CABOT

SPECIALTY CARBON BLACKS

APPLICATION GUIDE

CONDUCTIVE SPECIALTY CARBON BLACKS FOR USE IN PRIMER COATINGS

ELECTRONIC COATINGS

AUTOMOTIVE PRIMERS

Application description

Carbon blacks have electrically conductive properties that enable them to be used in numerous specialty applications such as cables, electrostatic coatings, batteries and electronic displays. In electrostatic coatings, conductive carbon blacks can be used in both water-based and solvent-based primers. On plastics, the conductive primer coating forms an electrostatic charge layer to improve the contact and adhesion of the electrocoat layer to the basecoat. Our VULCAN® conductive carbon black products are an excellent choice for use in electrostatic coatings because of their exceptional conductivity and processability.

CABOT PRODUCT OFFERINGS

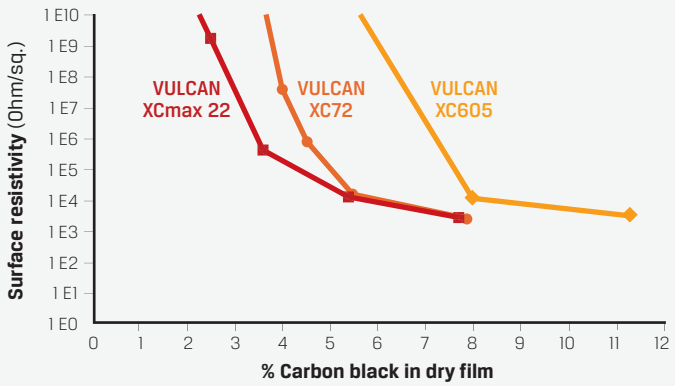
Specialty carbon blacks	Iodine number (mg/g)	OAN (cc/100 g)	Electrical conductivity	Processability
VULCAN XCmax™ 22	1360	325	High	Difficult
VULCAN XC72	253	174	Medium	Moderate
VULCAN XC605	74	148	Low	Easy

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.

CONDUCTIVITY PERFORMANCE OF CABOT CARBON BLACKS*

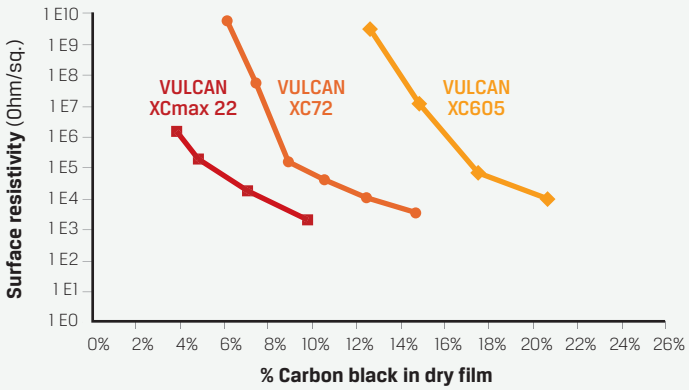
Water-based primer

Surface resistivity vs. %CB loading



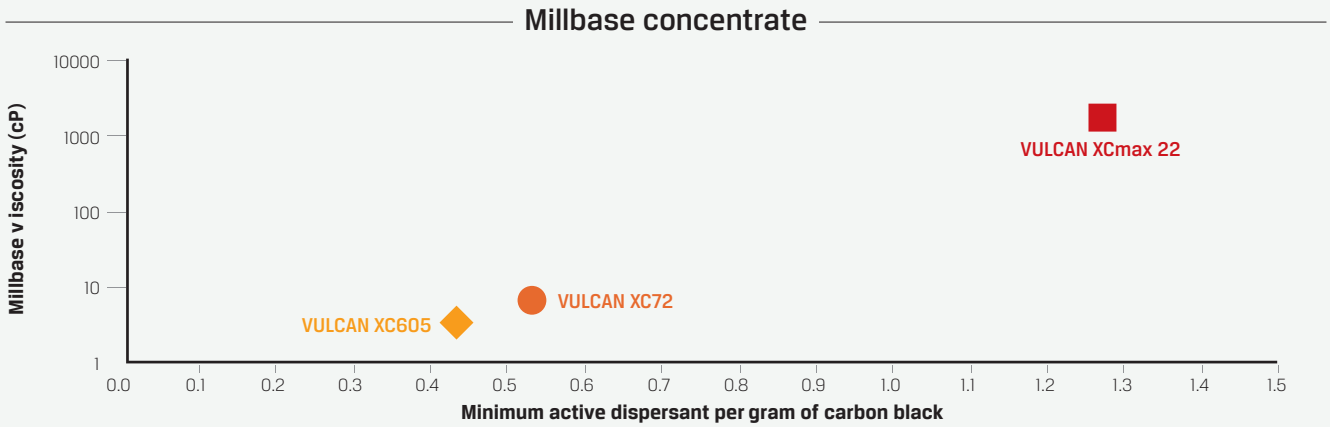
Solvent-based primer

Surface resistivity vs. %CB loading



*Surface resistivity measurement obtained using Jandel Cylindrical four point probe coupled with Keithley 2410-C source meter. Surface resistivity range of 10^3 – 10^{10} Ohm/sq.

PROCESSING PERFORMANCE OF CABOT CARBON BLACKS



MODEL FORMULATION: WATER-BASED ACRYLIC

Millbase

Product name	Description	Amount (%)
Water	Solvent	81.8
AMP95®	Multifunctional additive	2
Dehydran® 1293	Defoamer	3
Solsperse® 46000	Dispersant	7.2
Carbon black	Pigment	6
Total		**100.00**

- Using a Dispermat® mixer with a Cowles® blade, pre-mix water and AMP-95 additive.
- Add Dehydran 1293 defoamer and Solsperse 46000 dispersant under good agitation, followed by carbon black.
- Mix for 5 minutes at 4000 RPM, then transfer to a horizontal bead mill with 0.8-1.0 mm yttria-stabilized zirconia grinding beads (YTZ media) and grind for 5 minutes at 4000 RPM.

Tint base grind portion

Product name	Description	Amount (%)
Water	Solvent	17.2
Surfynol® 104 DPM	Wetting agent	0.8
Dehydran 1293	Defoamer	0.8
Petrolite™ D1038	Dispersant	22.7
Titanium dioxide	Filler	8.3
Huberbrite® 1	Filler	44.7
Calcium carbonate	Filler	5.5
Total		**100.00**

- Using a Dispermat® mixer with a Cowles® blade, pre-mix water, Surfynol 104 DPM wetting agent, Dehydran 1293 defoamer, Petrolite D1038 dispersant together.
- Add the solids under good agitation.
- Mix at 5000 RPM for 30 minutes using high speed Dispermat mixer.

Letdown portion

Product name	Description	Amount (%)
NeoCryl® XK90	Acrylic latex	81.2
Water	Solvent	9.6
Dehydran 1293	Defoamer	0.4
Surfynol 104 DPM	Wetting agent	0.4
BYK® -346	Leveling agent	0.2
Dipropylene glycol methyl ether	Co-solvent	2.7
Propylene glycol normal butyl ether	Co-solvent	2.8
Dipropylene glycol normal butyl ether	Co-solvent	2.7
Total		**100.00**

- Pre-mix water, Dehydran 1293 defoamer, Surfynol 104 DPM wetting agent, BYK-346 leveling agent, and the other co-solvents and add to the NeoCryl XK90 acrylic latex under good agitation.
- Mix for 15 minutes.

Tint base finish formulation

Material	Description	Amount (%)
Grind portion	Dispersion	33.7
Letdown portion	Letdown solution	66.3
Total		**100.00**

- Using a Dispermat mixer with a Cowles blade, establish good agitation in the letdown portion.
- Add the grind portion slowly, mix for 15 minutes, and discharge.
- Prepare the conductive carbon black primer formulations at different carbon black loadings using proportional amounts of the millbase and the tintbase finish under good agitation, and then proceed to the application stage.

MODEL FORMULATION: SOLVENT-BASED ACRYLIC

Millbase

Product name	Description	Amount (%)
Xylene	Solvent	71.6
Efka® 4310	Dispersant	20.4
Carbon black	Carbon black	8.0
Total		**100.00**

- Combine all materials in a can containing 100 grams of millbase and 100 grams of milling media.
- Mill for two hours using a paint shaker such as a Lau disperser.

Tint base grind portion

Product name	Description	Amount (%)
Setalux® 1385 BX51	Acrylic resin	9.8
Propylene glycol methyl ether acetate	Solvent	9
Disperbyk 161	Dispersant	3
Xylene	Solvent	6
Titanium dioxide	Filler	60.2
Huberbrite® 1	Filler	12
Total		**100.00**

- Mix Setalux 1385 BX51 resin and Disperbyk 161 dispersant into mixture of PGMEA and xylene under good agitation.
- Add in TiO_2, Huberbrite 1 filler and mix at 5000 RPM for 30 minutes.

Letdown portion

Product name	Description	Amount (%)
Setalux 1385 BX51	Acrylic latex	77.6
Butyl acetate	Solvent	4.4
Xylene	Solvent	2.2
Cymel® 325	Crosslinker	15.8
Total		**100.00**

- Mix the Setalux 1385 BX51 acrylic latex, solvents, and Cymel 325 crosslinker for 15 minutes.

Tint base finish formulation

Material	Description	Amount (%)
Grind portion	Dispersion	42
Letdown portion	Letdown solution	58
Total		**100.00**

- Prepare the tint base finish formulation by post-adding the grind portion into the letdown portion under good agitation.
- Mix for 15 minutes and then discharge.
- Prepare the conductive carbon black primer formulations at different carbon black loadings using proportional amounts of the millbase and the tintbase finish under good agitation, and then proceed to the application stage.

APPLICATIONS

- Prepare conductive carbon black primer formulations at different carbon black loadings accordingly with proportional amounts of millbase and tintbase. The formulations are mixed for 10 minutes.
- Apply coating to achieve a 1 mil dry film thickness in a well-ventilated area.
- Typical drying conditions are one hour at 150 °F.
- Test for surface resistivity of coated test panels.

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