PROTAVIC® VCO 60130

Formerly PROTAVIC® C 3513 S

A 28997-08-05 B

DEFINITION

The **PROTAVIC® VCO 60130** is a pure silver-filled electro-conductive ink which is supplied as a single component and is specially adapted for silk screen printing.

Its characteristic features are : fineness, good electrical conductivity and good adhesion on all substrates, especially on polyester sheets.

It is therefore suitable for producing flexible circuits and keyboards.

PRODUCT DESCRIPTION

Nature	pure silver-based, single component, electro-conductive paint	
Appearance	free flowing opaque liquid	
Odour	fruity	
Colour	silver	
Guaranteed specifications	**Standards**	**Methods**
Resistivity after curing for 30 min. at 20°C + 30 min. at 120°C (mΩ.cm)	< 0.2	ECA 1
Plane cone viscosity at 25°C (mPa.s)	6 000 ± 2 000	NFT 51211
Other information		
Diluent, if any	only use **PROTAVIC® 913** diluent	
Flammability	contains flammable solvents	
Flash point	93°C	
Storage	1 year at T < +25°C 2 years at T < -20°C	
Density at 20°C according to NFT 51201	2 approx.	
Drying / Curing	5-15 min. at 80°C 3-10 min. at 110°C 1-3 min. at 125°C	

APPLICATION PROPERTIES

Once cross-linked, the **PROTAVIC® VCO 60130** provides excellent protection against the environment, because of its modified vinyl base.

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After its solvent phase has evaporated, it leaves semi-rigid films which possess :

- excellent adhesion not only to polyester type thermo-plastic films but also to metals, ceramics and thermosetting materials,

- a very high electrical conductivity,

- excellent resistance to heat,

- good resistance to flexing,

- good abrasion resistance.

METHOD OF USE

A - Application process

Before the **PROTAVIC® VCO 60130** is used, it must be made absolutely homogeneous by stirring it in its original container (using a spatula for small amounts or by rolling the flask for several hours at low speed - between 15 and 60 rpm.

With the **PROTAVIC® VCO 60130** there is no need for an undercoat since it adheres through the evaporation of the solvent system. Surfaces on which it is to be applied should be dry and free from oil, grease or dust.

The **PROTAVIC® VCO 60130** is applied as delivered, after having been homogenized as described previously.

Its original viscosity makes it well suited to screen printing with a mesh size of between 70 and 270 mesh (to the inch).

Use polyester screens with a mesh of between 140 and 200 or stainless steel screens with a mesh of between 170 and 230.

Under these conditions, and with emulsion thickness of 10 to 30 microns, layers of the **PROTAVIC® VCO 60130** are in the region of 5 to 15 microns.

The thickness of the layer can be gradually reduced by adding between 0.5 and 2.0 % of diluent (only use **PROTAVIC® 913** diluent).

The **PROTAVIC® 913** diluent is also recommended for compensating for evaporation on the screen.

It can also be used for removing any the **PROTAVIC® VCO 60130** incorrectly deposited before it has dried and also for cleaning the application equipment.

B - Drying

It is possible to dry the product at ambient temperature, but tens of hours may be needed, depending on the properties which the user is seeking to achieve.

The **PROTAVIC® VCO 60130** can be dried in a ventilated oven (set at around 65°C). It requires between a few minutes and a quarter of an hour for the solvent to evaporate, depending on the thickness deposited. Infra red drying is also possible.

C - Curing conditions

The **PROTAVIC® VCO 60130** can be cured at 110°C for 3 to 10 minutes in a well ventilated oven.

Very good adhesion and conductivity results are achieved with a curing cycle of 3 minutes at 125°C.

Temperatures in the region of 125°C produce very good results with curing times of less than 15 minutes.

Curing temperatures over 125°C do not bring any benefits and must be avoided.

TYPICAL PROPERTIES OF CURED PROTAVIC® VCO 60130

A - Electrical properties

Curing conditions	Volume resistivity (*) in mohms/cm	Resistance in ohms per 25 micron square
10 min. at 110°C	0.05	0.015
3 min. at 120°C	0.05	0.015

(*) ECA 1 method (method available on request)

B - Thermostability in air

A thermogravimetric analysis of the **PROTAVIC® VCO 60130** dried for 30 min. at 20°C, then 15 min. at 105°C shows a decomposition in air temperature of approximately 350°C.

C - Resistance to flexing

The **PROTAVIC® VCO 60130** was applied using a DEK 245 screen printing machine on 125 micron thick MYLAR A. After drying for 30 min. at 20°C

then treating for 30 min. at 120°C, the electrical resistance before and after sustained bending of the MYLAR A film at 180°C was measured. The drop in resistance measured was less than 20 %.

D - Coverage

80 ± 20 g/m² with 200 mesh.
Corresponding thickness : 10 microns.

APPLICATIONS

The good mechanical and electrical properties of the **PROTAVIC® VCO 60130** make it especially suitable for producing conductive tracks on flexible or rigid circuits by screen printing.

Its main applications in the professional electronics industry and among the general public are :

- producing flexible keyboards,
- flexible circuits,
- electro-conductive coatings for electro-magnetic screening.

However, the **PROTAVIC® VCO 60130** can not be used with the **PROTAVIC® ACE** series. It is then recommended to use the **PROTAVIC® VCO 60100** or the **PROTAVIC® VCO 60110**.

STORAGE LIFE AND STORAGE CONDITIONS

The **PROTAVIC® VCO 60130** can be stored in its original sealed container for 1 year below 25°C.

It does not give rise to very hard sediments but it must however be rehomogenized for about 1 hour using a slow mixer at 15-60 rpm.

Only **PROTAVIC® 913** diluent should be used to compensate for any evaporation of solvent.

PRECAUTIONS IN USE

Refer to the attached safety data sheet.

PACKAGING

The **PROTAVIC® VCO 60130** is supplied in 25 g and 100 g pots, or in 500 g and 1 000 g boxes.