



# PROTAVIC® ACE 10021

Formerly PROTAVIC® CM 3270-2 FC

A 28603-08-06 B

## DEFINITION

A pure silver filled, fast curing, single-component electro-conductive adhesive.

Its great reactivity allows on-line or low temperature curing.

It has been specially developed for the conductive glueing of components onto a lead frame or onto a flexible circuit.

Its rheology and its pot life of 1 day at 20°C enable it to be applied by micro-dispenser or by silk screen printing.

## PRODUCT DESCRIPTION

Nature	pure silver-filled, solvent-free single-component epoxy adhesive	
Appearance	viscous opaque liquid	
Odour	faint	
Colour	silver	
<b>Guaranteed specifications</b>	<b>Standards</b>	<b>Methods</b>
% Ash residue at 900°C	70 ± 2	TGA 1
Plane cone viscosity at 25°C (mPa.s)	600 to 1 500	NFT 51211
Exothermic peak at 20°C/mn (°C)	140 - 160	DSC 1
Resistivity after 5 min. at 200°C (mohms.cm)	< 0.3	ECA 1
<b>Other information</b>		
Pot life 20°C	24 h	
Shelf life	2 weeks at T < -5°C 1 months at T < -10°C 2 months at T < -15°C 3 months at T < -20°C 6 months at T < -40°C	
Possible curing cycles	1 to 3 hours at 60°C 30 to 90 minutes at 80°C 3 to 10 minutes at 125°C 2 to 3 minutes at 150°C 1 to 2 minutes at 175°C 20 to 30 seconds at 200°C	
Density	3.0 approx.	

## APPLICATION PROPERTIES

**PROTAVIC® ACE 10021** electro-conductive adhesive has been designed for application by micro-dispenser and by silk screen printing.

It confers the advantages of a single-component epoxy, saving both time and avoiding waste of product.

Its original formulation provides two outstanding features, namely : constant viscosity at ambient temperature and a greater reactivity than conventional single and 2-component epoxies.

It combines the excellent adhesive properties of epoxy resins with the good electrical conductivity of pure silver.

It possesses good thermal stability due to a decomposition temperature of around 400°C, good adhesion to metals, plastics and ceramics and high ionic purity.

Its high reactivity and good electrical conductivity enable it to be used on flexible circuits which do not tolerate high curing temperatures and in high productivity processes requiring rapid curing.

## METHOD OF USE

Before opening the package, condition at ambient temperature for 15 to 30 minutes in order to avoid any condensation.

### 1 - Homogenisation

This operation can be avoided if there has been no break in the cold storage system whilst the product has been transported and stored.

If the product has been allowed to remain at 20°C for over 8 hours, it is advisable to stir slowly for approximately 1 hour in order to achieve the best results. In applications where inclusions of air cause defects, we recommend that a short treatment under a vacuum of 0.1 to 1.0 mm of mercury should be carried out for approximately 15 minutes.

### 2 - Applying the product

Surfaces in contact with the adhesive must be clean and free from grease. If necessary, degrease with chlorine-free solvent, finishing -if possible- with degreasing in solvent fumes, in order to achieve optimum adhesion.

#### Apply the adhesive with :

- a micro-dispenser

**PROTAVIC® ACE 10021** is suitable for use with needles with an internal diameter of approximately 0.3-1.0 mm.

- a silk screen printing machine

**PROTAVIC® ACE 1021** is suitable for use with stainless steel screens with a mesh of between 70 and 350.

The usual screens are in the region of 120 mesh.

### 3 - Curing

Cure as quickly as possible after application in order to achieve good electrical conductivity.

In the case of sticking chips onto a lead frame, the same result is achieved in less than 30 seconds at 200°C.

Depending on the constraints imposed on the components, post-curing for between 1 and 6 hours at 150°C optimizes the mechanical strength, electrical conductivity and moisture absorption.

## TYPICAL PROPERTIES OF THE CURED SYSTEM

The properties set out below were obtained after curing for 3 min. at 150°C in a ventilated oven.

They were determined following measurements carried out in the laboratory in a small number of tests.

They are values given by way of guidance, and do not constitute a guarantee. It will be for the user, in all cases, to carry out his/her own tests to determine the optimum curing conditions for **PROTAVIC® ACE 10021** with regard to his/her own particular application.

It possesses the good mechanical properties as well as the thermal stability of epoxy resins and the low thermal degassing associated with solvent-free epoxies. After 3 min. at 150°C, its degassing is in accordance with standard MIL 883.

Lastly, it is not toxic and, because it is solvent-free, it does not pose industrial health problems, provided the usual precautions for using epoxy resins are taken.

### **STORAGE STABILITY**

At around 20°C, the viscosity of **PROTAVIC® ACE 10021** doubles in one day. Users are advised to only thaw sufficient product for one days work ; under these conditions in fact, the viscosity remains virtually constant. Any **PROTAVIC® ACE 10021** which remains unused can be put back into the freezer at

the end of the day and re-used the next day after being thawed without appreciable change in the viscosity.

The storage stability in a freezer at -25°C, -20°C, is 3 months.

**PROTAVIC® ACE 10021** can be kept for up to 6 months in a freezer at -40°C.

### **PRECAUTION OF USE**

Refer to enclosed safety data sheet.

### **PACKAGING**

The **PROTAVIC® ACE 10021** is supplied in 15 g and 30 g syringes or in 500 g and 100 g boxes.

*The information contained in this data sheet corresponds to the present state of our knowledge ; it is intended for your guidance but we are not bound by it since we are not in a position to exercise control over the manner in which our products are used. Moreover, the attention of the user is drawn to the risks that could possibly occur should a product be used for an application other than that for which it is intended.*

## PHYSICO-CHEMICAL PROPERTIES

PROPERTIES	METHODS	UNITS	TYPICAL VALUES
Chlorine content	S 86005	mg/kg	< 1
Hydrolysable chlorine	MIL 883 - 5011	mg/kg	100
Sodium content	MIL 883 - 5011	mg/kg	< 50
Potassium content	MIL 883 - 5011	mg/kg	< 50
Shear strength on Al <sub>2</sub> O <sub>3</sub>	MIL 883 - 5011	MPa	> 20

## THERMAL PROPERTIES

PROPERTIES	METHODS	UNITS	TYPICAL VALUES
Coefficient of expansion : . from -50 to +80°C . from 100 to 250°C	TMA 1*	°C <sup>-1</sup>	40-50 x 10 <sup>-6</sup> 110-120 x 10 <sup>-6</sup>
Glass transition temperature	TMA 1*	°C	90 - 100
Thermal conductivity	CTH 2	W/(m.K)	> 2.5
Decomposition temperature in air	TGA 1**	°C	400
Loss of weight after post-curing for 2 h at 160°C between 25°C and : . 100°C . 200°C . 300°C	TGA 1**	% % %	0.07 0.30 0.93

\* Thermomechanical analysis TMA Mettler -20°C/min., force 0.1 N over 1 mm<sup>2</sup>.

\*\* Thermogravimetric analysis TG 50 Mettler -10°C/min., in 200 ml/min. stream of air.

## FIELDS OF APPLICATION

Silver-filled **PROTAVIC® ACE 10021** single-component adhesive is especially suitable for applications which call for the good adhesive properties of epoxy resins and very rapid curing :

- microchip cards - sticking chips onto the card's flexible circuit.
- LEDs - sticking LEDs onto flexible membranes.
- transistors, diodes, integrated circuits - sticking onto a lead frame with rapid on-line curing.

- surface-mounted components - sticking components onto the circuit - silk screen printing of the conductive circuits on flexible or rigid circuits.

- quartz for oscillators - sticking the quartz crystals onto the electrodes.

- repairing printed circuits.

**PROTAVIC® ACE 10021** adhesive is also outstanding in terms of its thermal and electrical conductivity and its high ionic purity which eliminate problems of corrosion and contribute towards the reliability of the components in which it is used.