Applied Surface Technologies

www.co2clean.com email: co2clean@co2clean.com
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CO_2 Snow Jet Cleaning

The CO_2 snow cleaning process removes particles of all sizes (measured from visible down to 0.003 microns), hydrocarbon, and organic residues from surfaces at high efficiencies. CO_2 snow cleaning is nondestructive, nonabrasive, residue-free, and leaves no chemical waste.

Mechanism
Liquid or gaseous CO_2 expansion through a small orifice leads to the nucleation of small dry ice particles carried by a high velocity gas stream. Upon impacting a substrate, the dry ice particles remove the micron and submicron particles via momentum transfer, and hydrocarbons via a transient solvent mechanism or freeze-fracture. The high velocity gas blows the contaminants away.

Applications - Many different cleaning applications have been successfully demonstrated:
- Contamination removal from metals, wafers, ceramics, polymers, and glasses;
- Particle and stain removal from substrates including Si, InP, and GaAs wafers;
- Cleaning optics, i.e., coated lenses, IR, UV and diamond turned optics, fiber optics
- Telescope mirror and large optics;
- Sample preparation for surface analysis - XPS, Auger, SIMS, and AFM;
- General cleaning in the laboratory, cleanroom, or for manufacturing;
- Cleaning vacuum systems components, X-Ray, and electron and ion optics
- Removing contamination from art, telescope mirrors, and much more

Equipment – Several different units are offered.
Standard Unit - includes a hand-held on/off gun, PTFE-lined stainless steel flexible hose, CO_2 cylinder fitting, NPT fittings, and two stainless steel nozzles: the asymmetric venturi on the unit and a low velocity nozzle.

K1-05	Basic unit with a five foot hose	$1955
K1-10	Basic unit with a ten foot hose	$2045

High Purity Units - includes a CO_2 cylinder fitting, PTFE lined stainless steel flexible hose, a stainless steel diaphragm valve, all compression fittings, and two nozzles as above. VCR fittings available too.

K4-05	High Purity unit with manual valve and 5 foot hose	$2095
K4-10	High Purity unit with manual valve and 10 foot hose	$2145
K4-10S	High Purity unit with solenoid valve, foot switch, and a 10 foot hose	$2595

Portable Units – A small portable CO2 cylinder, on/off control, and nozzles

K1-Port		$2195
K4S-Port		$2595

Variable Orifice Units - see leak valve option below
Dual Gas Unit - A High Purity Unit is modified to have a dry gas purge flow co-axial to the dry ice stream. Venturi nozzle only. This allows for a dry gas to surround the CO_2 stream

K6-DG10-A	– Dual Gas CO_2 Unit with two solenoids, foot switches	$3695
K6-DG10-B	– Dual Gas CO_2 Unit with 1 solenoid, one manual valve	$2995

Large Area Snow Units – For large telescope mirrors, see www.co2clean.com/telescopes

Options
Filters - sintered stainless steel rated at 0.5 microns (F1- $135), rated at .003 microns (F3 - $325)
Pressure Gauge PG (0-2000 psi) on TEE attached - K1 units - $200, K4, or K6 units - $250
Add-on portable unit to an existing K1 or K4 solenoid - $995.00
Metering Valve option for variable orifice for K1 and K4 units - $300

Test Units - *Test your applications before buying* – Call for terms. Dec 31, 2023

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Four Different Cleaning CO_2 Snow Jet Units Offered

Applied Surface Technologies manufactures several different CO_2 Snow Cleaning Units. Our goal is to provide maximum options and flexibility. We equip units with the American CGA320, European (International ISO Standard) DIN6, the Japanese JIS22R fittings, or the British BS-8

Standard Units
The K1 units are the simplest and easiest to use. This unit addresses both general and critical cleaning problems. They come with a 5 or 10 foot PTFE lined flexible hose, a CO_2 cylinder fitting, an on/off gun, and two stainless steel nozzles. The nozzle on the unit is an asymmetric venturi and yields small dry ice sizes with high velocities. The second nozzle is a tube nozzle and is geared for gentler applications. Most common options selected are purity filters (F1 or F3) or a pressure gauge (PG). This is the easiest unit to use.

Manual High Purity Units
The K4 High Purity Units are suitable for critical cleaning applications. This unit includes a CO_2 cylinder fitting, PTFE lined flexible hose, an electropolished (3 Ra) stainless steel packless valve, and two nozzles, as described above. All fittings are Swagelok type with a VCR valve option. Similar options as above can be added

Solenoid Operated High Purity Unit
The K4-10S uses a 24 VDC normally closed stainless steel solenoid valve in place of the manual valve and allows for automation and movement. Pressure gauges and filters can be added.

Portable Units
These K4-Port or K4S-Port models allow for easy and lightweight portable CO2 snow jets. They come with a stainless steel lightweight CO_2 canister and are easy to refill at your site.

Dual Gas System
Two Dual Gas Units, K6-10DG, are available. This model has a special second nozzle that allows a dry gas to surround the CO_2 snow stream allowing for reductions in moisture condensation problem. The Model A has two solenoids (for N_2 and CO_2), hoses, a cylinder fitting, a dual foot petal for individual control and a 24 VDC power supplies. Model B comes with a manual valve for the dry gas stream. Filters and other options are available.

Telescope Mirror Cleaning Units
These K1-LASU units are a modified K1 unit and allow for particle removal from large surfaces, such as telescope mirrors or any large object. **see http://www.co2clean.com/telescopes**

Other Units

Variable Orifice Units
There is now a leak valve option aimed for both delicate objects and hard to clean surfaces.

Special Nozzles
Custom nozzles are made for situations such as large areas, inner or outer diameters, or other unique geometries.