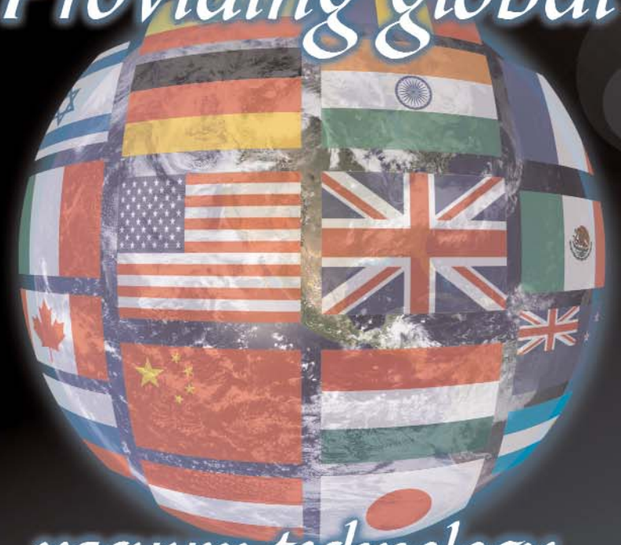
Kurt J. Lesker Company

LOCATIONS

Providing global



vacuum technology solutions.

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Kurt J. Lesker Company

LeskerBond™

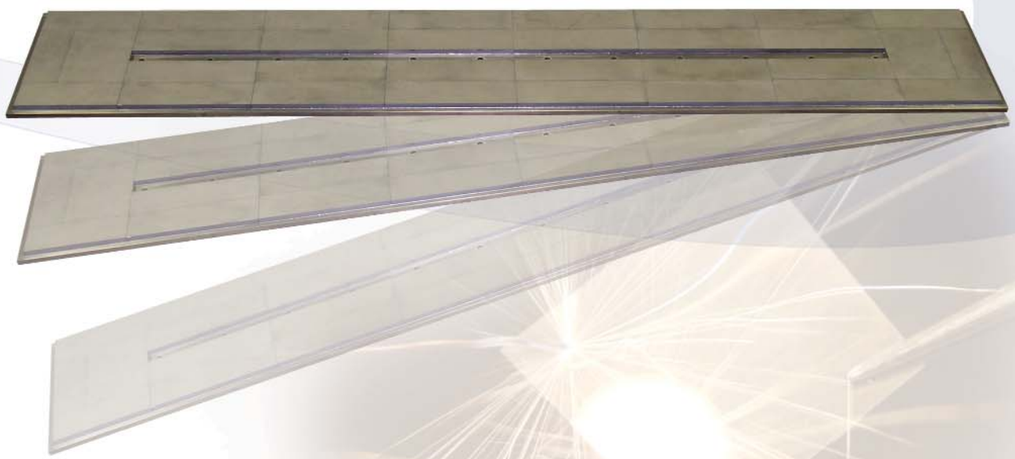
Featuring NanoBond® & NanoFoil®

Technologies from RNT

Reactive NanoTechnologies

Biotechnology Pharmaceutical Display Technologies OLED/PLED Nanotechnology
MEMS Night Vision Aerospace Semiconductor Superconductor Optical & Web Coate

Refrigeration Laser Technology Data Storage Mass Spectrometry Thin Film Pharmac
Automotive Lighting Surface Analysis R&D High Energy Physics Heat Treating Displ

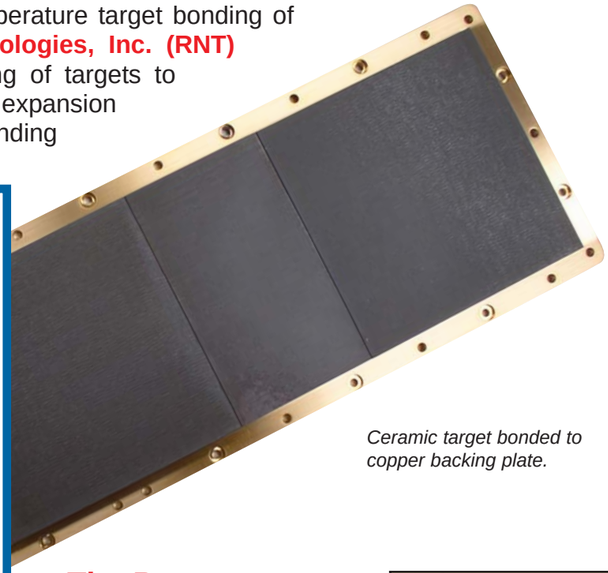


INTRODUCING. . . LESKERBOND™ FEATURING NANOBOND® & NANOFOIL® TECHNOLOGIES FROM RNT

Our LeskerBond™ Service offers in-air room temperature target bonding of dissimilar materials using **Reactive NanoTechnologies, Inc. (RNT) NanoFoil®**. Our service delivers superior bonding of targets to backing plates with different coefficients of thermal expansion --- reducing or eliminating target cracking or debonding during deposition.

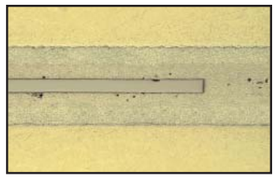
The Lesker *Advantage*

- Strong metallic bonds (3000-4000 psi typical)
- Ideal for bonding dissimilar materials–especially ceramics to metals
- Reduced strain and deflection compared to conventional techniques
- Better bond line thickness control
- Use of high temperature solders enables high sputter rates
- In-air room temperature process
- Controlled local heat source reduces stress to target assembly



Ceramic target bonded to copper backing plate.

The Process

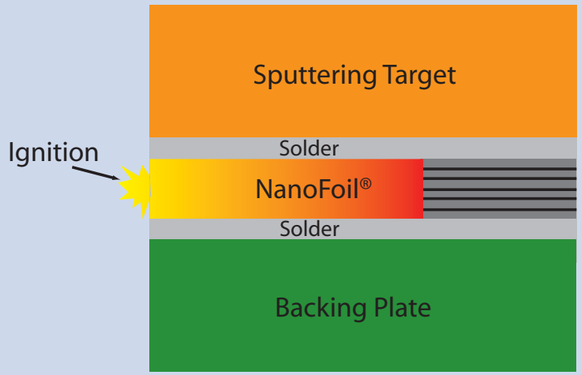


Close-up of foil and solder in-situ

The appropriate solder is selected based on the wetting characteristics of the target assembly and the application. The sputter target and backing plate surfaces are prepared with the solder and the **NanoFoil®** is placed between the two materials. Depending on the size of the target assembly, the foil can be a singular piece or a tiled array. Once the pieces are correctly aligned, pressure (50-350 psi) is applied to the assembly. An electrical impulse is then applied to the assembly which incites the reaction in the foil. This reactive, localized heat source instantaneously reflows the solder which bonds the target assembly. The bond is considered stress free since the target and backing plate, with different CTEs, do not heat up to any great extent during the bonding process.

The Technology

The LeskerBond™ Service utilizes the patented NanoBond® process technology and patented NanoFoil® under license from RNT. NanoFoil® consists of hundreds of alternating nanoscale layers of elements, such as aluminum and nickel.
Once activated, the inter-mixing of the metal layers leads to heat generation within the foil. This heat source is then used to melt adjoining layers of solder to bond components together without having to heat the entire assembly past the melting point of the solder.



Performance Data

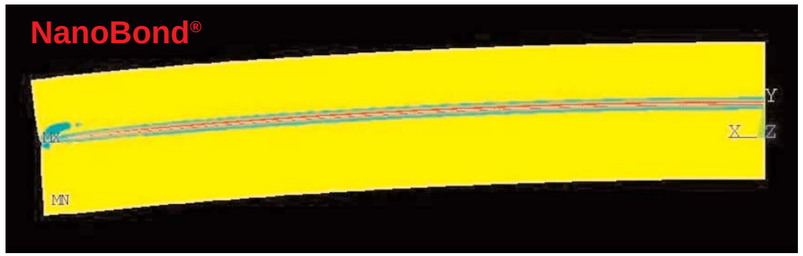
Summary of sputtering trials *(all targets bonded to copper backing plates)*

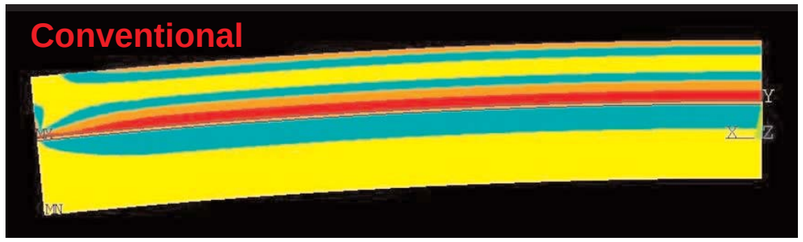
Target Material	Power Mode	Bond Type	Max. Power w/o Failure (W)	Power Density (W/cm²)
Indium Tin Oxide	DC	InSn-Reflow	200	4.4
Indium Tin Oxide	DC	Polymer	300	6.6
Indium Tin Oxide	DC	NanoBond®	400	8.8
Alumina	RF	Polymer	300	6.6
Alumina	RF	NanoBond®	400*	8.8*
Boron Carbide	DC	In Reflow	2000	2
Boron Carbide	DC	NanoBond®	4000*	4*

**Conservative values, not run to failure.*

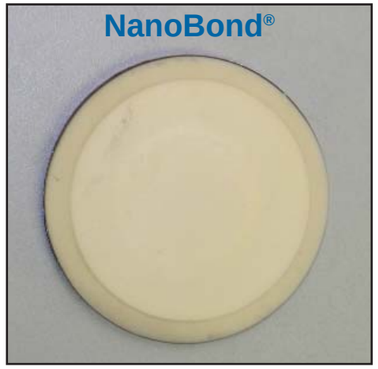
FEA Stress Modeling

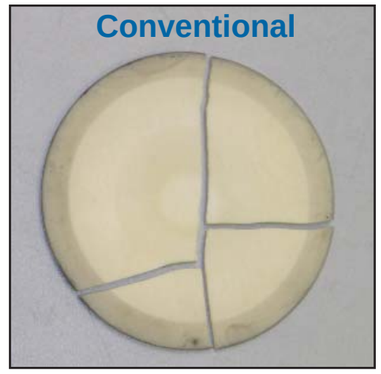
The strain energy of a NanoBond® joint is 1/8 that of a conventional bond joint and deflection is an order of magnitude less.





NanoBond® has a maximum y deflection of 0.04mm where as conventional bond has a maximum y deflection of 0.7mm for materials with CTEs of 6 and 17.





Alumina (3 inch diameter) targets after sputtering trials

RNT
Reactive NanoTechnologies