

# CAB-O-SPERSE® DISPERSIONS FOR INK RECEPTIVE COATINGS ON NONPOROUS SUBSTRATES

## Why CAB-O-SPERSE dispersions in ink receptive coatings?

An inkjet receptive coating is a layer which allows the ink to adhere to the required substrate, in this case a non-porous surface. The morphology and charge of our CAB-O-SPERSE® dispersions enable the coating to be ink receptive.

CAB-O-SPERSE® fumed silica or fumed alumina aqueous dispersions enable key performance benefits for this application including:

### 1. Performance improvement:

- Allows for high ink absorption due to the porous nature
- Promotes strong adhesion to non-porous substrate
- Enables excellent image quality
- Allows high transmission, low haze and high gloss

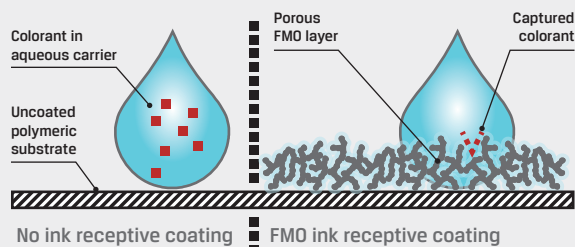
### 2. Processing ease:

- Pre-dispersed particles allow easy incorporation
- CAB-O-SPERSE® dispersions can be selected to optimize stability in the formulation

### 3. High purity:

- Good chemical and temperature stability without yellowing
- Dispersant-free to minimize incompatibility and aid formulation flexibility

The porosity, particle size distribution and surface charge of the coating – which are critical for coating adhesion, ink and coating drying time, ink opacity, color intensity, color gamut, and dot gain can all be tailored for the formulation.

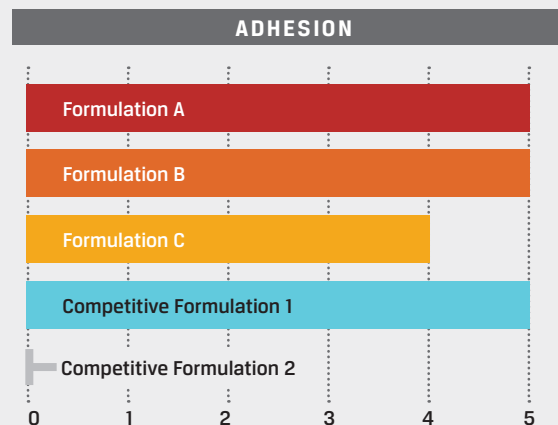


## Coating adhesion to non-porous substrate, PET

For PET substrate, the porous nature of CAB-O-SPERSE® fumed silica dispersions, and the charge of CAB-O-SPERSE® fumed alumina dispersions will improve the adhesion property of a typical coating formulation.

The formulations A, B and C containing CAB-O-SPERSE® dispersions are compared against two fully formulated competitive solutions, henceforward referred to as Competitive Formulation 1 and Competitive Formulation 2.

The coating adhesion is measured using the ASTM D3559 cross hatch adhesion test. Formulations A, B, and C prepared with CAB-O-SPERSE® dispersions all show excellent adhesion to PET; A and B both adhere to PET with no delamination, while C adheres well but shows spots of delamination. Competitive Formulation 1 adheres to PET with no delamination, however Competitive Formulation 2 does not adhere and delaminates from PET.



## Optical properties

CAB-O-SPERSE® dispersions in Formulations A, B, and C are effective in maintaining the clarity, haze as well as gloss for high quality crisp images.

All formulations, both Cabot's and the competitions, maintain a high transmission through the PET film. Formulations' A, C and Competitive Formulation 2 all show low haze, while B and Competitive Formulation 1 both have a haze to their film.

A high gloss finish is defined as >70 at 60° and a low gloss finish is defined as <10 at 60°. Formulations A, B, C and Competitive Formulation 2 all have a high gloss finish, while Competitive Formulation 1 has a low gloss.

FORMULATION	OPTICAL		
	Transmission, %	Haze, %	Gloss, 60°
A	>90%	<5%	High
B	>90%	>20%	High
C	>90%	<5%	High
Competitive Formulation 1	>90%	>20%	Low
Competitive Formulation 2	>90%	<5%	High

**Ink adhesion to coating & color gamut**

An Epson Workforce WF-3730 printer was used to evaluate ink adhesion and color gamut.

Ink adhesion is measured following ASTM D3359. Seven colors (black, red, green, blue, yellow, magenta and cyan) are printed as columns and measured on a scale of 0-5. Each color receives a rating from 0-5 with an ink adhesion total ranging anywhere from 0 to 35.

For color gamut, squares of all seven colors are printed and measured using a Hunter XE lab-scan colorimeter. The total color gamut is determined by adding up the chromacity for each color; the higher the number, the better color gamut achieved.

Color gamut for A, B, C and Competitive Formulation 1 are all considered high, while the color gamut for Competitive Formulation 2 is much lower than the others. Ink adhesion to the coating for A, B and Competitive Formulation 1 are all good, while C and Competitive Formulation 2 do not promote any ink adhesion.

FORMULATION	COLOR GAMUT	INK ADHESION
A	10000-11000	>30
B	12000-13000	>30
C	12000-13000	0
Competitive Formulation 1	12000-13000	>30
Competitive Formulation 2	6000-7000	0

**Example coating formulations**

Example coating formulations are shown below. Additional ingredients may also be added based on your formulation.

FORMULATION A
Polyurethane resin
CAB-O-SPERSE® 4012K dispersion
Surfactant for aqueous coatings

FORMULATION B
Polycarbonate-Polyurethane resin
CAB-O-SPERSE® 4012K dispersion
Surfactant for aqueous coatings

FORMULATION C
Polycarbonate resin
CAB-O-SPERSE® 4012K dispersion
Surfactant for aqueous coatings