

APIEZON Wax W, W40 Vacuum Sealing and Mounting Waxes

- Jointing media
- "Gettering" qualities
- Etch fluid resistant
- Mounting media
- Low to medium vacuum range



Introduction

Apiezon waxes are versatile products offering a multitude of uses. The key features of Apiezon waxes are shown in the table opposite.

Vacuum sealing

An Apiezon wax being a solid at ambient temperatures is ideal for use where a rigid permanent or semi-permanent sealed joint is required. Apiezon waxes are equally effective at maintaining seals in vacuum systems down to 10^{-9} torr at 20°C (dependent on the wax) and in systems at small positive pressures. They are excellent waterproof mediums providing a total seal against liquid water and offer superior sealing against water vapour and atmospheric moisture.

The excellent vapour pressure characteristics, as shown in the graph opposite, are extremely important for a variety of applications, including thin film deposition as volatiles will not jeopardise the vacuum within the system or contaminate thin film deposits.

Really clean

Like the greases, Apiezon waxes have powerful "gettering" qualities. This "gettering" power coupled with high purity and very "clean" meltdown properties of the waxes has led to their extensive use in the electronics industry, where scrupulous cleanliness of metal surfaces is required.

Etching

Apiezon waxes are used in the manufacture of silicon transistors and integrated circuits. They are chemically inert, being resistant to etching fluids such as hydrofluoric acid, nitric acid and acetic acid, but are easily removed with hydrocarbon or chlorinated solvents. Many impurities which may have remained on the surface if a solvent were used in isolation are also removed with the wax.

Apiezon waxes are extensively used as protective coatings for printed circuits, ensuring complete protection for the copper circuit from acid etching processes and air oxidation, while enabling direct soldering through the wax.

Mounting media

Apiezon waxes are excellent mounting media and are used extensively as both temporary and permanent adhesives for the mounting of silicon chips.

To use as a mounting medium, either melt the wax and apply neat to the surface, or dissolve in a hydrocarbon or chlorinated solvent prior to use. Evaporation of the solvent will leave a thin layer of wax with excellent adhesive properties. To ensure an adhesive layer of consistent thickness across its surface rapidly rotate the chip and a superior mounting surface will be created.

How to use

Apply pre-melted wax to the required area using a glass rod, spatula or other such implement, taking care not to exceed a temperature of 60°C above the softening point of the wax shown in the table above.

To remove the wax after use heat to soften and scrape away. Any deposits can then be washed with an organic solvent or removed using a vapour degreasing bath.

First choice

Apiezon Wax W is the first choice wax for most situations, offering efficient joint sealing over the widest temperature range, the most resistance to attack by acids and alkalis, the lowest vapour pressures, the most resistance to water and, for such a versatile wax, surprisingly the lowest cost when presented in the 1kg block.

Wax W is also available in 20g sticks offering faster application. A single stick being simply heated at the site of application with a small blow torch or Bunsen burner.

Greater choice

The Apiezon range offers the choice of three waxes with differing properties depending on the specific requirements of the job in hand. In addition to Wax W there is another formulation available. Wax W40 is the softest of all the Apiezon waxes. With a melting point of 45°C, it can be prepared for use in hot water for application to heat sensitive joints.

Typical Properties		
Physical property	Wax W	W40
Approximate softening point, °C	80 to 90	40 to 50
Est. vapour pressure @ 20°C, Torr	4.5×10^{-9}	6×10^{-8}
Temp for application, °C	130	90
Working temperature range, °C	-10 to 75	-10 to 35
Water permeability g/cm/hr/mm Hg @ 25°C	1.4×10^{-8}	1.6×10^{-8}
Pack	1kg block 25 x 20g sticks	250g tin
Thermal/Electrical property		
Thermal conductivity @ 20°C, w/m°C	0.189	0.177
Specific heat @ 25°C, J/g	1.8	2.9
Loss tangent	0.015	0.015
Permittivity	2.8	2.9
Volume resistivity, Ω cm	6.31×10^{15}	5.06×10^{15}

Vapour pressure over working temperature range

Vapour Pressure, Torr

