



## **AdherAlloy™ Application Notes**

The **AdherAlloy™** family of lead-free joining alloys use nano-dispersed reactive elements to eliminate the need for both fluxing and pre-metallization. They offer a new joining solution for both metals and ceramics, forming strong, stable bonds to a very wide range of important structural and functional materials. **AdherAlloy™** looks like solder, but offers unique properties:

1. **AdherAlloy™** does not wick or spread. In most use conditions, it will stick only where it is applied by tinning or foil/preform. This precise control of bond coverage protects adjacent windows, insulators and other structures without the need for solder mask or clean-up.
2. **AdherAlloy™** does not require or benefit from flux in most cases.
3. **AdherAlloy™** is reactive. It will combine directly with many ceramics, with the native oxide film on metals, and with many other materials. When molten, the active components react (slowly and safely) with air. So pots, baths and wave tanks require inert atmosphere.
4. **AdherAlloy™** protects its own reactive ingredients by forming a micro-thin oxide film on exposed surfaces. For a strong bond to form, this film must be disrupted when the **AdherAlloy™** is molten, exposing fresh liquid metal to the surface to be joined.

**Preparation** Surfaces to be bonded should be clean, dry and free of both solid and liquid residues, including dust and grease. Surface abrasion to produce texture is usually unnecessary. Ultrasonic degrease or wiping with a clean swab/cloth and alcohol is recommended.

**Joining** **Adhera Technologies** experts will be happy to work with you to optimize your process for precision, speed, convenience, and/or use of existing production equipment. Typical applications use one of the following:

- “Bake and shake” **AdherAlloy™** wire or foil is placed between bonding surfaces. The assembly is warmed on a hot plate, or with an iron, air gun or heat lamp. When all parts are at least 20°C (preferably 50°C or more) above the **AdherAlloy™** melting point, one part is moved slightly to induce wetting and bonding. Typically, a very small sliding motion (<1 mm) is sufficient. Vibration (as from an ultrasonic welding tip) is also effective.
- “Tin both sides” Areas previously tinned with **AdherAlloy™** and heated will bond immediately to each other, without the solder spreading beyond join areas. Tinned parts may be brought together while hot, or fixtured and then heated.

Important difference from solder: since **AdherAlloy™** does not spread, users can precisely define the wet area. Parts should be at least 20°C above the **AdherAlloy™** melting point; 50°C is a good starting point. **AdherAlloy™** may be applied with a conventional or ultrasonic iron, or directly onto heated parts with wire-brushing to achieve wetting.

- “Hybrid” One bonding surface is tinned as above. Both parts are then heated and rubbed or vibrated together slightly to make the bond.

**Post-treatment** In most cases, none is required. There are no organic, outgassing or powdery residues to be removed, no edge profiles to dress, and no polishing, passivating or other chemistry needed. **AdherAlloy™** bonding can be a one-step process!

For further technical data or applications support, please contact **Adhera Technologies** at [info@adheratech.com](mailto:info@adheratech.com) or 212-252-3848.