

HIGH COLOR BLACKS FOR POLYESTER CAB BLEND COATINGS



Application description

Polyester and cellulose acetate butyrate (CAB) resin blends offer rapid drying at a wide temperature range with excellent color performance and exceptional film forming properties. These polyester and CAB resin blends are often used in formulations that are air dried at room temperature, including automotive refinish applications.

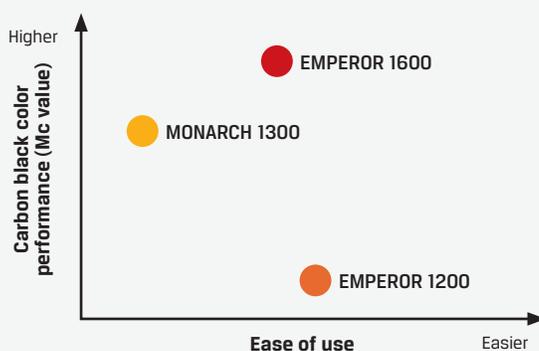
High color blacks are typically used in these high end coatings because they offer excellent color performance. Selecting the appropriate high color carbon black enables the formulator to achieve excellent masstone jetness and blue undertone in the final film.

CABOT PRODUCT OFFERING

| Carbon black product | Jetness | Typical surface area (N ₂ SA) m ² /gram | Typical structure (OAN/DBP) cc/100 grams | Product characteristics |
|----------------------|---------|---|--|--|
| EMPEROR® 1600 | Highest | N/A Surface treated | N/A Surface treated | A high jetness carbon black for solvent-based formulations. Surface treated for ease of dispersion. |
| MONARCH® 1300 | | 560 | 100 | A high jetness oxidized carbon black for a wide range of polar and nonpolar coatings formulations. |
| EMPEROR 1200 | Lowest | N/A Surface treated | N/A Surface treated | Extremely easy to disperse in solvent-based formulations due to surface treatment, with good blue undertone. |

The data in the table above are typical test values intended as guidance only, and are not product specifications. Product specifications are available from your Cabot representative.

PRODUCT PERFORMANCE



Formulators of high color black coatings typically balance the color performance of the coating with dispersion ease and formulation stability.

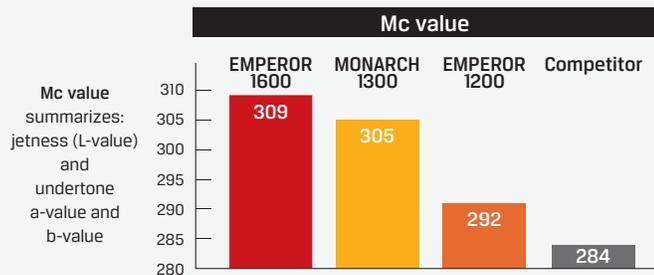
Color: The darkness and undertone of the pigment is typically measured with Hunter L-a-b values. An ideal masstone coating (high Mc value) has a low L-value, indicating dark color, and a low b-value, signifying blue undertone.

Ease of Use: The dispersion time, dispersant loading, type of milling equipment required and compatibility with other formulation components determine the ease of use of a carbon black.

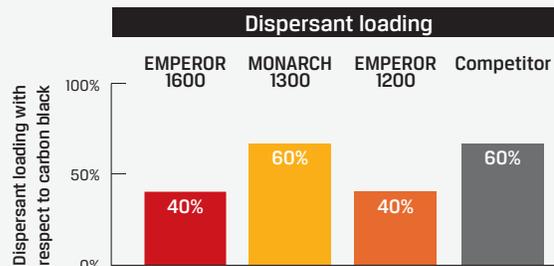
We also offer two products designed for waterbased formulations, EMPEROR 2000 and EMPEROR 1800 carbon blacks. Contact your Cabot representative for more information.

PRODUCT PERFORMANCE

Color performance of carbon black products

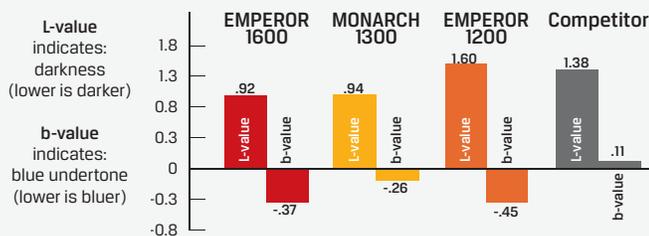


Ease of use of carbon black products

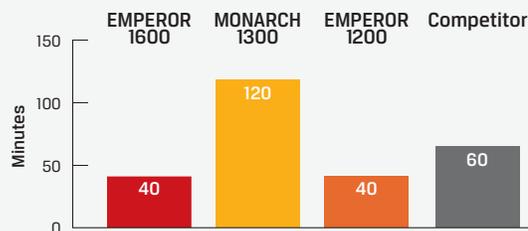


EMPEROR 1600 and 1200 carbon blacks use up to 33% less dispersant than the competitive grade to achieve optimal color performance.

Darkness and undertone



Dispersion time



Measured as the amount of time required to disperse the pigment to its optimal color value in this formulation.

The Mc value and darkness and undertone data below were obtained using the model formulation that follows. Only the carbon black was changed.

MODEL FORMULATION (optimized for EMPEROR 1600 carbon black)

| Millbase | | |
|----------------|-------------|---------------|
| Product name | Description | Amount (%) |
| Setal™ 189SS65 | Resin | 30.77 |
| Efka™ PX4310 | Dispersant | 8.00 |
| Butyl acetate | Solvent | 25.61 |
| PGMEA | Solvent | 25.62 |
| Carbon black | Pigment | 10.00 |
| Total | | 100.00 |

Millbase procedure:

- Premix Efka PX4310 dispersant, Butyl acetate, and PGMEA together.
- Post-add carbon black to mixture under good agitation and soak for 5 minutes.
- Add Setal 189SS65 resin to the above under good agitation.
- Mix for another 5 minutes at 4,000 RPM.
- Re-circulate through Eiger mill at 10 m/s tip speed.
- Discharge then measure millbase viscosity.

| Millbase constants | |
|---------------------------|-----------|
| Carbon black loading, (%) | 10.0 |
| Total solids, (%) | 34.00 |
| Pigment/dispersant ratio | 1.00/0.40 |

| Masterbatch letdown | | |
|---------------------------------|---------------|---------------|
| Product name | Description | Amount (%) |
| Setal 189SS65 | Resin | 48.11 |
| CAB551-0.01 (30% Butyl Acetate) | Resin | 29.88 |
| Cymel™ 325 | Resin | 2.79 |
| BYK®-346 | Wetting agent | 0.45 |
| Butyl acetate/PGMEA | Solvent | 18.77 |
| Total | | 100.00 |

Masterbatch letdown procedure:

- Premix CAB, Cymel 325 resin, BYK346 wetting agent, solvent blend together.
- Post-add the premix slowly into the Setal 189SS65 resin under good agitation then mix for another 15 minutes.
- Discharge then proceed to finish formulation.

| Masterbatch letdown constants | |
|-------------------------------|-------|
| Total solids, (%) | 42.69 |

| Finish formulation | |
|---------------------|---------------|
| Component | Amount (%) |
| Masterbatch letdown | 89.5 |
| Millbase | 10.5 |
| Total | 100.00 |

Finish formulation procedure:

- Post add the millbase to the masterbatch letdown under good agitation.
- Mix for 20 minutes then discharge.

Application procedure:

- Cast out the film on cold roll steel and BYKO™ chart using .003 inch cast out bar.
- Air dry for 10 minutes at room temperature.
- Cure at 66 °C for 10 minutes.
- Cast on the clear coat using .005 inch cast out bar.
- Air dry for 24 hours at room temperature.
- Measure hiding and color performance.

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