

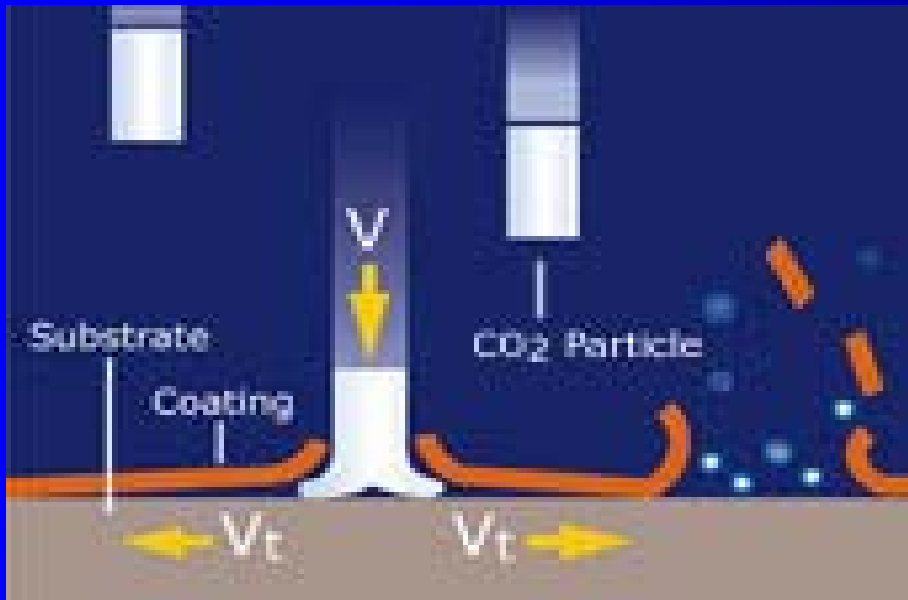
Characteristics of Dry Ice Blasting

- ***Blast Media***
- ***Equipment***
- ***Scientific Principles***

Blast Media – Dry Ice

- ***Solid form of Carbon Dioxide***
- ***Available in Pellets and Flakes***
- ***-109°F / 79,6 °C***
- ***Inert (non-combustible)***
- ***RECYCLED - Man-made bi-product of hydrocarbon and ammonia production***
- ***0.03%/Vol in normal atmosphere***

Scientific Principles



DRY ICE BLAST CLEANING

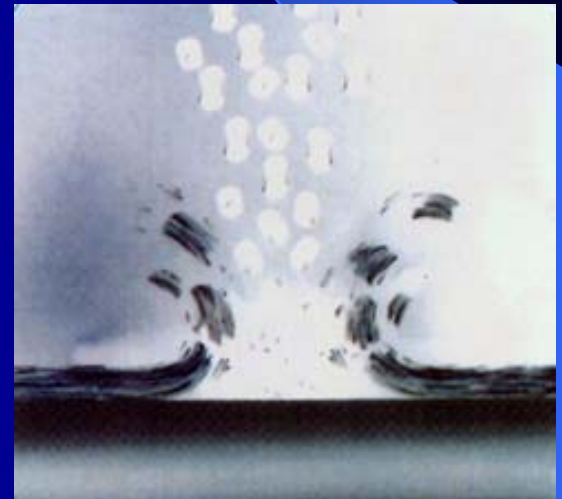
Impact Flushing

Action of CO₂

Particles Uses kinetic energy effectively sublimates on impact.

Scientific Principles

- ***Thermal Effect***
- ***Kinetic Effect***
- ***Sublimation Effect***



Thermal Effect

Dry ice particles have a temperature of -109°F . When these particles impact the impurities on the surface, the impurities are cooled down tremendously, shrink and then loosen from the surface. In most cases the surface temperature will fall below most impurities freeze point. As impurities freeze they lose their adhesion.

Kinetic Effect

When dry ice particles exit the nozzle, they have kinetic energy. As in commercial blast cleaning the impurities are dislodged from the surface. Unlike sand, dry ice has a lower hardness characteristic and therefore greater kinetic energy can be used to break impurities from the surface without damage occurring.

Sublimation Effect

When dry ice particles strike the surface, they immediately phase into gas from solid. The effect increases the gas volume approximately 700 times. The sudden increase in volume assists in moving the brittle fragments of impurities away from the surface.

Types of Applications

- ***Organic/Biological Contaminants***
- ***Man-made/Industrial Contaminants***
- ***Surface Preparation & Coatings Removal***

Types of Applications

Organic/Biological Contaminants

- ***Mold***
- ***Mildew***
- ***Dirt/Mud***
- ***Algae***
- ***Bird Droppings***
- ***Soot***
- ***Moss***
- ***Bacteria***
- ***Decaying Matter***
- ***Fruits & Vegetables***
- ***Sugars/Syrups***
- ***Flours & Grains***

Types of Applications

Man-Made/Industrial Contaminants

- ***Manufacturing Residue***
- ***Soot/Carbon Build-up***
- ***Adhesive Overspray***
- ***Welding Slag***
- ***Cement/Plaster***
- ***Grease & Grime***
- ***Chemical Polymers***
- ***Hydrocarbons***
- ***Paper/Pulp***
- ***Scale***
- ***Ink***
- ***Gum***

Types of Applications

Surface Preparation and Coatings Removal

- *Surface Rust & Oxidation*
- *Paint/**Graffiti***
- *Sealers*
- *Lacquers*
- *Urethanes*
- *Adhesives*
- *Resins*
- *Poly. Foam*
- *Plaster*
- *Tar*

What Surfaces Can Be Cleaned With FreezeBlasting?

- Steel
- Glass
- Aluminum
- Wood
- Fiberglass
- Tile
- Plastic
- Rubber
- Brick/Stone
- Cement

What Can Be Cleaned?

- Belts and Hoses
- **Co-Generators**
- Compressors/Condensers
- Escalators/Elevators
- Food Processing/Packaging Lines
- High Polished Molds
- Hydro-Electric Generators
- Mfg. Equipment & Tools
- Printing Presses
- Relays/Bearings/Cylinders
- **Turbines**
- Trucks/Engines/Boilers/Tanks
- Wood – Mold Remediation

DRY ICE BLASTING

VS.

TRADITIONAL CLEANING PROCESSES

Method	NON-Abrasive	Hazardous Material ¹	Performance	Toxicity	Conductivity
Dry Ice Blasting	YES	NO	Superior	NO	NO
Sand Blasting	NO	YES	Moderate	YES	NO
Glass Bead Blasting	NO	YES	Moderate	YES	NO
Walnut Shell Blasting	NO	YES	Limited	NO	NO
Steam Jet Blasting	YES	NO¹	Inferior	NO	YES
Water Jet Blasting	YES	NO¹	Inferior	NO	YES
Chemical Solvents	NO	YES	Limited	YES	YES
Hand Scrubbing	NO	NO¹	Inferior	NO	NO

¹ Any characteristic of hazardous material being removed becomes the characteristic of the media used for removal

Benefits of Dry Ice Blasting

New technology breeds new phrases – "*Clean Cleaning*"

Unlike all other surface preparation technologies, there are:

- **NO** Residual chemicals;
- **NO** Residual abrasives;
- **NO** Residues of any kind;
- **NO** Excessive moisture;
- **NO** Additional mess to clean up;
- **NO** Hazardous materials to dispose of;
- **NO** Headaches.

There is NO other environmentally safer alternative.

Benefits of Dry Ice Blasting

Dry Ice Blasting **SHOULD** Be Used When There Is A Concern For:

- Surface Abrasion
- Avoidance of Drainage into Watershed/Storm Drains
- Avoidance of Sand/Grit Entrapment
- Difficult or Excessive Cleanup
- Complexity of the Surface
- Critical Production Downtime
- Elimination of Solvents/Chemicals
- Elimination of Rinsing and Drying
- Delicate Electrical Wiring

Benefits of Dry Ice Blasting?

New technology breeds old phrases – “Bottom Line”

In today's business environment, cost cannot only be measured in the amount of capital outlay. Many other factors are considered.

- Increasingly important to lower the bottom line to maximize the top line.
- Labor costs, workman's comp insurance, and environmental requirements are only small examples of the burden many companies experience.
- Important to find and use new technology that can relieve these burdens.

Dry Ice Blasting is a cost effective means of reducing overhead.

Environmental Concerns

Green House Effect – Global Warming

It has been established by EPA studies that CO₂ emissions are contributory to the global warming problems of the world.

Our process uses CO₂ that would otherwise be vented to the atmosphere.

Therefore, our process does not add any additional CO₂ emissions. Our process uses, in essence, recycled waste product, then converts it into a usable phase. It is applied as a replacement for traditional hazardous material such as solvents and chemicals.

Industries Served by Dry Ice Blasting

- Aerospace
- Automotive Mfg.
- Construction
- Energy/Nuclear
- Food/Agriculture
- Foundry/Smelting
- General Mfg.
- Marine
- **Oil/Petrochemical**
- Printing/Publishing
- Semi-Conductor

Results / Examples



Cleaning Hydro-Electric Turbine



Cleaning Turbine Dovetails



Cleaning Turbine Blades



Cleaning Other Turbine Components