



CO₂ Composite Spray Technology for Probe Card Cleaning

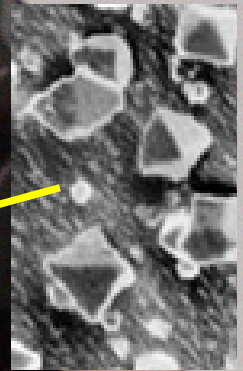
P1_01

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PurCO₂ Division**

Scrubbing CO₂ Particles

- **Structure** - molecular crystal, angular, octahedron
- **Solvency** – “Frozen Freon”, 22 MPa^{1/2}
- **Impact Phenomenon** – ablation and phase change (solid→liquid→gas)
- **Chemistry** – can be modified with plasmas, liquids, solids, vapor-phase additives
- **Compressibility** - incompressible
- **Density** - 1.6 g/cm³
- **Hardness** – 0.3 Hm (8 Hv)
- **Particle Size** – < 0.5 microns to > 500 microns, range adjustable (coarse/fine)
- **Impact Stress** - up to 60 MPa (8,700 psi)

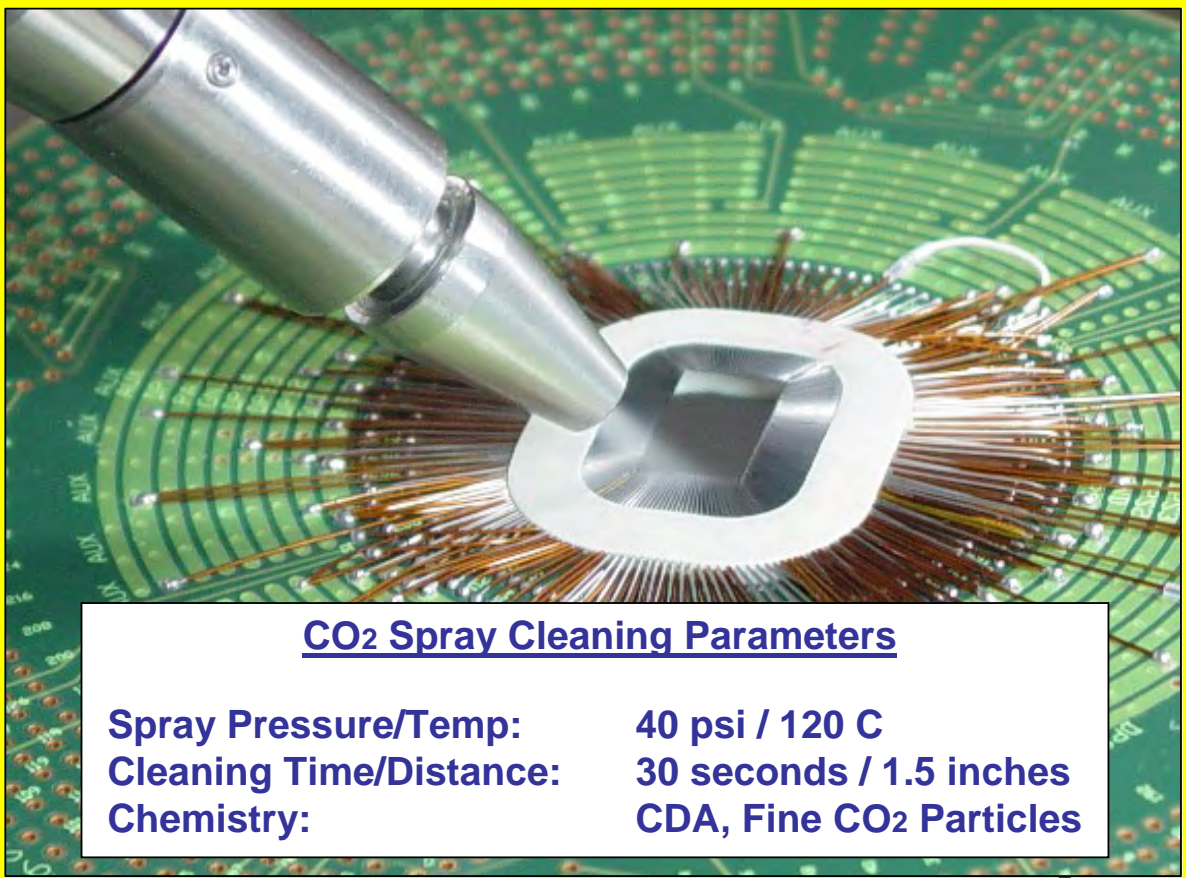
SEM
Photomicrograph



1 μm

**CO₂ composite spray cleaning
process effectiveness and
efficiency is controlled by:**

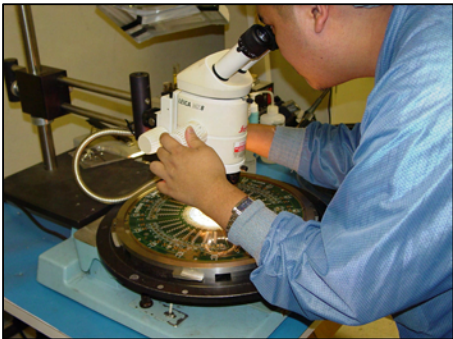
- ✓ Particle velocity
- ✓ Particle mass/size
- ✓ Spray chemistry
- ✓ Particle hardness
- ✓ Particle shape
- ✓ Impact frequency
- ✓ Spray distance
- ✓ Time



CO₂ Spray Cleaning Parameters

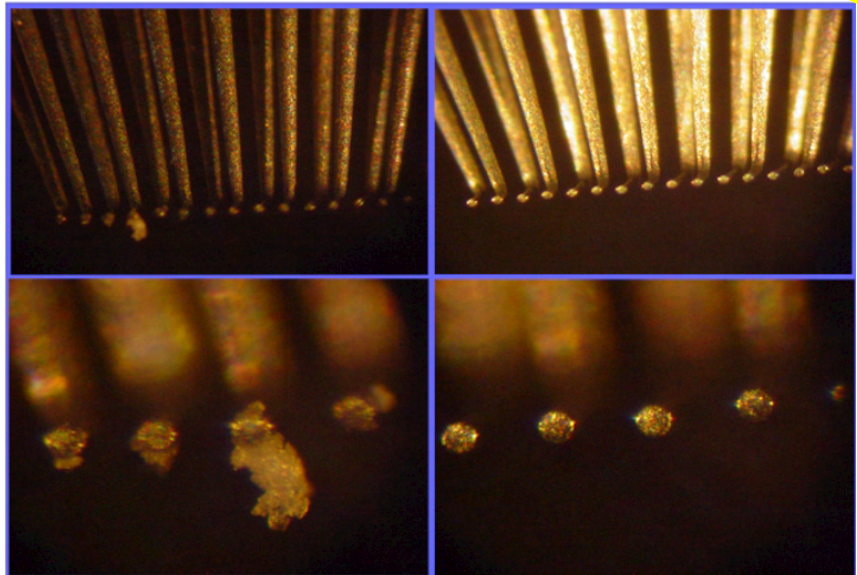
Spray Pressure/Temp:	40 psi / 120 C
Cleaning Time/Distance:	30 seconds / 1.5 inches
Chemistry:	CDA, Fine CO₂ Particles

Clean-during-Inspection



CO₂ composite spray cleaning processes easily adapt to and augment existing probe card maintenance programs....

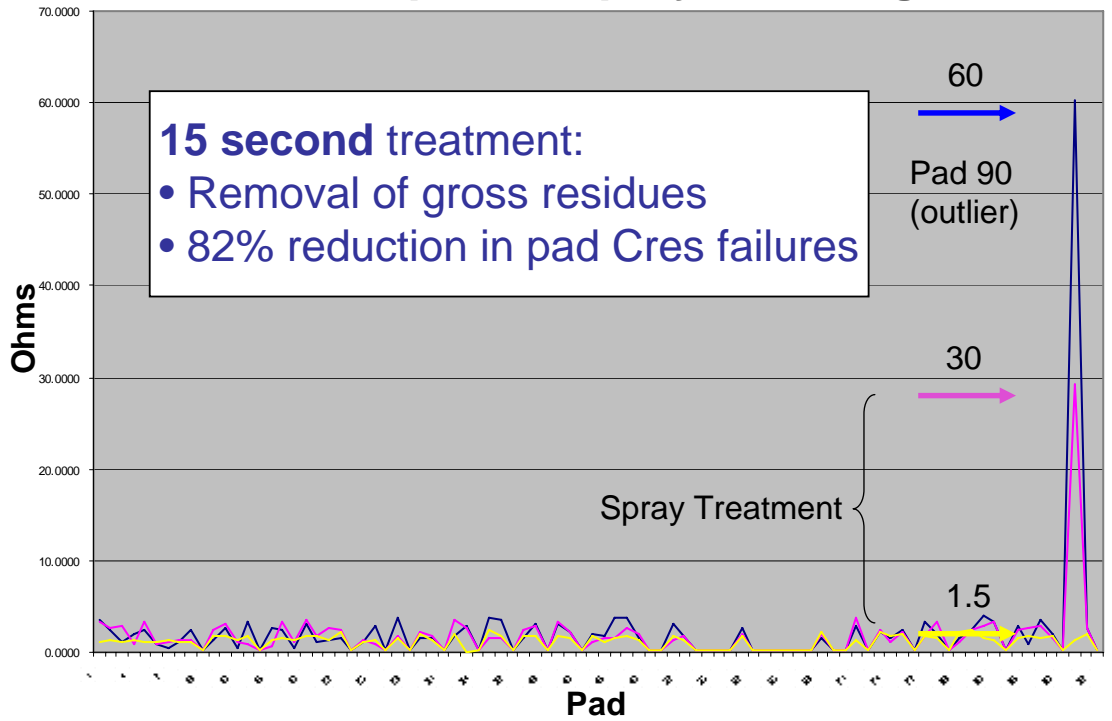
Metal Oxides and Solder Flux



Before

After

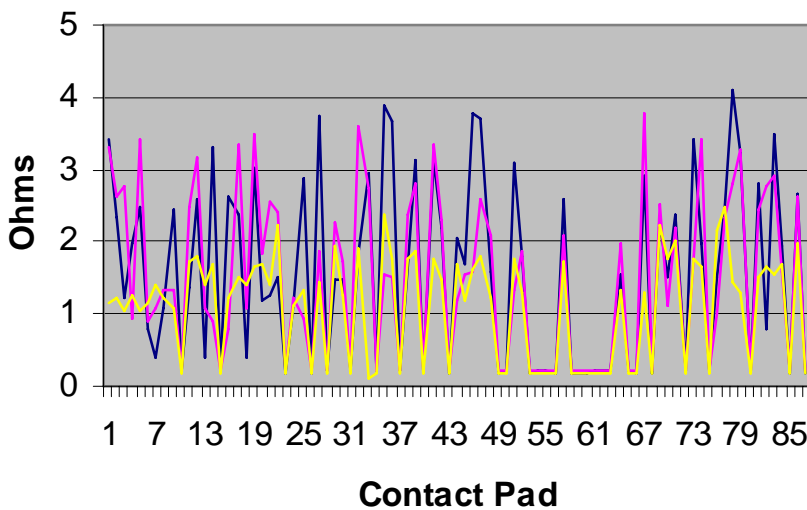
CO₂ Composite Spray Cleaning



- ✓ Significant reduction in maintenance labor
- ✓ Cleaner surfaces...*faster*
- ✓ No direct contact
- ✓ No physical damage

CO₂ increases probe maintenance efficiency and effectiveness

Pad Cres



- Cres Preclean 1
- Cres Preclean 2
- CO2 Composite Spray

Pad 90 removed from data set.

For more information...

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PurCO₂
 Clean...Pure & Simple.