CABOT

SPECIALTY CARBON BLACKS

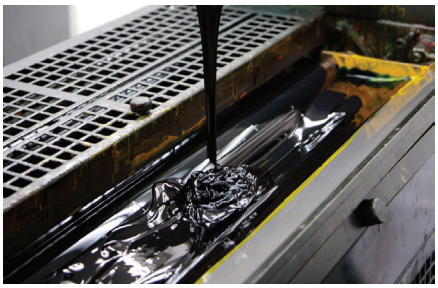
SPECIALTY CARBON BLACKS FOR PRINTING INK APPLICATIONS

PRODUCT SELECTION GUIDE

Performance and leadership in specialty carbon blacks

Cabot Corporation is a global performance materials company striving to be our customers' commercial partner of choice. We have been a leading manufacturer of carbon black and other specialty chemicals for more than 130 years, and have long supplied pigments to the inks industry.

Our global reach enables us to work closely with customers to meet the highest standards for performance, quality and service. Our global production network and applications development facilities provide our customers with global service capabilities as well as the latest technical innovations.



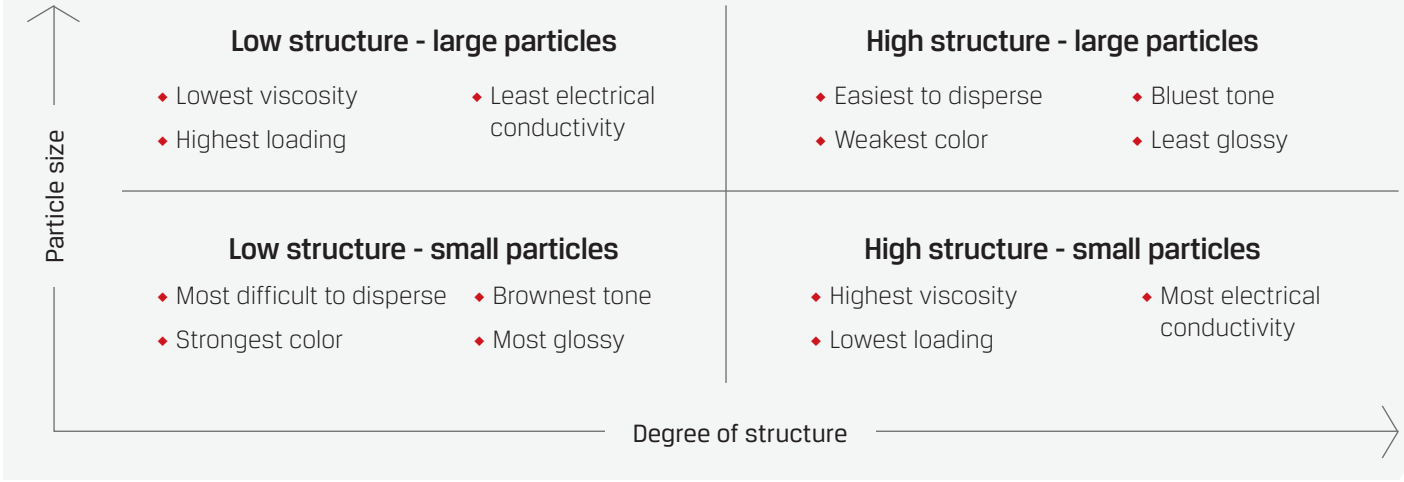
Our offerings for printing ink applications

Our specialty carbon blacks for inks have been formulated to meet application-specific needs and are manufactured to exacting standards. Equally important, our technical sales and service teams are available to work with you to provide additional product information and support to aid in your selection of the best product for your specific application. Regardless of your application, our specialty carbon blacks provide differentiated performance and reliable quality.

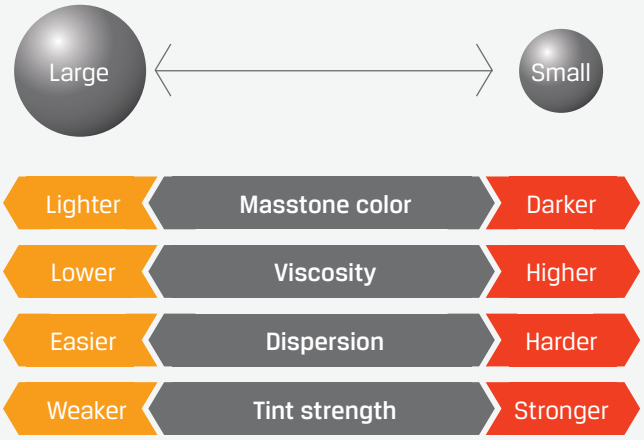
The properties of pigment blacks

Pigment black is composed of primary aggregates, each of which resembles a cluster of spherical primary particles fused together. Both the primary aggregates and the spherical particles comprising them are important controlling factors in pigment black performance.

PERFORMANCE AS A FUNCTION OF PARTICLE SIZE AND STRUCTURE



PERFORMANCE AS A FUNCTION OF PARTICLE SIZE



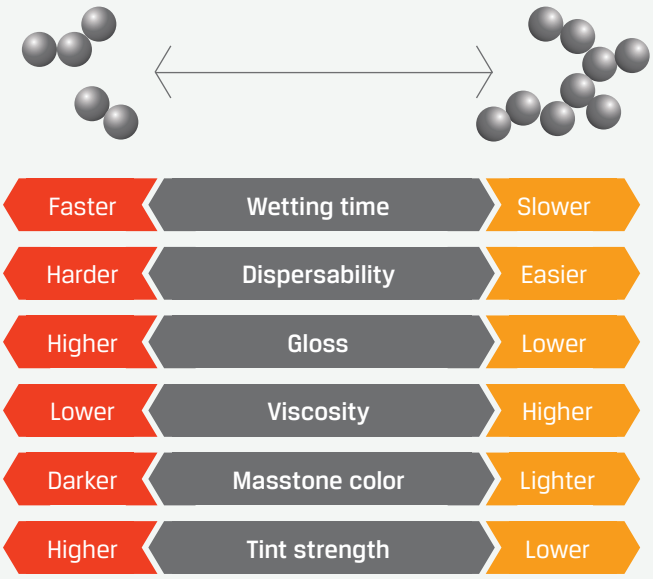
Primary particle size related to function

The particle size of pigment black determines to a large extent its degree of blackness or "jetness" in dispersed form.

The smaller the primary particle size, the greater the surface area per unit weight of pigment black in the dispersion. This increased surface area and increased number of aggregates per unit weight combine to increase the light absorption and scattering efficiency, improving jetness.

Pigment blacks with smaller primary particles are stronger (darker) in tinting strength with a less blue undertone than carbon blacks having larger primary particles. Higher surface area pigment blacks require more energy to disperse and also impart higher viscosity than lower surface area blacks.

PERFORMANCE AS A FUNCTION OF STRUCTURE



Structure related to function

Another key property of pigment black which influences ink performance is the structure of the primary aggregate. A number of attributes are dependent on the structure:

- Wetting time
- Dispersion properties
- Gloss
- Rheological properties
- Color tone
- Optical density
- Rub resistance

Surface chemistry

All pigment blacks have oxygen groups (e.g. carboxylic, quinonic, lactonic, or phenolic groups) chemisorbed on their surfaces to varying degrees, depending upon the conditions of manufacture.

Some pigment blacks have surfaces that have been chemically oxidized to increase the amount of oxygen groups. The oxygen groups will aid in the dispersion of the carbon black by acting as a chemically bound dispersant or wetting agent. Depending on the ink system, they can improve the flow properties of the ink. In free radical cure UV inks, chemically oxidized pigment blacks also tend to increase the cure rate of the applied ink.

Food contact requirements

Many of our pigment blacks are suitable for applications that come into contact with food. For more details regarding food contact compliance for specific grades in various countries, please refer to the relevant Food Contact Statement available through your Cabot representative.

Selecting a pigment black for your application

OFFSET INKS

This category may be separated into three sub-categories; web offset heatset, sheet-fed offset and web offset coldset. Web offset heatset inks are primarily used for printing on coated paper for magazines. Sheet-fed inks are used for printing both commercial and packaging applications, and web offset coldset is used for printing newspapers.

Web offset heatset / Sheet-fed offset

Low structure pigment blacks are primarily used to impart high gloss and good jetness in ink for web offset heatset and sheet-fed offset applications. We provide a number of pigment blacks suitable for these applications.

Pigment blacks for heatset and sheet-fed offset gloss inks	
Cabot carbon black	**Description**
MOGUL® L, BLACK PEARLS® L	Chemically oxidized blacks offering excellent jetness, flow, gloss, and strength with very good dispersion and stability.
REGAL® 400R, REGAL 400	Chemically oxidized blacks offering very good jetness, flow and gloss, superior dispersion and good stability.
ELFTEX® 410, ELFTEX 415	Provide superior dispersability, high jetness, and exceptional gloss.
REGAL 250R, ELFTEX 320	Provide low viscosity, with high loadings possible, offering good gloss and blue undertone.
REGAL 350R, REGAL 350A120	Provide low viscosity, the strongest blue undertone with good gloss and dispersion.

Web offset coldset

Lithographic newspaper ink "dries" by penetrating into the paper stock. Generally, intermediate to high structure blacks are preferred because these blacks do not penetrate into the paper as much as lower structure blacks, thus maximizing jetness and print mileage. In cases where rub-off resistance is critical, lower structure blacks can be used either in blends with or in place of the higher structure blacks.

Pigment blacks for lithographic newsink	
Cabot carbon black	**Description**
REGAL 99R, REGAL 99I	Offer very good color strength, rub resistance, and flow.
BLACK PEARLS 430, BLACK PEARLS 450, ELFTEX 430	Provide good rub resistance and flow.
BLACK PEARLS 460, ELFTEX 460	Provide good color strength and dispersability.
BLACK PEARLS 160, CSX™156	Provide good dispersion and blue undertone.

PUBLICATION APPLICATIONS

Publication flexographic applications (aqueous newsink)

Newspaper inks for printing by flexography cure by evaporation of the water solvent and cross linking of the resin system. The high structure pigment blacks tend to "stand up" on the porous newsprint, giving better coverage and higher optical density than the lower structure pigment blacks. In aqueous flexographic newsinks, rub resistance is not a concern so higher structure pigment blacks are commonly used.

Pigment blacks for aqueous flexographic newsink	
Cabot carbon black	**Description**
MONARCH® 490/480, BLACK PEARLS® 490/480/470	Offer excellent jetness and hiding power with easy dispersability.
MONARCH 430, ELFTEX 430, BLACK PEARLS 450A111	Offer good color strength, lower viscosity and good flow.

Publication gravure applications

We provide a number of products that offer the ink maker high jetness, gloss, and blue undertone that are desired in gravure inks.

Pigment blacks for publication gravure ink	
Cabot carbon black	**Description**
BLACK PEARLS 450A111	Provides low abrasion wear and high jetness.
REGAL® 330/330R	Provides low viscosity, with high loadings possible, offering good gloss and blue undertone.
REGAL 350R, REGAL 350A120	Offer low abrasion wear, low viscosity with high loadings possible, excellent flow, and good dispersion. Also provide strong blue undertone and good gloss.
MONARCH 280, BLACK PEARLS 280	Provide blue undertone, excellent dispersability, and hold out on absorbent stocks. Suitable for matte applications.

Selecting a pigment black for your application (continued)

PACKAGING APPLICATIONS (FLEXOGRAPHIC, GRAVURE)

For packaging applications, a wide range of pigment blacks are commonly used. Product selection depends on the type of substrate being printed and the desired gloss and jetness. Some of the pigment blacks more commonly used for packaging applications are listed in decreasing order of jetness in the table below.

Pigment blacks for liquid packaging inks

Cabot carbon black	Description
MONARCH® 800, BLACK PEARLS® 800	Provide excellent jetness for packaging applications. Frequently used for point of purchase applications.
MOGUL® L, BLACK PEARLS L	Provide excellent flow, gloss and strength in high quality inks. Frequently used for nitrocellulose and polyamide-based inks.
REGAL® 660R, REGAL 660	Provide very high jetness, good flow, and high gloss.
REGAL 400R, REGAL 400	Offer very good flow and gloss, superior dispersion and good stability. Often used for nitrocellulose based inks.
ELFTEX® 410, ELFTEX 415	Provide excellent dispersability, with high jetness and exceptional gloss. Often used in PVC copolymerizates.
REGAL 99R, REGAL 99I	Offer very good color strength, scuff resistance, and flow.
REGAL 350A120	Low viscosity products with good flow properties, providing good dispersion, strong blue undertone, and high gloss.
MONARCH 490/460/450/430, BLACK PEARLS, 490/460/450/430	Series of pigment blacks with varying structure at essentially equal primary particle size. Often used in water-based flexographic inks.

ENERGY CURE PRINTING INKS

In recent years, the use of ultra-violet radiation to polymerize ink films has gained in popularity. The mechanism of cure is generally a "free radical" process started by photo initiators in the presence of UV radiation. Pigment black absorbs UV light, with the level of absorption varying as a function of its particle size and surface area. We provide three product types designed for the different performance requirements of both paste and liquid energy curing inks. All three products provide low levels of UV absorption and good dispersability even in the poorly wetting binders typically used in UV printing inks.

Pigment blacks for energy cure printing inks

Cabot carbon black	Description
MOGUL® E, BLACK PEARLS® E	Provides excellent viscosity and flow for flexographic applications. Excellent gloss and strong blue undertone.
REGAL® 400R, REGAL 400	Offer very good flow and gloss, superior dispersion and good stability.
REGAL 250R	Provides low viscosity, with high loadings possible, offering good gloss and blue undertone.

Additional references

This Product Selection Guide provides specific information about our specialty carbon blacks for use in printing inks.
For other application-specific product information, please visit cabotcorp.com or contact your Cabot representative.

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