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Dry Ice Blasting for Parts Cleaning

Residue-Free and Gentle Cleaning with Dry Ice

Gentle Cleaning with Dry Ice

Growing demands for efficiency, sustainability, and process reliability are increasingly bringing industrial cleaning methods into focus. Dry ice blasting has established itself in many industries as a residue-free and gentle alternative to conventional methods and can help reduce downtime and cleaning costs.

Dry ice blasting is based on the use of solid carbon dioxide, usually in pellet form. This is blasted at high speed onto the surface to be cleaned. Upon impact, a thermal shock occurs, causing contaminants to loosen. At the same time, the dry ice sublimates immediately – that is, it transitions directly from a solid to a gaseous state.

The process differs fundamentally from traditional cleaning methods such as sandblasting or high-pressure cleaning. While these methods often remove material and cause wear or rely on water and chemicals, dry ice blasting is non-abrasive, dry, and leaves no residue. Dry ice blasting technology thus enables the gentle cleaning of machines, production lines, and conveyor systems. Oil, grease, lubricants, and production residues are reliably removed without damaging or altering even the most sensitive surfaces. Coatings such as paint and adhesive can also be removed without leaving any residue. In the electrical industry, this dry and non-conductive cleaning process offers a decisive advantage: control cabinets and electronic control systems can be safely cleaned without compromising the sensitive electronics. Dry ice blasting technology can be used across various industries and offers a high degree of flexibility.

Carbo develops and manufactures dry ice blasting systems for a variety of user groups. Customers include both industrial companies that perform cleaning tasks in-house and specialized cleaning service providers. Users can therefore choose between an in-house solution using their own system and outsourcing to external service providers, depending on their cleaning volume, capacity usage, and available resources. Which option is more cost-effective depends, among other things, on the scope of cleaning, production cycle times, and staff availability.



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Non-abrasive and residue-free cleaning of injection molding tools using dry ice blasting technology.



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The dry ice blasting systems can be operated manually or automatically.

Practical example from the plastics industry

In an application example from the plastics processing industry, the company switched to dry ice blasting as a cleaning service.
Cleaning injection molding tools is a time-consuming task. Deposits such as baked-on coolant residues or outgassing products from the processed plastic must be removed. At a plastics processing company, the tools had previously been cleaned manually using brass brushes, scrapers, and chemical cleaning agents. This approach is not only labor-intensive but also entails technical drawbacks. Particularly stubborn contamination in channels, bores, and extensive hard-to-reach areas can only be removed with considerable time and effort. At the same time, mechanical processing inevitably leads to wear on the metal surfaces.
The plastics specialist then switched from in-house cleaning to dry ice blasting as a service provided by a Carbo customer. This method allows even stubborn residues to be removed quickly without subjecting the metal surfaces to mechanical stress. The advantages are particularly evident when cleaning channels and bores. While these areas are extensive and difficult to access with mechanical tools, dry ice blasting effectively dislodges deposits from the cavities through the pressure jet and the thermal effect of the dry ice pellets.
Until now, thoroughly cleaning a single tool by hand required approximately two workdays, or 16 working hours. Using the dry ice blasting method, the same carrier could be cleaned in just under 1.5 h – with better cleaning results. This corresponds to a reduction in cleaning time of approximately 91 %
As a result, the customer has decided to outsource the cleaning of the molds entirely to Carbo partners in the future. A regular cleaning cycle every one to two weeks is planned. Furthermore, the concept is to be expanded in the future to include the injection molds themselves. This will increase tool and equipment availability and significantly reduce downtime. In addition, there are no investment or maintenance costs for an in-house dry ice blasting system; all operating supplies and safety equipment are included in the service.

System technology for efficient cleaning processes

Carbo develops and manufactures its dry ice blasting systems in Germany; the Carbo Blaster systems are produced entirely in-house. The systems can be used for both manual and automated cleaning processes and are designed for industrial applications.
For gentle cleaning of sensitive surfaces with lower compressed air requirements, the systems can optionally be equipped with an integrated, adjustable dry ice mill.

Conclusion

Dry ice blasting is used in numerous industrial sectors for cleaning machines, tools, and equipment. The process enables the dry and gentle removal of contaminants and can supplement or replace conventional cleaning methods in certain applications, such as the injection molding industry.
In addition to specialized cleaning services, users also have access to high-performance dry ice blasting systems for in-house use. Depending on the application scenario, these systems can shorten cleaning times, reduce downtime, and make maintenance processes more efficient. //

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