



YOUR GUIDE TO

BLASTING SOLUTIONS FOR MANUFACTURING

POLARCLEAN.COM

Manufacturers with tight production schedules and little margin for downtime need industrial-strength cleaning solutions that are both effective in removing stubborn residues and buildup from complex machinery and also fast, cost-effective and minimally disruptive.

Conflict between production demands and cleaning needs is an ongoing challenge that leads some manufacturers to delay cleaning until it becomes a matter of machinery efficiency.

Others resort to hand-cleaning only to find that the results do not justify the amount of labor and time required.

With the right cleaning solutions, however, manufacturers don't have to choose between production schedules and the cleanliness of their equipment. From [dry ice blasting](#) to sponge blasting, abrasive blasting and hybrid combinations, manufacturers can implement effective cleaning solutions without excessive disruption, added debris, or even water.

This guide provides a comprehensive look at dry ice blasting and other methods effective in the manufacturing setting, alone and in combination.



COMMON CLEANING CHALLENGES IN GENERAL MANUFACTURING

With its mix of complex processes, equipment and materials, the cleaning of manufacturing facilities poses a variety of challenges:

Maintenance of Intricate Equipment

The manufacturing floor is home to a variety of intricate and often delicate machinery that accumulates dust, grime and operational by-products like oil, grease and glue, which can lead to overheating and malfunctioning. Regular and precise cleaning is essential, yet traditional methods can be overly abrasive or disruptive.

Handling Adhesive & Paint Residues

Operations involving adhesives, as in laminating processes, or paint, as in paint booths, can leave behind sticky or hard-set residues. These substances can be difficult to clean without risk of damage or requiring excessive time and manual labor.

Balancing Efficiency & Safety

In manufacturing settings, maintaining a balance between operational efficiency and stringent safety standards is crucial. This includes ensuring that equipment is free from contaminants that could compromise product quality or worker safety.

Studies have also shown that proper lighting reflected off clean, white walls and ceilings can reduce eye strain and [accidents](#) while [improving accuracy and morale](#).

Specialized Settings

Manufacturers of food and pharmaceutical products often require specialized cleaning methods that do not introduce, water, chemicals, or added debris into processing facilities and cleanrooms.

Environmental Concerns & Regulatory Compliance

Manufacturers face strict regulatory standards as well as demands to reduce environmental impact. Safety concerns include the accumulation of combustible dust, as well as the use of cleaning solutions that do not contribute to environmental or human health risks.

Minimizing Downtime

Downtime for cleaning and maintenance can be a significant cost in manufacturing. Traditional cleaning methods often require machinery to be taken offline for extended periods, impacting production schedules and efficiency.

Versatility in Cleaning Applications

Manufacturers require cleaning solutions versatile enough to address a range of materials and surfaces, from delicate electrical components to structures with firmly adhered buildup.

Challenging Manufacturing Application Examples

- Conveyor lines
- Pet food dryers
- Electrical control cabinets and boxes
- Printing presses
- Laminating machines
- Food production equipment
- Rail loaders
- Coffee bean silos
- RTOs
- Paint booths
- Wooden racks
- Ceilings, walls and ductwork
- Removal of epoxy resins
- CNC machines
- Ovens
- Tanks
- Combustible dust cleanings
- Pre-inspection prep
- Preventive maintenance

WHAT IS DRY ICE BLASTING?

Dry Ice Blasting is a cleaning process that uses frozen carbon dioxide (CO₂) pellets as the blasting medium. These pellets are propelled at high speeds using compressed air, like abrasive blasting, but with a crucial difference. Upon contact with the surface being cleaned, the dry ice pellets sublime, transitioning directly from a solid to a gas without passing through a liquid phase.

Dry ice blasting uses specialized nozzles and force levels adjustable down to a light dusting for cleaning delicate surfaces like electrical equipment. It removes dirt and grime from all types of manufacturing equipment without the introduction of water, chemicals or abrasive materials that require additional cleanup – and additional downtime.

Unlike conventional methods that rely on physical abrasion, water or chemical agents, dry ice blasting uses the thermal shock effect to dislodge dirt and other adherents. Traditional methods often require extensive cleanup, pose a risk of damaging delicate machinery, and can introduce moisture or chemical residues — none of which are concerns with dry ice blasting.

Depending on the application, dry ice blasting can be used in combination with abrasive blasting methods to tackle areas that require more abrasive force. The right blasting method or combination of methods is based on factors that include the type and stubbornness of the adherents, substrate type, and the setting.

The Science



When the dry ice pellets hit a surface material, their extremely low temperature (-78.5°C or -109.3°F) causes a rapid thermal shock. This shock weakens the bond between the contaminant and the surface. Simultaneously, as the pellets sublime, the vapor expands up to 800 times in volume, providing a powerful but non-destructive lifting force that removes the loosened debris.

DRY ICE BLASTING APPLICATIONS & USES IN GENERAL MANUFACTURING

The versatility of dry ice blasting enables a quick, safe, and economical cleaning solution, without the need for disassembly or significant downtime. From dirt to soot, grease, oil buildup and more, dry ice blasting can resolve a variety of cleaning challenges in general manufacturing. Some of the top applications include:

Cleaning Intricate Machinery

Dry ice blasting easily cleans complex and sensitive machinery such as **CNC machines and electrical control cabinets**. It is non-conductive and can remove contaminants like oil, grease and operational residues without the risk of damage or the need for disassembly.



Removing Adhesives & Flaking Paint



Dry ice blasting can be effective for removing adhesives and preparing a surface for repainting. However, layers of well-adhered paint, especially on brick, may require more abrasive force than dry ice blasting can provide.

Ensuring Safety & Compliance

For industries with stringent safety and quality standards, like food manufacturing and pharmaceuticals, dry ice blasting offers a cleaning solution that maintains the integrity of the production environment. It's non-toxic, leaves no residue, can be used in cleanrooms, and is approved for use in FDA and USDA inspected facilities.



Preventing Downtime



The efficiency of dry ice blasting allows for quick cleaning operations, preventing downtime otherwise required for repairs or alternative cleaning methods. This is especially beneficial in high-throughput manufacturing settings where every minute of production time is valuable.

Environmental & Regulatory Compliance

Dry ice blasting is often preferred in settings with sensitive environmental and regulatory compliance requirements. The ability to clean without the use of harmful chemicals aligns with eco-friendly practices and occupational health and safety standards.



Versatile Cleaning Application



Dry ice blasting is adaptable to a range of materials and surfaces. It can be used for delicate tasks, such as cleaning electrical components, and more robust applications, like removing corrosion or weld slag from metal structures.

COMPARISON OF CLEANING METHODS FOR MANUFACTURING

BLASTING/ CLEANING TYPE	NO WATER	NO MEDIA RESIDUE	NO CHEMICALS	100% PAINT REMOVAL	PAINT PREP	NON ABRASIVE
Dry Ice Blasting	✓	✓	✓		✓	✓
Abrasive Blasting	✓		✓	✓		
Sponge Blasting	✓		✓	✓		
Hydroblasting		✓	✓			✓
Mechanical	Depends on use	✓	Depends on use			

CASE STUDIES

Indiana Laminate Board Manufacturer

The process of coating giant sheets of laminate with glue left an Indiana supplier of laminate for RV manufacturers with the sticky and time-consuming job of scraping old glue from laminating machines and floors - where it mixed with dust to create cement-like buildup. Hand cleaning was incredibly time consuming and had a tendency to burn out a lot of power tools. Then a continuous improvement engineer happened to visit a similar facility that was surprisingly clean. The answer, she learned, was regular dry ice cleaning.

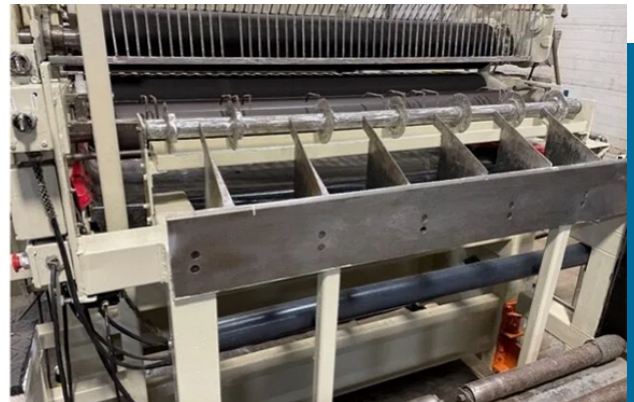
Polar Clean got the job, and in little time, the facility was looking like new. Laminate deposits removed from machinery controls by water-free dry ice blasting revealed wires, buttons and controls that had been completely concealed beneath the residual glue. If not for Polar Clean, the company would likely have had to replace the \$50,000 board coater. [Learn more.](#)

“I wish we would have known about dry ice cleaning sooner.”

- Continuous Improvement Engineer



Before Dry Ice Cleaning



After Dry Ice Cleaning

Midwestern Food Production Facility

When a large food producer made the shift from a soy-based additive to a non-allergenic product, every trace of soy had to be removed from the facility. The debris included caked-on soy powder inside food dryers that were 75-feet deep, as well as solidified soy powder crusted into machine crevices.

Strict cross-contamination prevention practices made water-based cleaning methods problematic.

Polar Clean Dry ice blasting, including the use of proprietary nozzles to remove soy particles from hard-to-access processing and packaging areas, left the six-floor facility soy free and pristine. [Learn more.](#)

Before Dry Ice Blasting



After Dry Ice Blasting



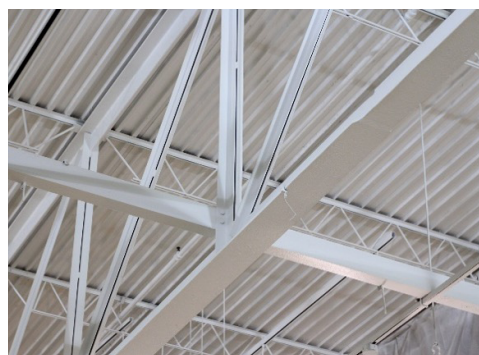
Chicago Steel Manufacturer

Polar Clean was contracted to clean and repaint a facility in Chicago that manufactures steel pipes and tubes. The client initially faced issues with paint adhesion due to repainting over unclean surfaces. Polar Clean utilized dry ice blasting to effectively remove cobwebs, dust, rust, and loose paint, providing a clean and smooth surface. This method greatly improved the paint adhesion, ensuring a more durable and long-lasting result for repainting.

Before Dry Ice Blasting



After Dry Ice Blasting



Manufacturing Facility in Ohio

A combination system using [selected abrasive media](#) then dry ice blasting was used to clean multiple heat recovery steam generators (HRSGs) at a metallurgical producer in Ohio. This cleaning was completed by calibrating a mixture of abrasive media with the dry ice. The work was performed by multiple crews working round the clock in 12-hour shifts to accommodate our client's strict 48-hour shutdown time frame.

Before Dry Ice Blasting



After Dry Ice Blasting



THE POLAR CLEAN ADVANTAGE FOR GENERAL MANUFACTURING

Polar Clean stands out in the general manufacturing sector for its innovative approach to maintenance and cleaning challenges, delivering swift, efficient, and comprehensive solutions. Our strength lies in our ability to navigate complex manufacturing environments, offering a range of cleaning methods tailored to the specific needs of each project.

Tailored Solutions

Polar Clean begins with a thorough assessment of each project. Our team's technical experience allows us to provide customized hybrid solutions, addressing even the most intricate and demanding manufacturing scenarios with precision and effectiveness.

Rapid Service

Careful planning and assessment are also used to minimize downtime. We can also work around production shifts to minimize disruptions, including overnight cleaning or the use of specialized containment to accommodate ongoing production.

Versatile Techniques

No two manufacturing projects are the same, and Polar Clean provides an array of cleaning solutions. From dry ice blasting services to other techniques like [sponge blasting](#) or abrasive blasting, we ensure the right fit between cleaning challenge and method. A variety of cleaning methods, combined with specialized training and experience, enables our team to tackle every job with the right approach.

ADDITIONAL CONSIDERATIONS

Some manufacturing cleaning projects require additional planning and techniques to ensure safety and effectiveness, including:

Containment

Containment planning may be necessary to prevent debris from contaminating the environment or areas of a building in use. This also minimizes the amount of collateral cleanup and ensures the best results.

Though containment is routinely required for other blasting methods, it can also be required for dry ice blasting, depending on the amount and type of debris that is blasted off – dry ice sublimates on contact, so does not require containment by itself.

Heights & Scaffolding

Height and accessibility challenges may require additional training and precautions, including certifications for:

- OSHA Aerial Lift Training
- OSHA Scaffolding Training
- Rappelling Training

Confined Spaces

When blasting in confined spaces, personal protective equipment (PPE) and supplied air are required, as well as training and certifications:

- OSHA PPE training
- Permit-required confined space entry training
- Respirator fitness certification

Hazardous Substances

If lead, mold or asbestos is involved, additional training and certifications are required:

- Asbestos awareness certification
- EPA Lead Renovation, Repair and Painting (RRP) Rule certification
- OSHA Hazardous Waste Operations & Emergency Response (HAZWOPER) training
- Mold remediation certification

PARTNER WITH A MANUFACTURING BLASTING EXPERT

Manufacturing projects require specialized capabilities and experience to ensure high quality results with minimal disruption.

The right partner will understand the needs, goals, and logistical requirements of working in the manufacturing setting. They will combine technical expertise with innovative solutions, speed with quality, and proactive communication with dedicated and reliable service.

We take pride in our ability to handle complex cleaning projects, delivering rapid and efficient service, and providing a wide range of solutions to ensure the safest and most effective results.

From patented nozzles and other proprietary equipment to meticulous processes for planning, staging and executing complex cleaning projects, the Polar Clean team provides reliable, rapid and professional cleaning services that busy manufacturers can rely on.

Additional Reading

For a deeper understanding of our services and the benefits for general manufacturing, we invite you to explore:

- [Additional Case Studies: Dry Ice Blasting in Manufacturing](#)
- [Dry Ice, Sponge & Abrasive Blasting: A Comparison](#)
- [Guide: Why Use Dry Ice Blasting?](#)

About Polar Clean

Since 2011, facility managers, turnaround managers and restoration professionals have relied on Polar Clean, a division of Premium Plant Services, for safe, efficient and mess-free cleaning needed for challenging commercial and industrial environments. Without the collateral damage and containment challenges of hydroblasting and other abrasive cleaning methods, dry ice blasting is ideal for preventive maintenance, shutdowns, emergencies, and restoration – for oil refineries, petrochemical plants, power plants, food processing facilities, manufacturing plants, and other sensitive environments. We offer hydroblasting and other abrasive blasting services when they are a better fit. To determine the right cleaning method for your facility, contact a member of the Polar Clean Premium Plant Services team for a dry ice blasting assessment: <https://polarclean.com>

