

## AN04: Handling and Soldering of Rod Resistors

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Res-Net rod resistors should be handled using finger cots or lint free gloves. They should remain in their protective bag/container until used. Static protection should be utilized when handling/installing the rod resistors.

Rod resistors can be used as a “stand alone” resistor element or installed within a microwave cavity. The ends of the resistor have been metalized with a tin over nickel plating to facilitate easy soldering. It is very important to solder the rod resistors rapidly without overheating the rod. Severe overheating will damage the resistive element possibly causing a shift upward in resistive value.

When soldering, you may use 60/40, 63/37 leaded solder or SAC 305 un-leaded solder. For the leaded solder, the temperature should be  $\sim +210^{\circ}\text{C}$ . For the un-leaded SAC 305 solder, the temperature should be  $+217$ - $+221^{\circ}\text{C}$ . The rod resistors may be soldered using a temperature controlled hand soldering station or an automatic soldering system having profiles as illustrated with the charts provided with this application note.

Flux may be used as an aid to soldering. A RMA type flux (MIL-F-14356) is recommended as an aid used to clean metal surfaces and remove any oxides prior to soldering. You can apply the flux directly to all surfaces including the solder or as part of the solder paste, perform or wire.

Preforms are solid flat pieces of solder, available with or without flux. They can be used to solder the rod resistor into a microwave cavity. The preform should be sized to provide the minimum area necessary for a good solder joint. This will help to prevent overheating that could occur if the perform is sized too large.

Solder paste is often used to solder the rod resistor into a cavity. The solder paste is a mixture of solder, flux, and solvents. Drying the solder paste slightly before soldering will remove any solvents that might try to “boil out” causing solder splash.

However, do not completely dry out the paste. The solder paste method often results in the most uniform distribution of solder. Preheating is recommended in order to reduce any thermal shock to both the rod resistor and the cavity/interface substrate.

Pretinning is the solder coating of the rod resistor prior to the final soldering of the component. This can be done by dipping the rod resistor into a molten solder pot. It is very important not to exceed the temperatures indicated above when performing this operation.

Cleaning the soldered rod resistor is important in order to remove any flux or residual solvents. Alcohol cleaning is recommended for this operation and will remove many of the RMA fluxes.

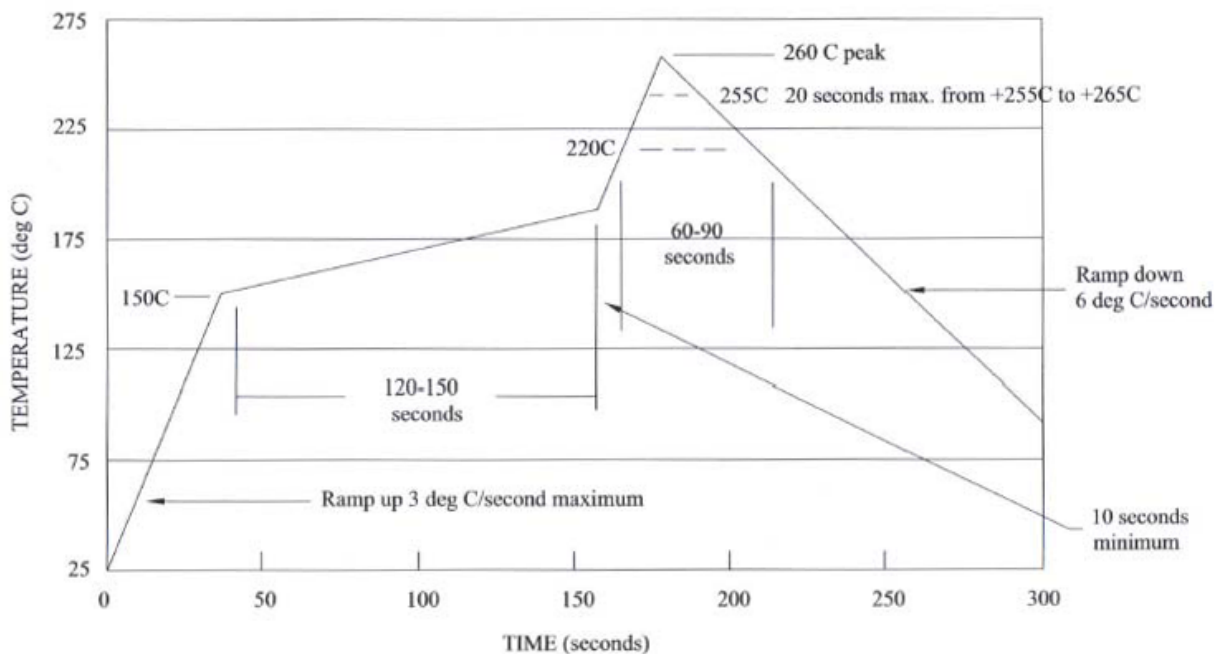
Be sure to properly dry the rod resistor and cavity/interface substrate after cleaning.

**See recommended lead-free and tin/lead soldering profiles, next page.**

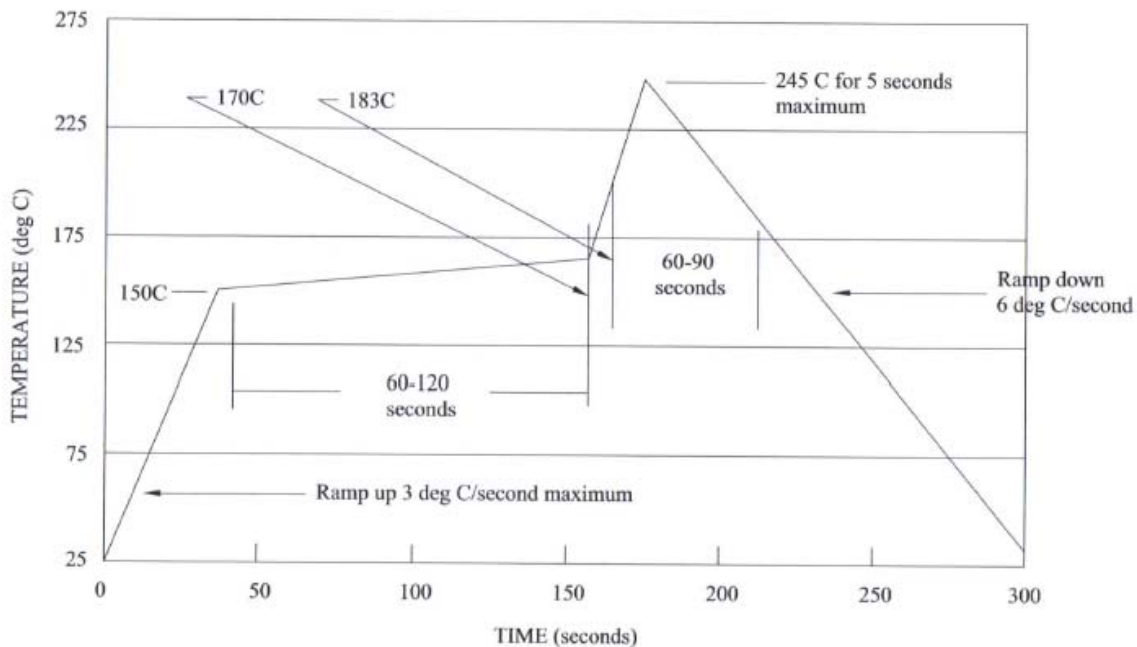


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RES-NET MICROWAVE



## LEAD-FREE SOLDERING PROFILE



## TIN-LEAD SOLDERING PROFILE

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