

A cool way of cleaning

Dry Ice Blasting

Is there ice in your future?

If you are using chemicals or grit to clean, a new dry ice blasting process might be a cost-effective alternative to your current processes. Dry ice blasting or carbon dioxide (CO₂) blasting is ideal for applications where there is a need to protect objects from the kind of damage grit causes, where maintaining dimensional stability is critical, where possible degradation to the finish of a product is a concern, and the chance of grit entrapment jeopardizes operating machinery or electrical equipment.

Dry ice blasting also has superior environmental characteristics. The CO₂ blasting method is waterless, waste free, non-corrosive, and non-reactive. Commercial CO₂ is primarily produced as a salvaged waste gas from the production of other industrial gases. In the blasting operation, the frozen CO₂ pellet is transformed into its gaseous state which is a normal component of the earth's atmosphere. The CO₂ blasting system can solve many of the environmental problems now facing individuals responsible for specialized cleaning. Also, no special preparation is required, e.g. masking, covering and/or relocating equipment.

How it works

Small dry ice pellets are accelerated through one of a variety of cleaning nozzles, using compressed air variable in pressure up to 230 psi.

When the pellets hit the surface to be cleaned, their kinetic energy causes them to penetrate to the base material, at which point they shatter, blasting fragments laterally in all directions, releasing the contaminant from the base material.

Instantaneously, the dry ice fragments sublime, i.e. turn directly from solid to gas. The expansion of the CO₂ from solid to gas adds a lifting force "mushroom effect" to speed removal of the contaminant.

The debris falls away, and the CO₂ gas returns harmlessly to the atmosphere.

The equipment

There are many manufacturers of dry ice blasting equipment—look for quality of construction, ease of maintenance, compact size, maneuverability, reliability, safety features, and of course, value, when researching machines. Barry Finegold, President of CryoBlast, began importing Cryonomic® Equipment, manufactured by Artimpex N.V. of Belgium, in 1994. Barry chose the CryoBlast product because of its



European engineering and design integrity. His customers appreciate the equipment's compactness and ease-of-use since one of the benefits of dry ice blasting is that production equipment that is normally dismantled and transported to special areas can be cleaned safely in place on the production floor, saving substantial downtime and other resources.

When grit blasting is better

Dry ice blasting is a direct substitute for grit blasting in applications where there is a need to protect the objects being cleaned from the kind of damage that grit can cause. Where the drawbacks of abrasive grit are not an issue, dry ice blasting may not be a direct substitute. Grit blasting equipment is generally less expensive than dry ice equipment and for some applications grit blasting can perform the cleaning task faster.

With dry ice blasting, wood and softer plastics could be damaged. Brittle substances like thin untempered glass, could shatter. Some coatings are very hard and some bond very tenaciously. In these cases, CO₂ blasting technology may not be the best cleaning method. An example is the removal of baked-on enamel from cast iron. Soft contaminants, like grease and oil, tend to splatter and may require special procedures or collection apparatus. In addition, these softer materials may be pushed into cavities and crevices in the object being cleaned, and sometimes the dry ice blast effect cannot reach these places. However, for hardened, baked-on grease, dry ice blasting is very effective.

Ideal dry ice blasting applications

"Dry ice blasting is a tremendous tool for the right cleaning application," says Barry Finegold, "and we are finding new opportunities everyday that will eliminate the danger of using harsh chemicals. Furthermore, it greatly reduces costly labor." CryoBlast's customers include aerospace maintenance facilities, foundries, pharmaceutical plants, food processing facilities and plastics manufacturers. The following are more dry ice blasting applications:

- Production equipment that is normally dismantled and transported to special areas can be cleaned safely in place on the production floor, saving substantial downtime and other resources.
- Industrial control panels, fans, and other electrically sensitive equipment now being cleaned by hand can be

blasted safely with dry ice pellets, since CO₂ is entirely non-conductive.

- Continuous web processes - like paper, printing, food processing benefit from in-place cleaning particularly well. Conveyors of all types are easily cleaned with CO₂ cleaning.
- Foundry core boxes and patterns, plastic or die casting molds, engine parts, and hundred of items now being cleaned with toxic chemicals or environmentally undesirable substances, such as Freon, can be cleaned with CO₂ cleaning.
- The removal of carbon deposits for inspection and processing when rebuilding engine blocks and cylinder heads is a very good application for CO₂ cleaning. The process is also ideal for the removal of carbon on aircraft engines, jet turbines and injectors. No metal is removed and no surface texture is changed.

- Printers that use soda and plastic media blasting to remove ink and dirt from "Anolox" (ceramic) printing rolls.
- Carbon dioxide does not become radioactive, so CO₂ cleaning is a natural choice for nuclear decontamination. The only disposal required is for the debris. The CO₂ just disappears harmlessly back into the air.
- Applications by job include deburring, machine maintenance, mold cleaning, paint stripping, tank cleaning, carbon, glue, and rust removal.

If you are interested in learning more about dry ice blasting, start at www.cryoblast.com. CryoBlast has one of the most well-thought out and informational web sites that we found on dry ice blasting. Barry Finegold can be reached at 1-800-236-4205 or by email at info@cryoblast.com.

A real life application

Flanders Electric Motor Service is one of the largest electric motor repair companies in the United States. Flanders' client base includes general manufacturing, metals, paper, plastics, utilities and power, mining, chemical, petroleum and agriculture.

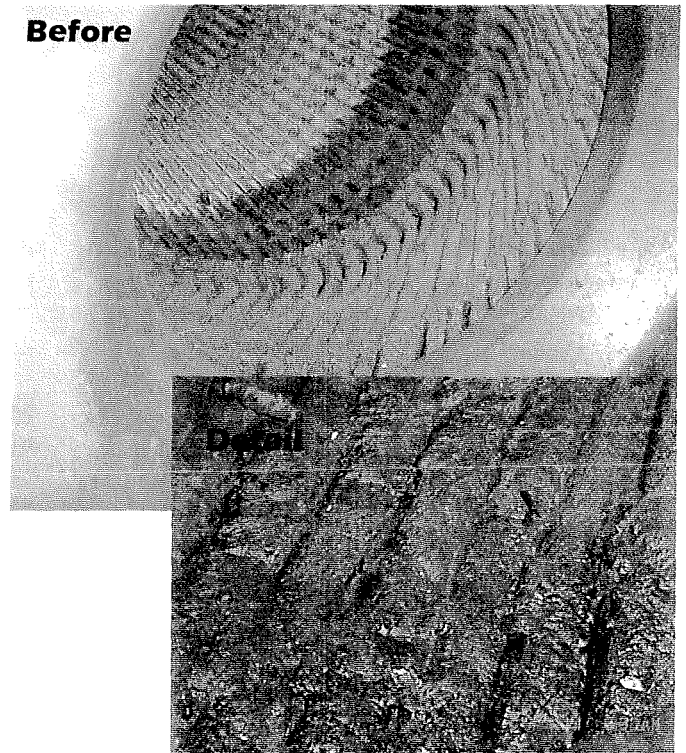
According to Steve Pfettscher, Flanders Western Division Representative, "We have experience with all kinds of cleaning methods and media. We've worked with everything including beads, sand, aluminum oxide, corn cobs and walnut shells. A couple of years ago, a customer requested dry ice blasting because it was environmentally friendly. Flanders invested in two machines and has been using it ever since."

These photos are of the stator windings of a 7000 horsepower motor in a boiler feed pump used in a public utility. The contaminant on the windings severely compromised the insulation integrity of the windings. After dry ice blasting, the insulation was restored to an acceptable level that insured longer life for the windings. It is most important in windings to maintain the highest possible level of insulation integrity—we call this value "insulation resistance". Insulation to ground must be maintained at a level commensurate with the applied voltage of a given machine. Ice blasting affords a client an economical means of restoring diminished or lost insulation resistance values. Many machines, like in the photos, are very difficult to remove. To have them cleaned in a motor repair facility would require extensive removal and handling costs so it's most attractive to do some on-site disassembly and clean the unit in place. Flanders does a lot of this. We have crews that dismantle, ice blast and reassemble the unit on-site. It's very cost-effective and efficient.

—Steve Pfettscher
Flanders Electric Motor Service

Editor's Note: Thank you to Steve Pfettscher and Flanders Electric for sharing information and photos. For more information on Flanders, visit www.flanderselectric.com.

Before



After

