

DEFINITION

A solvent-free, single component resin with low linear expansion and high ionic purity for protecting semiconductor silicon crystals.

PRODUCT DESCRIPTION

| | | |
|---|---|---------------------------------|
| Appearance | liquid | |
| Odour | light | |
| Colour | black | |
| Guaranteed specifications | Standards | Methods |
| % Ash residue | 75 ± 2 | PROTEX TGA 1 |
| Brookfield viscosity (mPa.s) | 70 000 ± 30 000 | NFT 51210 Mob. 7 - 20 t/min. |
| Peak temperature (°C) | 160 ± 10 | PROTEX DSC 1 |
| Significant value (for guidance) | | |
| Density | 1.7 approx. | |
| Other information | | |
| Pot life at 20 ± 2°C | 5-6 days | |
| Possible curing | 30-40 min. at 125°C 5-10 min. at 150°C 1-2 min. at 175°C Post-curing for 1 h at 150°C is recommended in all cases. | |
| Storage stability | 3 months below -20°C | |

APPLICATION PROPERTIES

The consistency of **PROTAVIC® PNE 30270** coating resin has been designed for application by micro-dispenser.

The rheology allows good wetting of surfaces in contact with the resin and also good adhesion. It is possible to fill cavities less than 1 millimetre in size.

Adjusting the automatic dispensers is made easier by the fact that the viscosity of the product remains stable for one week at 18-22°C.

One must take care however not to leave the product, after dispense, in contact with moist air for longer than 1 to 2h. Although not strongly hygroscopic, **PROTAVIC® PNE 30270** resin shows a slight drop in glass transition in the presence of moisture. It is therefore preferable to cure as quickly as possible after applying the product.

We recommend removing **PROTAVIC® PNE 30270** resin from the freezer 15 to 30 minutes before it is due to be used in order for it to reach a temperature of between 18 and 22°C.

METHOD OF USE

PROTAVIC® PNE 30270 resin is supplied frozen and ready for use. It can be supplied in syringes designed to fit on the microdispenser, which has the advantage of avoiding handling operations which encourage the entrainment of air bubbles.

When the product is supplied in pots, the resin should preferably be degassed for 15 minutes under a vacuum of less than 1mm of mercury. In the absence of stirring, during the vacuum treatment, provide a container which is at least 6 times higher than the initial height of resin.

Optimum application is provided by means of a pneumatic dispenser and needles with an internal

diameter of between 0.5 and 1.5 mm. The product can be cured at temperatures from 125°C for a period of at least 30 minutes, but post-curing for 1-2 h at 150-175°C is recommended in order to achieve optimum protection of a silicon crystal.

TYPICAL PROPERTIES OF THE CURED SYSTEM

The properties set out below were obtained after curing for 1h at 175°C.

They were determined following measurements carried out in the laboratory over 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 whether **PROTAVIC® PNE 30270** resin can be used for the particular application which he/she has in mind.

1/ PHYSICO-CHEMICAL PROPERTIES

| PROPERTIES | METHODS | UNITS | TYPICAL VALUES |
|----------------------------|----------------|----------------------------|--------------------------------------|
| Density at 20°C | NFT 51201 | g/cm ³ | 1.7 |
| Shear strength at 20°C | NFT 76107 | MPa daN/cm ² | > 5.0 > 50 |
| Flexing resistance at 20°C | NFT 51001 | MPa daN/cm ² | 110 - 120 1 100 - 1 200 |
| Flexing modulus at 20°C | NFT 51001 | MPa daN/cm ² | 12 000 - 13 000 120 000 - 130 000 |
| Shore D hardness | NFT 51109 | -- | 80 - 90 |
| Chlorine content | MIL-STD-883 | µ/g | < 10 |
| Sodium content | MIL-STD-883 | µ/g | < 20 |

2/ ELECTRICAL PROPERTIES

| PROPERTIES | METHODS | UNITS | TYPICAL VALUES |
|--|----------------|--------------|-----------------------|
| Dielectric rigidity | NFC 26255 | kV/mm | > 15 |
| Dielectric constant at 100 HZ and 20°C | NFC 26230 | -- | 5.0 ± 0.5 |
| Electrical dissipation factor at 100 HZ and 20°C | NFC 26230 | -- | < 0.01 |
| Transverse resistivity | NFC 26215 | Ω.cm | > 10 ⁺¹³ |

3/ THERMAL PROPERTIES

| PROPERTIES | METHODS | UNITS | TYPICAL VALUES |
|--|--------------|------------------|----------------|
| Glass transition temperature Tg | PROTEXDSC 1* | °C | 145 - 155 |
| Coefficient of linear expansion from -50 to 100°C | PROTEXTMA 1* | 10 ⁻⁶ | 18 - 20 ppm/°C |
| Coefficient of linear expansion from +200 to 280°C | PROTEXTMA 1* | 10 ⁻⁶ | 65 - 75 ppm/°C |
| Thermal conductivity | PROTEXCTH2 | W/(m.K) | > 0.70 |
| Decomposition temperature | PROTEXTGA 1* | °C | > 350 |
| Linear shrinking | NFT51401 | % | < 0.15 |

* Thermo-analysis chain Mettler TA 3000.

FIELD OF USE

PROTAVIC® PNE 30270 single-component, high purity insulating resin has been developed for protecting semi-conductors in the field of MCM, chip carriers, hybrid circuits and chip on board applications.

It is generally recommended for large-sized semi-conductors.

The high ionic purity guarantees good reliability of the semi-conductor. The same is true of the adhesion on different substrates which offers optimum protection against external agents (moisture, dust, etc).

PRECAUTIONS IN USE

Refer to the attached safety data sheet.

PACKAGING

The **PROTAVIC® PNE 30270** resin is supplied in pots and syringes other packaging on demand.

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Protavic International specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Protavic International's products. Protavic International specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Protavic International patents that may cover such processes or compositions. We recommend that each prospective user tests his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more European or foreign patents or patent applications.