

DEFINITION

The **PROTAVIC® VCO 60100** is a single-component, pure silver, electro-conductive ink suitable for screen printing. The polyester binder enables it to have very good mechanical properties : adhesion, abrasion resistance, bending strength.

The **PROTAVIC® VCO 60100** ink is characterized by its fineness, good electrical conductivity and good adhesion on all substrates, especially polyester sheets.

It is therefore well suited to the production of flexible circuits and keyboards.

PRODUCT DESCRIPTION

Nature	single-component, pure silver, varnish	
Nature of binder	polyester	
Appearance	viscous liquid	
Odour	solvent	
Colour	silver	
Guaranteed specifications	Standards	Methods
Volume resistivity (in mΩ.cm)	< 0.100	ECA 1
Plane cone viscosity at 25°C (mPa.s)	2 500 ± 1 000	NFT 51211
Other information		
Density	2.1 approx.	
Storage time	1 year at T < 25°C 2 years at T < -25°C	
Flash point (in a closed cup)	83°C	
Diluent and cleaning solvent	PROTASOLVE® 913	
Curing cycles	5 to 15 min. at 80°C 3 to 5 min. at 100°C 1 to 3 min. at 125°C 30 to 120 sec. at 150°C	

APPLICATION PROPERTIES

The **PROTAVIC® VCO 60100** has been developed for application by screen printing in order to give very fine coats 8 to 12 microns thick.

Its solvent system and latency make it possible to work without the screen drying out or blocking.

Under these conditions, it shows :

- high electrical conductivity,
- good adherence not only on thermoplastic films - polyethylene terephthalate for example - but also on ceramics and thermosetting compounds,
- good heat resistance,
- good abrasion resistance,
- good bending strength.

The **PROTAVIC® VCO 60100** is perfectly compatible with the graphite resin **PROTAVIC® VCO 60502** (formerly **PROTAVIC® C 1502 S**). Good conductivity is achieved with a level of about 40 % **PROTAVIC® VCO 60100** and about 60 % **PROTAVIC® VCO 60502**.

METHOD OF USE

a - Application process

After a prolonged period of storage, the product must be homogenised by moderate stirring for 3 to 5 minutes. Care should be taken not to introduce air bubbles. It is also possible to rehomogenize by rolling the container for 4 to 8 hours depending on the scale of settling.

The viscosity may be adjusted using **PROTASOLVE® 913** according to the parameters of screen printing or other possible processes :

- manual with a spatula,
- with a paintbrush,
- with a roller,
- with a pad.

PHYSICAL PROPERTIES

The following properties were measured when applying the product by screen printing using a 200 mesh polyester screen.

This coat was cured for 8 min. at 125°C in a ventilated oven. A thickness of 10 to 12 microns was obtained.

Pencil hardness	SNV 37113	2H - 3H
Resistance (for an average thickness of 10 µm)	ohm per square	< 0.3
Covering power	g/cm ²	40
Cross hatch test	on PET	good

Good results can be obtained in screen printing with stainless steel or polyester 200 or 325 mesh screens (strands per inch). Under these conditions, thicknesses are in the region of 8 to 12 microns with lower values with polyester screens.

In order to achieve greater thicknesses, 80 mesh screens can be used, whilst screens as fine as 380-400 mesh enable thinner films to be deposited.

b - Drying and curing

The **PROTAVIC® VCO 60100** needs to undergo a period of drying to allow the solvent to evaporate and also needs to harden under heat in order to achieve optimum properties. For 8-12 microns thick coats, the following conditions are recommended :

- . 5 to 15 min. at 80°C
- . 3 to 5 min. at 100°C
- . 1 to 3 min. at 125°C
- . 30 to 120 sec. at 150°C

These times are given for guidance, since they depend - amongst other things - on the effectiveness of the ventilation, any preheating of the ventilation and the nature of the heating : hot air, infrared, ventilated oven or hot plate.

As a general rule, the above times may be shortened in the case of hot air heating with a strong air flow.

On the other hand, the above times must be lengthened in cases where an oven is used, especially if the substrates have a substantial calorific capacity ; it will then take 15 min. at 125°C in order to achieve a good result.

Bending strength :

The **PROTAVIC® VCO 60100** was applied in accordance with the procedure used in method ECA 1. The bend was made between two plates of glass under a weight of one kilogramme, halfway between the volume resistivity measuring points. The electrical resistance was measured before and after bending : the increase was less than 15%.

FIELD OF USE

The good properties of **PROTAVIC® VCO 60100** ink enable it to be used in the following applications :

- flexible circuits and keyboards,
- electroconductive coatings for electromagnetic shielding.

PRECAUTIONS TO USE

Refer to the enclosed safety data sheet.

PACKAGING

The **PROTAVIC® VCO 6100** is supplied in 25 g, 100 g, 500 g and 1 000 g flasks.