Modified Process Reduces Porosity When Soldering in Reduced Gravity Environments

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A modified process yields lower levels of internal porosity for solder joints produced in reduced-gravity environments. The process incorporates both alternative materials and a modified procedure. The process provides the necessary cleaning action to enable effective bonding of the applied solder alloy with the materials to be joined.

The modified process incorporates a commercially available liquid flux that is applied to the solder joint before heating with the soldering iron. It is subsequently heated with the soldering iron to activate the cleaning action of the flux and to evaporate most of the flux, followed by application of solder alloy in the form of commercially available solid solder wire (containing no flux). Continued heating ensures adequate flow of the solder alloy around and onto the materials to be joined. The final step is withdrawal of the soldering iron to allow alloy solidification and cooling of the solder joint.

This method provides adequate cleaning of contaminants by the flux agent from the materials to be joined, but allows dissipation of most of the flux agent prior to application of the solder alloy. This significantly reduces the amount of flux that can be entrapped in the solder alloy that would result in internal porosity.

This work was done by Kevin Watson of Johnson Space Center; Peter Struk of Glenn Research Center; and Richard Pettegrew, Robert Downs, and Daniel Haylett of the National Center for Microgravity Research. Further information is contained in a TSP (see page 1).
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