



# Anti-Pillow Defect Lead Free Solder Paste

## S3X48-M406-5

**PREVENTS** the occurrence of **HIDDEN PILLOW DEFECT** (Head in Pillow) and ensures the highest quality of solder joints.

Ensures **OUTSTANDING** continual **PRINTABILITY** with super fine pitch and CSP applications and has exceptionally long stencil idle time.

New heat **RESISTANT** flux formulation achieves complete solder melting and wetting on micro-components and footprints in all finishes.

### Background of development

Using mobile telephones as a typical example, whilst downsizing of the electronic devices continues, more and more space saving components, such as BGAs and CSPs, are being widely used. It has become a critical issue when complete solder merging between the bumps and solder does not occur, and is referred to as "hidden pillow defect" or "head in pillow" under certain conditions.

The solder paste **S3X48-M406-5** has been specifically developed to solve this difficult technical problem, not only for bumped components such as BGAs, but also exhibits excellent wetting with all other types of components.



Pillow defect

### Mechanism of occurrence of Pillow Defect

For various reasons, such as package warpage and co-planarity, inconsistent bump size, insufficient solder deposit, distortion of package during reflow etc., will induce the solder bump to be separated from the solder paste before the solder melts and wets to it. In such cases where the solder bump separates from the solder paste, during heating in the reflow oven, an adverse effect occurs in two areas. Firstly, the area of the bump surface where it is in contact with the molten solder gets badly oxidized, and secondly, the flux activation of the solder paste will be too quickly consumed as the solder melts, thus forming a layer of oxidized flux and solder on the surface.

When the bump descends onto the molten solder due to the weight of the package and wetting forces from the other joints, the oxide film formed on the surface of the molten solder paste and the molten solder bump with almost no flux activation, prohibits them from fully merging together.

It seems difficult to completely prevent the separation of the bumps from the solder paste, so it is critical to develop the solder paste featuring **high heat resistance** characteristics to protect the solder powder and bump from oxidation and sustain the activation strength of the flux for a long time at high temperatures. Furthermore it is necessary to facilitate **quick wetting reaction speeds** to reduce the exposure time of the solder bump and secure sufficient time for the bump to collapse and merge with the molten solder paste.

