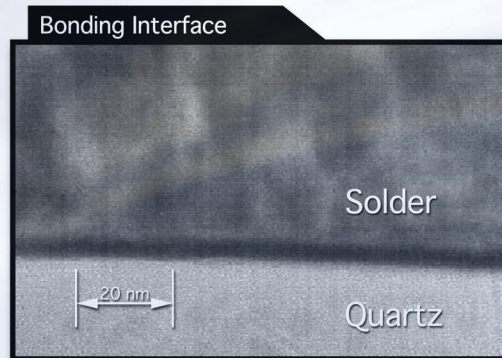
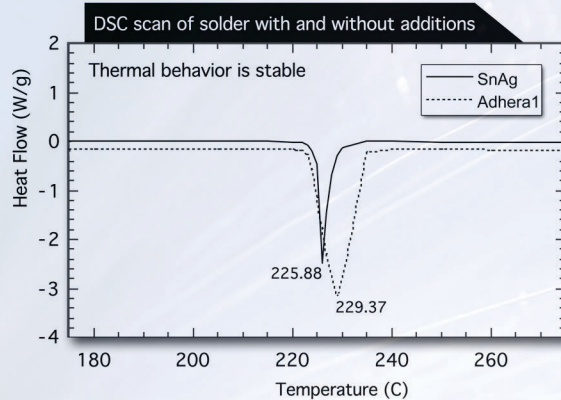


SPECIALTY PRODUCTS DATASHEET

Fiber Optic Center and Adhera Technologies introduce novel, lead-free solder compositions possessing superior bonding properties to a wide variety of materials. These rare earth (RE) metal-containing solders allow for the wetting and bonding of difficult to bond surfaces such as nitrides, oxides, and other inert materials such as diamond and silicon carbide. Cost effective bonding can be achieved without complex metallization schemes or the use of flux. The unique compositions prevent the oxidation of RE and allow for the formation of thermodynamically stable, interfacial bonds that remain so over time, ensuring reliability of the joint. The solders are available in a variety of forms and melting ranges.

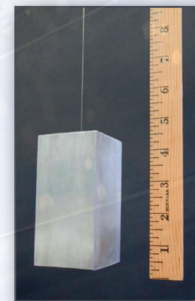
**PROPERTIES**

- Capable of direct bonding to typically difficult solderable surfaces such as oxides, carbides, nitrides, fluorides, diamond, Si, GaAs, etc.
- Thermal behavior of solders with RE remains the same.
- The interfacial bonding region consists of stable RE-oxides.
- Resistant to long term oxidation; greater reliability of the joint
- Eliminates the need for multilayer metallization.
- Eliminates the need for flux and subsequent removal thereof.
- Useful for the assembly & packaging of electronic, optical, and MEMS devices.
- Available in various temperature ranges and forms.



A nanometer-sized interfacial layer sustains the bond

**Direct bonding to Hard-to-Bond surfaces**



- Al Block (1.6 lbs.) bonded directly to SiO<sub>2</sub> Optical Fiber with solder
- Fiber undergoes 84,000 psi stress (580 MPa)
- Bond held for over 3-years (until disassembled)

**Bond Strengths (in psi) as Determined by Pull Testing**

| Substrate                      | Sn-Ag  | Adhera #1 | Au-Sn | Adhera #2 |
|--------------------------------|--------|-----------|-------|-----------|
| Al <sub>2</sub> O <sub>3</sub> | 0      | > 1670    | 0     | > 1900    |
| SiO <sub>2</sub>               | 0      | > 2400    | 0     | > 2500    |
| TiN                            | 0      | 3060      | 0     | 540       |
| SiC                            | 0      | 1130      | 0     | > 1020    |
| AlN                            | 0      | 1400      | NT*   | NT*       |
| Diamond                        | 0      | > 2100    | 0     | 200       |
| Stainless Steel                | 0      | 2177      | NT*   | > 2740    |
| Au                             | > 3065 | > 3065    | NT*   | NT*       |

\*NT = Not Tested

For more information on these or other products and their availability, please contact: us at 1-800-IS-FIBER (473-4237), or (508) 992-6464, fax us at (508) 991-8876 or via e-mail at sales@focenter.com Visit us on the web at [WWW.FOCENTER.COM](http://WWW.FOCENTER.COM)