



DRY ICE BLASTING

FAST, EFFECTIVE ed ECO-FRIENDLY CLEANING METHOD

Cryogenic cleaning (Dry Ice Blasting) eliminates the use of chemicals and harmful substances, and does not result in the production of additional effluent and residue for disposal. Cryogenic cleaning uses a combination of forces to break down contaminants and dirt, leaving treated surfaces completely residue-free, dry and ready to be put back “on the road” without further loss of production time.

Unlike other traditional methods, such as cleaning with high-pressure water or abrasive media, cryogenic cleaning uses dry ice (solid-state carbon dioxide) combined with a high-speed air stream as the mechanical medium.

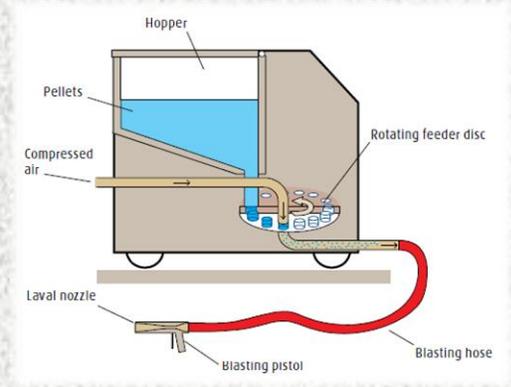
The dry ice, after removing contaminants from the surface, sublimates by transforming into gaseous carbon dioxide and produces no residues or secondary effluents to be disposed of, consequently zeroing out all the associated additional costs of such inconveniences. The application of cryogenic cleaning is particularly suitable for areas, equipment and production processes that are not compatible with water and liquid cleaners in general.



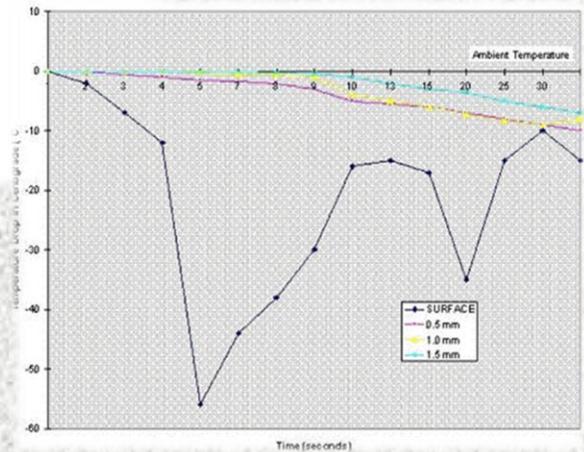
Carbon dioxide is an odorless and colorless, non-harmful and nonexplosive natural gas that occurs as a solid at a temperature of -78°C . The degree of purity of carbon dioxide (dry ice) used in the process is the same as that used in the food industry. The production of the pellets used in the cryogenic cleaning process are produced from carbon dioxide captured from the environment therefore the system does not compare further carbon dioxide inputs to the environment other than the same amount originally taken from the environment.

HOW DOES IT WORK?

Carbon dioxide (in the form of dry ice pellets) is projected against the surfaces to be cleaned at an extremely high speed by compressed air (mechanical action). Upon impact with the material to be removed, the pellet absorbs its heat and sublimates, lowering the temperature of the encrustation/dirt to temperatures well below zero (thermal action). The pellet instantly changes from a solid to a gaseous state. In the sublimation phase, the dry ice rapidly increases its volume (from 300 to 800 times the volume of the pellet in a few milliseconds), strengthening the kinetic effect of the flow on the surface of the dirt. As the material to be removed cools, it undergoes a thermal contraction (Thermal Shock) that causes it to lose its adhesion from the artifact and thus detach. The residue that remains is nothing more than the removed contaminant



Heat shock affects only the surface of the fouling, laboratory tests indicated a temperature decrease of only 10° C in 30 seconds at 2mm from the surface of the treated medium



DRY ICE CLEANING ADVANTAGES

COST REDUCTION

The process eliminates additional costs for the removal of cleaning residues, such as detergents, chemical agents, and abrasive media, and does not involve the production of waste or secondary effluents to be disposed of, a typical aspect of traditional high-pressure water cleaning systems for example.

Because of its characteristics, cryogenic cleaning can be applied as "on-line" equipment maintenance, minimizing the time and costs associated with production downtime or disassembly and reassembly of components to be cleaned..



EXTENSION OF THE MACHINERY LIFE

Unlike traditional high-pressure water and abrasive-mechanical media cleaning systems, dry ice is not an abrasive material and does not create wear or damage to treated surfaces (even surfaces with finishes), bearings, mold tolerances, and so on. Cryogenic cleaning does not damage electrical parts and control panels of equipment and does not produce the typical rust phenomena that are typical drawbacks of washing with water or steam. Finally, in the food and pharmaceutical industries, the use of dry



ice for cleaning reduces the possibility of bacteria and mold growth.

SAFE FOR THE OPERATOR AND THE ENVIRONMENT

Carbon dioxide is a naturally occurring nontoxic and nonexplosive element. The system does not result in the release of additional carbon dioxide into the environment, and operators do not come into contact with hazardous, toxic or harmful chemicals.

ACTUAL APPLICATIONS

POLYMER AND RUBBER INJECTION AND MOULDING

Dry ice cleaning completely removes all residue from molds and injection heads without damaging their surfaces. It can also be applied to components that are still hot and without removing them from the machine. In addition, cleaning can be done "on-line" reducing downtime costs production.

- Rubber moulds
- Tyres moulds
- HDPE and PET moulds
- Banbury Mixer



FOOD INDUSTRY

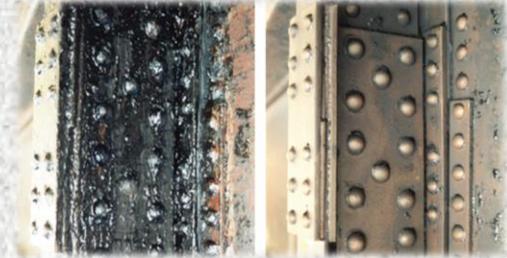
The major benefit of using cryogenic cleaning in the food industry is that dry ice is compatible with all food processes and does not promote the growth of bacteria after cleaning, even inhibiting their formation in some cases.

- Residues from baked goods
- Carbon residues from cooking plates and baked goods
- Screw conveyor belts and systems
- Tanks and fermenters



PAPER AND PRINTING INDUSTRY

Cleaning presses of oil, ink and various grease residues with reduced time and waste for color proofing before printing.



CHEMICAL INDUSTRY, PETROCHEMICAL AND PHARMACEUTICAL

Removal of dirt resulting from lime, combustion and bituminous residues.

Cleaning of filters, heat exchangers, chimneys, reactors.

VARIOUS APPLICATION

- Sludge and bitumen removal
- Oil and grease removal
- Adhesives, resins and paints removal
- Polymer removal
- Welding slag removal and cutting
- Switchboard cleaning
- Cleaning carbon residue on stators and rotors
- Transformer cleaning
- Cleaning turbine blades and compressors
- Miscellaneous cleaning in aviation industry
- Cleaning of hulls, engines, propellers
- Post-fire remediation



THE FUTURE

We cannot predict the future, but environmental and health regulations are becoming increasingly stringent; one thing is certain:

the successful company of the future that cares about the environment and the health of its workers will have incorporated cryogenic cleaning into its production processes.



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