
Clay	20.0	7.5472	
PLASTIC PIGMENT	-	-	PVC
Latex	12.0	11.3208	76.923%

CaCO3	77.0	29.0566	39.4340
Clay	20.0	7.5472	
SBP-252	3.0	2.8302	PVC
Latex	12.0	11.3208	77.695%

CaCO3	74.0	27.9245	41.1321
Clay	20.0	7.5472	
SBP-252	6.0	5.6604	PVC
Latex	12.0	11.3208	78.417%

CaCO3	70.0	26.4151	42.4528
Clay	20.0	7.5472	
SBP-252	9.0	8.4906	PVC
Latex	12.0	11.3208	78.947%

PVC Calculation



		Volume	Pig Vol.
CaCO3	78.0	29.4340	40.4117
Clay	20.0	7.5472	
SHP-100	2.0	3.4305	PVC
Latex	12.0	11.3208	78.117%

CaCO3	76.0	28.6792	43.0875
Clay	20.0	7.5472	
SHP-100	4.0	6.8611	PVC
Latex	12.0	11.3208	79.193%

CaCO3	74.0	27.9245	45.7633
Clay	20.0	7.5472	
SHP-100	6.0	10.2916	PVC
Latex	12.0	11.3208	80.168%

PVC Calculation

- **Match the PVC level around 78 ~ 80**

Binder level	10	11	12	13	14	15
PVC	80.0	78.4	76.9	75.5	74.1	72.7

- **By using small sized solid bead PP or easily deformable HPP, the average interstitial air void size decrease without loss of binder force of Latex.....**

Suggestion of Using HPP.

- **Improving Gloss / Opacity / Whiteness / Brightness**
- **Reduce Clay Dosage.**
- **Using Plastic Pigment (4 - 10 part).**
- **To get the Optimum Properties and reducing the Production Cost.**
 - **Use HPP to Mix with the Solid Bead Plastic Pigment 20 – 40%.**