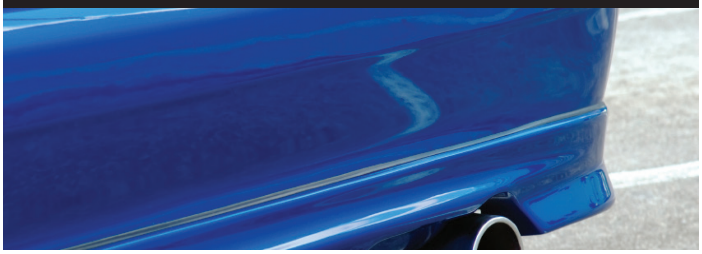
CABOT

SPECIALTY CARBON BLACKS

APPLICATION GUIDE

CONDUCTIVE CARBON BLACK
FOR USE IN ACRYLIC AND EPOXY COATINGS

PLASTIC PRIMERS



ANTI-STATIC FLOOR COATINGS

Application description

Electrically conductive coatings containing carbon black are essential in many applications, including primers for plastic parts and coatings for electrostatic dissipation control. Carbon black is the preferred conductive additive because it is readily available, cost-effective, and can be dispersed and stabilized in liquid systems.

The selection of an appropriate carbon black impacts the ultimate resistivity, processability, and sprayability of the coating. Our VULCAN® XC72R carbon black is specifically designed for use in conductive coatings. It delivers excellent conductivity in an easy-to-use fluffy form.

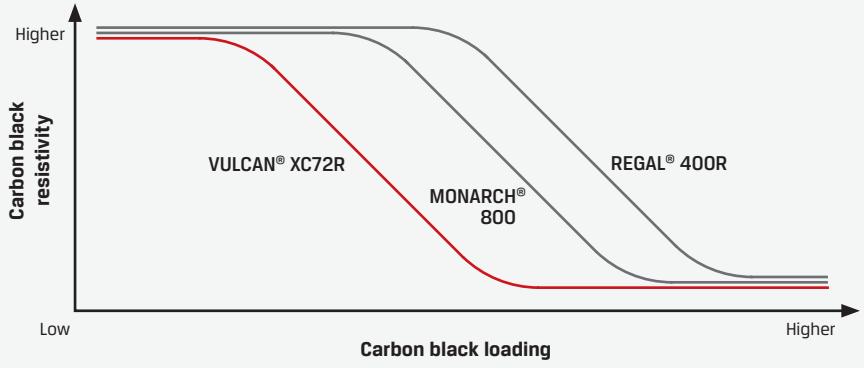
Conductive coatings can be formulated with a variety of common resins. Two of the most frequently used resin systems are acrylic and epoxy because of their favorable durability, mechanical properties, and weatherability.

CABOT PRODUCT OFFERING

Carbon black product	**Typical surface area** (N_2SA) m^2/gram	**Typical structure** (OAN/DBP) cc/100 grams	**Typical tint strength** ASTM D-3265	**Product characteristics**
VULCAN® XC72R	254	192	87	Powder-form conductive carbon black that is easy to disperse in coating formulations

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



Conductive carbon black provides low resistivity at low loading. Low carbon black loading minimizes changes in other physical properties of the coating, such as color and viscosity. Our VULCAN XC72R carbon black exhibits excellent performance in conductive coatings. Data for MONARCH 800 and REGAL® 400R carbon blacks are shown here for comparison purposes only.

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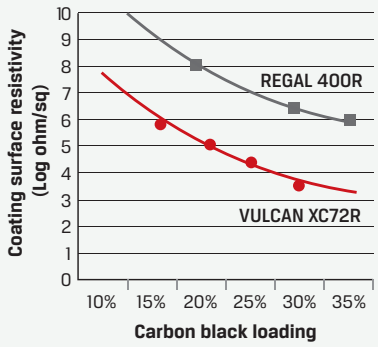
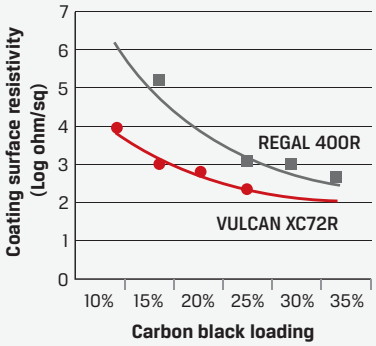
PRODUCT PERFORMANCE

Conductivity in acrylic coatings



In a typical acrylic conductive coating, **VULCAN® XC72R** carbon black delivers resistivity of 10^5 ohm/sq at loadings of 20% or less. Achieving comparable conductivity with **REGAL® 400R** carbon black requires loadings of 35% or higher.

Conductivity in epoxy coatings



In a typical epoxy conductive formulation, resistivity of 10^3 ohm/sq or less can be achieved with **VULCAN XC72R** carbon black at significantly lower loadings than those of **REGAL 400R** carbon black. The lower loading required for **VULCAN XC72R** carbon black facilitates easier processing.

The product performance results below were obtained using the model formulations that follow. Only the carbon black was changed.

MODEL FORMULATIONS

Conductive acrylic formulation

Millbase		
Product name	**Description**	**Amount (%)**
Viacryl® SC370	Resin	50.11
Methyl-n-amyl ketone	Solvent	27.29
N-butanol	Solvent	5.25
DisperBYK® 163	Dispersant	5.35
Carbon black	Pigment	12.00
Total		**100.00**

- Mix the Viacryl SC370 resin and DisperBYK 163 dispersant together
- Add in carbon black under good agitation
- Adjust viscosity of the paste in the range of 85-110 KU with methyl-n-amyl ketone and N-butanol blend
- Ball mill at 82 RPM for 24 hours using steel media
- Add in the rest of solvent to clean out the mill

Letdown masterbatch		
Product name	**Description**	**Amount (%)**
Viacryl SC370	Resin	60.56
Cymel® 325	Resin	11.9
BYK®-348	Wetting agent	1.14
2-ethoxyethyl-acetate	Solvent	10.35
N-butanol	Solvent	4.83
Methyl-n-amyl ketone	Solvent	11.22
Total		**100.00**

- Mix Viacryl SC370 resin, Cymel 325 melamine resin, BYK-348 wetting agent, 2-ethoxyethyl-acetate, methyl-n-amyl ketone, and N-butanol together under good agitation
- Mix for 10 minutes

Finish formulation		
Component	**Description**	**Amount (%)**
Millbase	Dispersion	40.5
Letdown masterbatch	Letdown solution	59.5
Total		**100.00**

- Premix millbase and letdown masterbatch together under good agitation
- Adjust relative percentages of millbase and letdown to give carbon black loading of 10-35% based on resin solids

Conductive epoxy formulation

Part A		
Product name	**Description**	**Amount (%)**
Epon 828	Resin	60.00
Xylene	Solvent	24.07
SR882M	Silicone resin	.58
Surfynol® 104DPM	Wetting agent	.35
Carbon black	Pigment	15.00
Total		**100.00**

- Mix the Epon 828 resin, SR882M silicone resin, and Surfynol 104DPM wetting agent together
- Add carbon black to the mixture under good agitation
- Adjust viscosity of the paste in the range of 85-110 KU with xylene
- Ball mill at 82 RPM for 24 hours using steel media
- Add in the rest of the xylene to clean out the mill

Part B		
Product name	**Description**	**Amount (%)**
Epikure® 3381	Curing agent	48.54
Epikure 3010	Curing agent	48.54
Methyl isobutyl ketone	Solvent	2.92
Total		**100.00**

- Mix Epikure 3381 curing agent, Epikure 3010 curing agent, and methyl isobutyl ketone together for 15 minutes under good agitation

Finish formulation	
Component	**Amount (%)**
Part A	25.29
Part B	74.71
Total	**100.00**

- Premix part A and part B together under good agitation
- Adjust to give carbon black loading of 10-35% based on resin solids

CABOT

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