ADHESIVES FOR PCB'S

ADVANCED TECHNOLOGY FOR RESEARCH & INDUSTRY

KNOWLEDGE BASE FACT SHEET

- SCOPE: We take a look at some of the ways adhesives are used in PCB assembly

Component fixing pre-reflow. It is often necessary to tack small SMDs, such as resistors and capacitors, into place to prevent their movement during reflow, as even a minute drift away from the solder paste pads will compromise quality. The best type of adhesive to use here is a heat-cured, one-part epoxy. These offer high thermal resistance, as they need to withstand three reflow passes (the industry norm) at circa 220^{o}C.

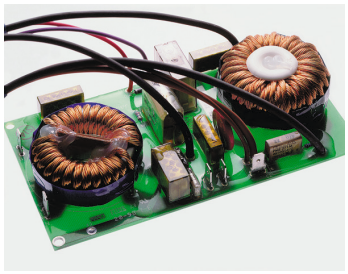
Placement of the adhesive is typically by automated dispenser before the board goes into the pick-and-place machine. A consideration here though is the time between the two activities. If it is likely to be a long time, you may need to assess the epoxy's sensitivity to moisture.

Regarding storage, the latest one-part epoxies to join the market require a temperature of less than 10^{o}C and some can be as low as -40^{o}C. Curing temperatures vary from 60 to 150^{o}C and curing time will typically be less than an hour.

Socket securing and pin coating/sealing. This is done mainly to prevent moisture ingress and to reduce the risk of dendritic growth. There are two options available for securing/bonding pins/sockets. The first is to use a light-cured epoxy (see photo). These are popular as they cure very quickly in the presence of a high intensity light-source, making them ideal for high volume, rapid-turnaround production runs.

The second option is to use a dual-curing (but again one-part) epoxy. High intensity light can be used for a rapid, initial cure, so that the board can be handled. This is then followed by heat curing - some of which can be time spent in the solder reflow oven – and will cure any epoxy 'shadow zones' (i.e. areas the light could not penetrate).

Coil fixing. The objective here is primarily to provide additional strength (see photo). Choke coils have a relatively higher mass than most electronic components, and bonding can protect against the effects of shock and vibration. A two-part epoxy would be best to use, applied manually before soldering. There are no major curing issues, as the soldered joints will hold the coil in place while the adhesive cures (which is typically viscous and won't run) at room temperature. Storage pre-use is typically at room temperature too.



Ferrite bonding. Here, the bond might be ferrite-to-PCB or ferrite-to-ferrite (e.g. the two halves of a transformer integral to the board). Because at least one surface is metal, the best adhesive to use would be a one-part anaerobic, a common use for which is thread-locking. Curing is at room temperature in the absence of oxygen, so any visible adhesive (i.e. at the edge of the bond) will remain viscous/liquid and should be removed. However, recent anaerobic adhesives to join the market can also be UV cured, meaning the excess adhesive can be treated.

Casting. This is typically for circuitry intended for use in harsh environments; to protect the PCB from moisture and contamination (see photo). The adhesive-of-choice would be a two-part epoxy, as they are relatively low cost and a significant volume might be required for some applications. Pre-use storage and curing (which takes about 24 hours) is at room temperature.

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