

CO₂ Snow Jet Cleaning

Surface Cleaning Solutions

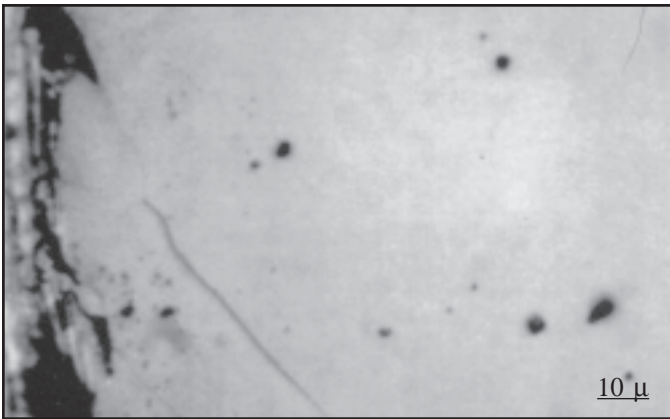
www.co2clean.com

CO₂ Snow Jet cleaning uses a carbon dioxide snow plume to remove particles of all sizes (down to 0.03 microns) and hydrocarbon-based contamination. CO₂ Snow Cleaning is

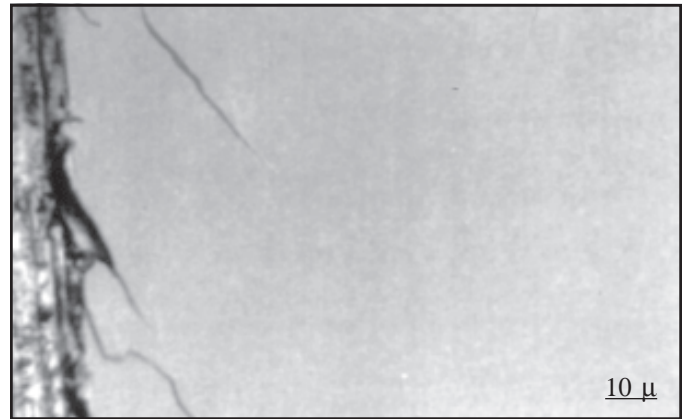
- **Nondestructive**
- **Nonabrasive**
- **Residue-free**
- **Environmentally Safe**

Particle Removal – All Sizes

CO₂ snow cleaning removes particles of all sizes, even inorganic particulates down to 0.3 micron, and lower. In the example below, we scribed a Si wafer and cleaned it with the CO₂ Snow Jet. Comparison of the same areas before and after cleaning (at 1000x magnification) shows complete particle removal after CO₂ Snow Jet cleaning. The process works on wafers, optics, metals, sensors, and many other materials.



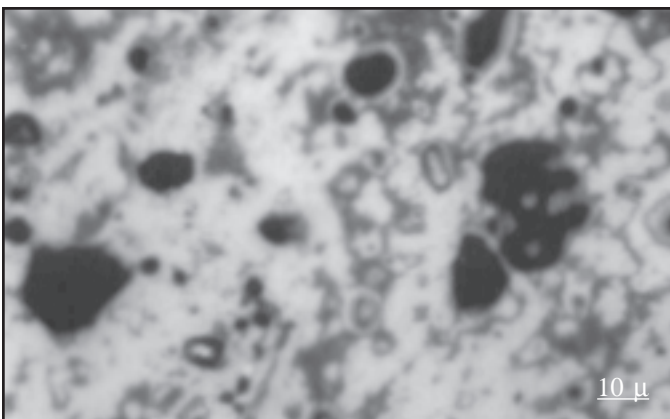
BEFORE CLEANING



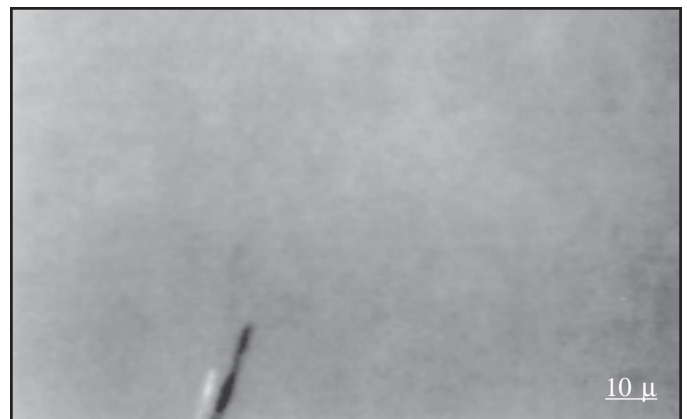
AFTER CLEANING

Organic Removal

Here, we scribed a Si wafer and rubbed facial grease on the surface. Comparing the same area at 1000x magnification, we see that CO₂ Snow Jet cleaning totally removed the stain. Further analysis by X-ray photoelectron spectroscopy showed total stain removal and reductions in the background hydrocarbon content. Cleaning is as effective as solvents.



BEFORE CLEANING



AFTER CLEANING

Safe, Fast, Effective

Mechanism – The cleaning mechanism for the CO₂ Snow Jet is simple. Expanding either liquid or gaseous CO₂ through a small orifice leads to nucleation of small dry ice particles and a high-speed carrier gas stream. Upon impact with a substrate, the dry ice removes particulates via momentum transfer and organics via a transient solvent process. See www.co2clean.com for details.

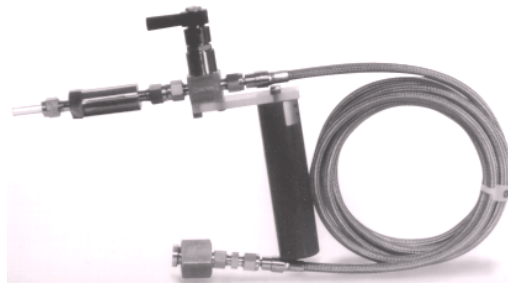
Applications – many different applications have been successfully demonstrated:

- Contamination removal from wafers, metals, polymers, glasses, and ceramic substrates;
- Cleaning optics, i.e., coated lenses, mirrors, lasers, IR and UV optics, fiber optics;
- Sample preparation before surface analysis (AES, XPS, SIMS);
- Sample preparation for AFM;
- General cleaning applications in laboratories, cleanrooms, and manufacturing;
- Disk drive parts and assemblies;
- Cleaning vacuum system parts, components and systems; and
- General substrate preparation and general cleaning.

Equipment – Four different units are offered with prices starting at about \$1800. See www.co2clean.com for more details. The two most popular units are:

Standard Unit - As seen in the left image, these units include a hand-held on/off gun, a PTFE lined stainless steel flexible hose, a CGA320 cylinder fitting, and two nozzles - one stainless and one polymer. An optional pressure gauge and filter are included in the photo.

High Purity Unit – Similar to the standard unit but with an electropolished manual valve (middle) and all compression fittings, or this unit can be equipped with a solenoid (right).



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