

the DEFINITIVE GUIDE *to*

DRY ICE BLASTING



 **Cold Jet®**
the force of nature

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Introduction

Dry ice blasting, or dry ice cleaning, is used across the globe as a solution for industrial cleaning, surface preparation, and the deburring and deflashing of parts in a wide range of industries. It is a preferred method because it is non-abrasive, non-conductive, non-toxic, and does not create secondary waste.

This guide is designed to answer all of your questions about dry ice blasting. It will review everything from what dry ice cleaning is to what equipment you need to implement a dry ice cleaning process.

You will learn that dry ice blasting is an environmentally responsible industrial cleaning solution that will help you cut costs, decrease cleaning time, and reduce labor allocated to cleaning and maintenance projects.

You will also learn if dry ice blasting is right for you.



Key Takeaways

- Fundamentals of dry ice and dry ice blasting
- How dry ice blasting works
- What dry ice blasting is used for
- Benefits of dry ice blasting
- Comparing dry ice blasting to other industrial cleaning methods
- What equipment is needed for dry ice blasting
- How to choose a dry ice blasting machine
- How to get dry ice
- Safety considerations

What Is Dry Ice?

Dry ice is the solid form of carbon dioxide (CO₂). Unlike regular ice made from water, dry ice doesn't melt into a liquid. Dry ice sublimates, or phase transitions from solid CO₂ to gaseous CO₂.

Dry ice has a very low temperature, around -109.3°F (-78.5°C), which makes it an excellent cooling and cleaning medium.



These unique properties make dry ice useful for several applications.



Cleaning

Dry ice blasting uses pellets of dry ice to clean surfaces without chemicals or abrasives.



Cooling and Preservation

Dry ice is much colder than regular ice and doesn't leave water behind, making it ideal for shipping frozen foods, medical supplies, and other temperature-sensitive items.



Scientific Applications

Dry ice is used in laboratories for freezing samples and creating controlled low-temperature environments.

What Is Dry Ice Blasting?

Dry ice blasting is similar to sand, bead, and soda blasting in that it cleans surfaces using a medium accelerated in a pressurized air stream. It differs in that dry ice blasting uses solid CO₂ pellets or MicroParticles (sugar-sized particles) accelerated at high velocities to remove a variety of contaminants and residues. The dry ice particles sublime upon impact, lifting unwanted residues from the underlying surface without damage.

Dry ice blasting does not create secondary waste like other media blasting techniques. Because dry ice turns back to gas when it hits a surface, it eliminates secondary waste streams. The only remaining waste products are the dislodged contaminants, which can be vacuumed or swept away.

The dry ice cleaning process has unique characteristics that differentiate it from other cleaning methods and other media blasting methods.



Dry Ice Cleaning is

- ✓ Non-abrasive
- ✓ Non-conductive
- ✓ Non-flammable
- ✓ Non-toxic
- ✓ Environmentally friendly

Dry ice cleaning was originally developed to remove paint and coating from airplanes in the 1970s. The technology has been developed commercially by Cold Jet since 1988.

Dry ice blasting is known by several alternative names in the industry, including dry ice cleaning, CO₂ blasting, cryogenic cleaning, dry ice blast cleaning, dry ice shot blasting, and even dry ice sandblasting.

How does dry ice blasting work?

Dry ice blasting combines three primary factors to remove contaminants:

- Pellet Kinetic Energy
- Thermal Shock Effect
- Thermal-Kinetic Effect

Pellet Kinetic Energy

How Dry Ice Blasting Works - Kinetic Energy

Dry ice is accelerated by compressed air through a nozzle at supersonic speeds. When the dry ice impacts the surface being cleaned, it creates a kinetic effect. This effect has the largest contribution to the cleaning process when surfaces are at ambient temperatures or below.

Even at high impact velocities and direct head-on impact angles, the kinetic effect of solid CO₂ pellets is minimal when compared to other media. This is due to the relative softness of a solid CO₂ particle (1.5 – 2 on the Mohs Scale of Hardness), which is not as dense and hard as other blasting media.

Also, the pellet phase changes from a solid to a gas, almost instantaneously, upon impact. Very little impact energy is transferred into the surface, so the dry ice cleaning process is considered to be non-abrasive.

Thermal Shock Effect

How Dry Ice Blasting Works - Thermodynamic Shock

The temperature (-109°F / -78.5°C) of the dry ice causes thermodynamic shock, which causes the contaminant to embrittle and shrink. The resulting micro-cracking helps break the bond between the surface and the contaminant.

The instantaneous sublimation (phase change from solid to gas) of dry ice upon impact absorbs maximum heat from the very thin top layer of the surface contaminant. Maximum heat is absorbed due to latent heat of sublimation.

The very rapid transfer of heat into the dry ice from the coating top layer creates an extremely large temperature differential between successive micro-layers within the contaminant. This sharp thermal gradient produces localized high shear stresses between the micro-layers. The shear stresses produced are also dependent upon the contaminant's thermal conductivity and thermal coefficient of expansion/contraction, as well as the thermal mass of the underlying substrate. The high shear produced over a very brief period of time causes rapid micro-cracking between the layers leading to the failure of the bond between the contaminant and surface.

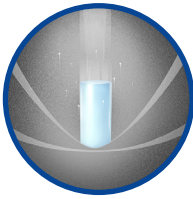
Thermal-Kinetic Effect

How Dry Ice Blasting Works - Expansion

Upon impact, the combined impact energy dissipation and extremely rapid heat transfer between the pellet and the surface cause the dry ice particles to sublimate, or expand instantly, and return to the natural gas state. During this phase transition from solid to gas, the volume of dry ice expands up to 800 times in a few milliseconds and lifts the contaminant off of the surface.

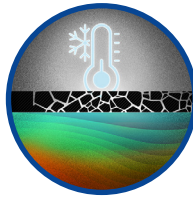
This aids in the lifting of thermally-fractured contaminants from the surface. This is because of the dry ice particle's lack of rebound energy, which tends to distribute its mass along the surface during the impact. The CO₂ gas expands outward along the surface and its resulting "explosion shock front" effectively provides an area of high pressure focused between the surface and the thermally fractured contaminant particles. This results in a very efficient lifting force to carry the particles away from the surface.

To simplify it, we use the acronym ICE



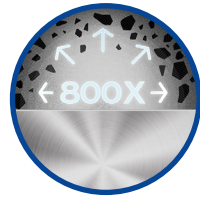
Impact

Impact of pellets creates a Kinetic Energy Effect. The soft dry ice is accelerated by compressed air through specially designed nozzles at supersonic speeds.



Cold

Cold temperature of dry ice pellets creates a Thermal Effect. The temperature of dry ice causes the contaminant to embrittle. This helps break the bond between the substrate and the contaminant.



Expansion

Expansion of the dry ice pellets. Dry ice pellets sublimate upon impact, expanding volumetrically, removing the contaminant.

What is dry ice blasting used for?

Surface Cleaning

Dry ice blasting is a non-abrasive, non-conductive, non-toxic cleaning method that does not create secondary waste. It is used to clean many types of surfaces in a multitude of commercial and manufacturing settings. Surfaces of tooling, machinery, and finished parts can be cleaned with dry ice.



Dry ice cleaning has a wide range on the aggression spectrum (from very aggressive to delicate cleaning). The compressed air pressure, dry ice particle size, and dry ice feed rate can be adjusted and dialed down to clean very delicate and sensitive surfaces, such as soft alloys, electrical wires, and sensors. It can also be dialed up to clean heavy and stubborn contaminants, such as asphalt, corrosion and weld slag.

Surface Preparation

Dry ice cleaning serves as a moisture-free surface preparation method that eliminates mold release compounds, debris, lubricants, dust particles, fingerprint residues, and production contaminants from components prior to painting, coating, and other finishing processes. It's gentle on materials, preserves surface integrity, and avoids creating surface texture changes.

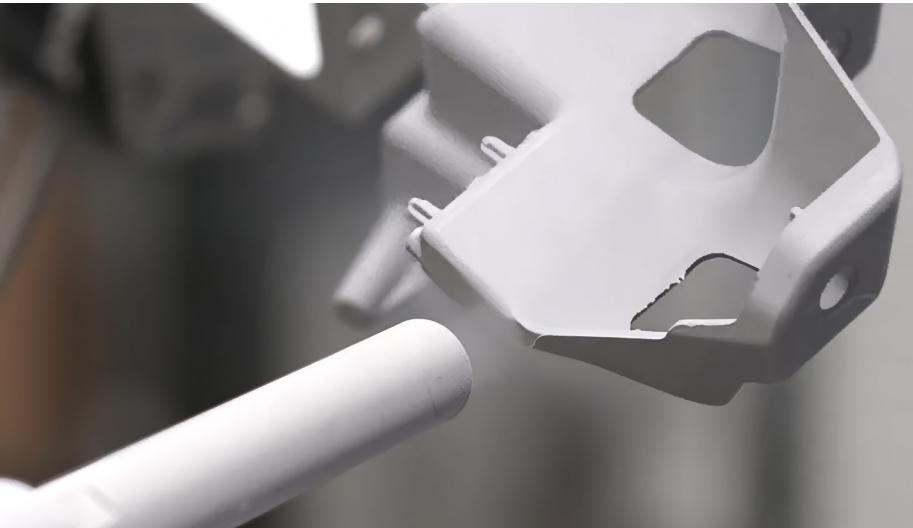
Since the process contains no water, it removes drying requirements and produces surfaces ready for immediate coating or painting application. The surface preparation technique activates the surface while providing thorough contaminant elimination across various material types.



Deburring and Deflashing

Dry ice cleaning safely removes burrs and flash from a variety of materials. The deburring and deflashing technique preserves part surfaces, maintains dimensional accuracy, and protects essential features. This method enables precise removal from targeted locations containing excess material while delivering more consistent results compared to conventional finishing equipment or mechanical deflashing systems.

Dry ice blasting machines do not generate secondary waste streams, eliminating concerns about surface contamination and grit entrapment.



What are the benefits of dry ice blasting?



Non-Abrasive and Non-Damaging

Dry ice is a very soft media and can clean most surfaces without damage. It can clean sensitive surfaces, such as electronic equipment, printed circuit boards and plastic molds, without etching, profiling, or changing surface dimensions.



No Secondary Waste

Dry ice sublimates upon impact with the surface being cleaned, which results in no secondary waste, no residue, and no moisture. This eliminates extra cleanup, disposal of secondary waste streams, and additional cleaning preparation, such as masking delicate sensors or wrapping electronic components. Elimination of secondary waste allows equipment to be cleaned while online and still operating.



Environmentally Friendly

The dry ice used in the dry ice cleaning process is made of reclaimed CO₂ that is collected and recycled from other industrial processes. It does not produce more CO₂ or add additional greenhouse gases to the atmosphere.

Due to the fact that the dry ice is recycled CO₂, it will not contribute to your greenhouse gas score. In the calculation of a carbon footprint, CO₂ is accounted for at the producer level. It is not counted a second time at the point of use.

—
California Air Resources Board

Under the current Greenhouse Gas Reporting Program (GHGRP), dry ice blasting is not required to report.

—
Federal Register, Environmental Protection Agency (EPA)

Dry ice cleaning also eliminates environmentally and occupationally harmful cleaning chemicals and eliminates worker exposure to hazardous cleaning agents. It also does not produce any toxic waste that must be disposed of.



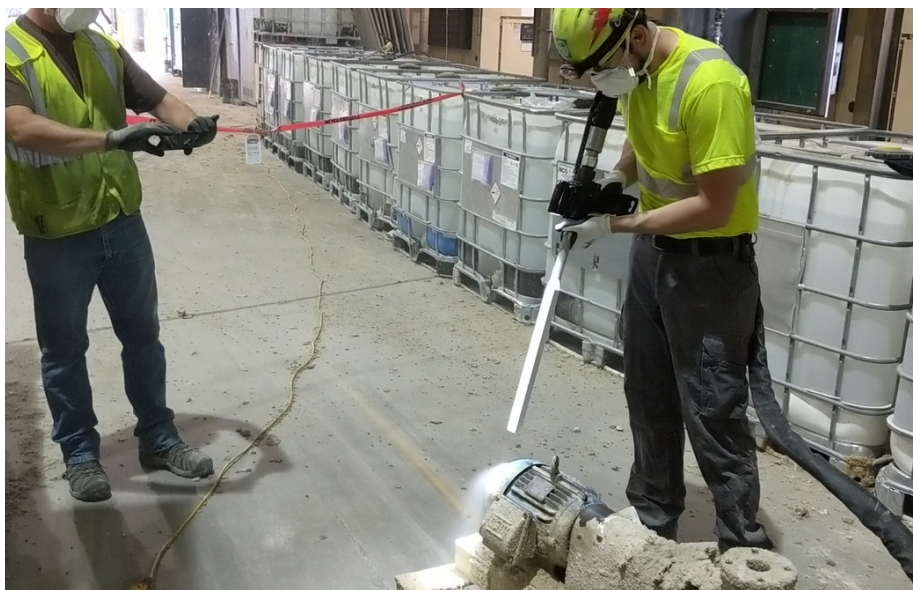
Non-Toxic

Dry ice is a food grade media and is approved for use in FDA and USDA inspected facilities. It is colorless, tasteless, odorless, and non-toxic. Traditional cleaning methods often rely on chemical cleaning agents that can be hazardous to workers and the environment. Dry ice blasting eliminates the need for these chemicals, reducing employee exposure to dangerous substances and minimizing the risk of chemical contamination.



Non-Conductive and Non-Flammable

Dry ice is non-conductive and will not cause corrosion or rusting of surfaces. It also allows for electrical equipment to be safely cleaned. CO₂ is also a non-flammable gas and there is no risk of combustion.



Why do businesses choose dry ice blasting?

Alternative cleaning methods are time consuming, labor intensive, and costly. Manual scraping or scrubbing with wire brushes and water or chemicals can consume many hours and result in extended downtime. It can also cause damage to equipment and shorten operational life or make it less productive.

The unique characteristics of dry ice make it the perfect cleaning media.

Dry ice is non-abrasive and non-conductive and will not damage surfaces or equipment. It sublimates on impact, leaving behind no secondary waste. It is also non-toxic and safe for employees.

These attributes make dry ice cleaning an efficient, cost effective, and environmentally sustainable cleaning solution.



Dry Ice Cleaning Enables

- ✓ Reduced costs
- ✓ Improved productivity
- ✓ Prolonged equipment life
- ✓ Improved worker safety
- ✓ Enhanced sustainability



Reduced Costs

Dry ice cleaning reduces labor costs because it can be done quickly by one person and in significantly less time than conventional industrial cleaning tools. This enables a cleaner clean, even in situations that are difficult or unpopular to clean by hand or with other conventional methods. In some instances, cleaning time will be measured in minutes instead of hours.



Improved Productivity

Dry ice blasting machines do not generate water or a secondary waste, which allows equipment to be cleaned while hot and online. This eliminates the need to perform timely equipment disassembly and helps to reduce shut down times.

By cleaning equipment in less time, facilities are able to get more production cycles from existing equipment. Preventative maintenance or spot cleaning can also be done more frequently without impacting production. This increases tool uptime, which extends production runs and reduces downtime associated with cleaning and maintenance.



Prolonged Equipment Life

Dry ice cleaning is a dry process that is non-abrasive and non-conductive; meaning it won't damage equipment and is safe for most surfaces, including electrical components. Other cleaning methods, such as manual scraping or scrubbing with chemical solvents, are abrasive and corrosive and can damage the equipment or wear it down. By extending the operational life of key tooling and equipment, dry ice cleaning can save significant amounts of money.



Improved Worker Safety

Dry ice cleaning eliminates exposure to toxic cleaning materials. The process also eliminates repetitive motions of hand cleaning, scrubbing, chiseling, or activities that require pounding, sanding, or scraping.



Enhanced Sustainability

When using solid grit media or water for cleaning hazardous materials, the cleaning media also becomes hazardous, requiring special handling, disposal, and regulatory reporting. The resulting waste can also create downstream contamination that affects surrounding installations. Dry ice does not create waste stream additions.

Where is dry ice blasting used?

Dry ice blasting machines are used for a wide variety of cleaning, surface preparation, and parts finishing applications in a diverse range of industries.

**Dry ice cleaning is successfully being used
in the following industries:**



Aerospace



**Automotive
Manufacturing**



**Automotive
Restoration &
Detailing**



**Contract
Cleaning**



**Engineered
Wood**



Fire Restoration



**Food &
Beverage**



Foundry



**General
Maintenance &
Facilities**



**Historical
Restoration**



**Medical
Equipment
Manufacturing**



**Mold
Remediation**



Oil & Gas



Packaging



**Plastics &
Composites**



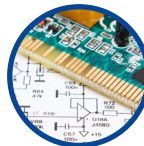
**Power
Generation**



Printing



**Rubber &
Tires**



**Semiconductor
Fabrication**



Textiles

Dry Ice Blasting vs Alternative Industrial Cleaning Methods

When evaluating cleaning methods for industrial applications, dry ice blasting presents distinct advantages compared to alternatives. The selection of an appropriate cleaning method requires careful consideration of multiple factors beyond cleaning efficacy. Each technique's unique characteristics significantly impact the target surface, surrounding environment, and operator safety. Understanding these distinctions is essential for making informed decisions that optimize both cleaning performance, safety, and operational efficiency.



Let's compare several common industrial cleaning methods to dry ice blasting

- ✓ Abrasive Blasting
- ✓ Sand Blasting
- ✓ Laser Cleaning
- ✓ Hand Tools and Chemical Solvents
- ✓ Soda Blasting
- ✓ Pressure Washing

Dry Ice Blasting vs Abrasive Blasting

Abrasive Blasting

Traditional abrasive blasting techniques (crushed glass, plastic beads, walnut shells) inherently cause some degree of surface erosion, pitting, or surface profiling, which can be detrimental to sensitive equipment, industrial molds, or components requiring precise tolerances. Traditional abrasives also create messy secondary waste, which must be collected and removed.



Dry Ice Blasting

Dry ice blasting is non-abrasive and cleans without damaging surfaces. Dry ice sublimates upon impact, which means no secondary cleaning media is left behind. This eliminates the labor-intensive and costly cleanup associated with abrasive blasting's spent media.

Dry ice cleaning machines are also safer and more environmentally friendly. The process does not create harmful dust or airborne particulates that are common with abrasive media. Dry ice blasting equipment improves worker conditions and reduces environmental footprint.

Dry Ice Blasting vs Sand Blasting

Sand Blasting

While sandblasting aggressively removes contaminants, it's often at the expense of the underlying surface. Sandblasting uses abrasive media and damages delicate surfaces and equipment. The high-pressure abrasive particles can cause surface pitting, dimensional changes, and premature wear. Additionally, sandblasting generates hazardous silica dust that poses serious respiratory health risks to workers and requires expensive ventilation systems and PPE. The process also contaminates the surrounding work area with spent abrasive media, creating extensive cleanup requirements and potential environmental concerns. Equipment downtime is significantly increased due to the need for thorough post-blast cleanup, media disposal, and potential surface repairs from blast damage.



Dry Ice Blasting

In contrast, dry ice blasting machines utilize non-abrasive dry ice pellets that sublimate on impact, leaving behind no secondary waste. This not only eliminates costly cleanup, but also preserves equipment integrity, extending its operational life.

Dry ice blasting machines are a safer and more environmentally friendly option, producing no harmful dust or airborne particulates common with sandblasting, ensuring a healthier work environment and reduced environmental impact.

Dry Ice Blasting vs Laser Cleaning

Laser Cleaning

Laser cleaning has drawbacks that limit its widespread adoption. It demands substantial capital investment and carries high upfront costs. Laser cleaning also requires considerable energy consumption during operation, leading to elevated ongoing operational expenses. The process also has notable material limitations. Laser cleaning is ineffective on soft, fragile, or highly reflective surfaces that cannot properly absorb or interact with laser energy. Additionally, laser cleaning operates relatively slowly, making it impractical for large surface areas.

Extensive operator training and expertise are essential for proper operation. Operators must understand complex laser parameters, including wavelength, pulse duration, and energy density to achieve optimal results without damaging substrates. Laser cleaning also introduces safety concerns for operators and surrounding workers. High-powered laser beams pose serious risks of skin burns and eye injuries, while vaporized contaminants can create harmful fumes requiring ventilation systems.



Dry Ice Blasting

Dry ice blasting cleaning machines are a more practical choice for many industrial applications. Unlike laser cleaning systems that require substantial capital investment and specialized technical expertise, dry ice blasting equipment is more accessible and easier to operate, reducing both initial costs and training requirements.

Dry ice blasting machines are a more versatile solution than laser cleaning. They effectively clean a wide range of materials including soft, delicate, and reflective surfaces that laser cleaning cannot handle effectively. Dry ice blasting also operates significantly faster than laser cleaning, making it ideal for large surface areas.

From a safety perspective, while proper precautions are still necessary, dry ice blasting presents fewer risks than high-powered laser beams that can cause severe burns and eye damage.

Additionally, dry ice blasting equipment has lower energy consumption and maintenance requirements compared to complex laser equipment, resulting in reduced operational costs.

Dry Ice Blasting vs Hand Tools & Chemical Solvents

Manual Cleaning

Manual cleaning usually involves a lot of effort, such as repetitive scrubbing and scraping. Also, it often requires using chemical solvents. This can be very time-consuming and physically demanding, leading to worker fatigue and potential injuries from repetitive motions or contact with hazardous substances. Hand tools struggle to reach small, complex areas. Equipment must be taken apart to be cleaned, leading to long periods where machinery isn't running. Furthermore, cleaning with hand tools can damage sensitive surfaces, which can compromise equipment performance and lifespan.



Dry Ice Blasting

Dry ice blasting is a gentle, non-toxic, and much faster way to clean. Dry ice blasting can clean equipment in place and without disassembly. The process also excels at cleaning hard to reach or complex surfaces, such as complex geometries on plastic molds. This significantly cuts down on the time workers spend cleaning and reduces how long production stops. Additionally, dry ice cleaning machines do not expose workers to harmful chemicals.

Dry Ice Blasting vs Soda Blasting

Soda Blasting

Soda blasting uses sodium bicarbonate (baking soda) as its media. It is mildly abrasive, but it is more gentle than abrasive blasting and can effectively remove contaminants. However, it creates a significant amount of secondary waste in the form of soda residue. This residue requires extensive cleanup, often leaving a fine powder that can be challenging to remove from intricate components and crevices. It is also moisture-sensitive, which leads to clumping. Soda blasting may pose environmental risks when cleanup is inadequate. If sodium bicarbonate particles penetrate soil, they can disrupt pH balance and kill vegetation.



Dry Ice Blasting

Dry ice blasting is non-abrasive and will not damage equipment or tooling. Dry ice cleaning does not produce a secondary waste stream like soda blasting, which means there is no leftover blasting media to clean up. This significantly reduces labor, disposal costs, and downtime. Dry ice also poses no environmental risk to the surrounding area being cleaned.

Dry Ice Blasting vs Pressure Washing

Pressure Washing

Pressure washing, while effective for general surface cleaning, presents significant drawbacks that limit its application in many industrial environments. Its reliance on high-pressure water introduces considerable moisture, posing risks to electrical systems, intricate machinery components, and leading to potential issues like rust, corrosion, and mold growth. The process generates a substantial volume of waste water that must be contained, collected, and disposed of. This adds additional operational expenses and introduces environmental concerns regarding runoff and pollution. The abrasive force of water can also damage delicate surfaces.



Dry Ice Blasting

Dry ice blasting is a completely dry cleaning process. This eliminates the need for drying, prevents water-related damage to sensitive equipment, and drastically reduces cleanup efforts. Its non-conductive nature makes it uniquely safe for cleaning energized electrical components.

What equipment is needed for dry ice blasting?

Dry ice blasting requires a simple setup.

You will need the following equipment when implementing your dry ice blasting operation.



Dry Ice Blasting Machine

Cleaning and maintenance procedures are often overlooked, but are key to maintaining high operational efficiency. Industrial cleaning is often performed in demanding environments. A high quality, durable, and easy to use dry ice blaster is essential. Cold Jet offers a variety of dry ice cleaning machine models to choose from, including models that feature adjustable blasting pressures, stainless steel components, and rugged and durable frames. Along with your dry ice blasting machine, the systems will come complete with a blast hose, air hose, an applicator, and a nozzle that is best suited for your application.



Compressed Air Source (plant air or an air compressor)

Compressed air can be supplied from an existing filtered air system or from a dedicated mobile compressor with appropriate filtration.

An after cooler is essential if you are using a portable diesel compressor as your air source. An after cooler removes most of the moisture from the system and can cool the air within 15°F (-9.4°C) of the surrounding air. This is primarily dependent on humidity levels.



Dry Ice Supply

Regular access to dry ice is essential for your dry ice blasting operation. Most dry ice blasting customers purchase dry ice from industrial gas suppliers, welding supply companies, and other regional or local suppliers. Partner with suppliers who can establish a reliable delivery schedule aligned with your cleaning and maintenance schedules.



Electric Power Source

Dry ice blasters can be plugged into a standard 110-volt outlet. The machine will draw about 6 amps.

Personal Protective Equipment (PPE)

Operators should be equipped with proper PPE, including: gloves, eye protection, and hearing protection.

How to choose a dry ice blaster

When choosing an appropriate dry ice blasting machine, a variety of factors must be considered:

- Your application and industry
- Equipment or tooling you're cleaning
- Contaminant(s) you're removing
- Size of the area you're cleaning
- Desired cleaning outcome

Ultimately, choosing the right dry ice blasting machine depends on your specific cleaning requirements. Cold Jet has an experienced team that can evaluate your needs and guide you through the selection process.

Everything You Need to Know About Buying and Storing Dry Ice

How do you get dry ice?

Dry ice pellets or blocks can be ordered from industrial gas suppliers, welding supply companies, and other regional suppliers. Dry ice can be picked up directly from suppliers, or most major metropolitan areas have regular delivery trucks that cover 100-mile radiuses. Dry ice can also be shipped using a common carrier and it is delivered in insulated containers.



How long will dry ice last?

Dry ice will last for up to a week if it's properly stored in an insulated container, which is provided by your dry ice supplier and picked up by them when needed. The thicker the insulation, the slower it will sublimate. Depending on the climate and thickness of your container, typical dry ice sublimation is approximately 2% to 10% per day.

How much dry ice do I need?

The amount of dry ice needed to clean effectively varies from application to application and can vary dramatically with each dry ice cleaning machine. The average dry ice consumption for dry ice blasting equipment will range from approximately 0.7 lbs (0.32 kg) per minute for a MicroParticle system to 2 1/2 lbs (1.1 kg) per minute for a pellet system.

How much does dry ice cost?

Dry ice is a commodity and prices vary geographically. The cost of dry ice generally ranges from \$.60 to \$3.00 per pound. Other factors can influence the exact price, including: quantity purchased, form of dry ice you're purchasing, and geographic location.

What type of dry ice do I need?

Dry ice is always solid CO₂. However, it comes in different forms and sizes, which are chosen based on their intended use. Different dry ice forms include: pellets, blocks, nuggets, and slices or slabs. Which type of dry ice you need to purchase depends on your dry ice blaster. Standard dry ice blasters rely on pellets, which can blast with full pellets, as well as with smaller sizes if a fragmenting nozzle is used. MicroParticle dry ice blasters will need blocks or slabs, which are shaved, grinded, or cut with a Particle Control System (PCS) to make MicroParticle dry ice.

What type of dry ice should I blast with?

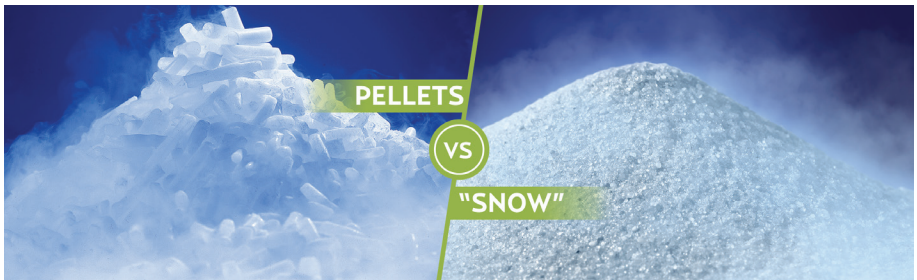
The size and density of the dry ice particle greatly affects the resulting clean. Different sized particles are used for different cleaning applications:

1. Dry Ice Pellets

- 3mm in size (roughly rice sized)
- High density
- Used for a more aggressive clean, getting rid of the most stubborn contaminants

2. Dry Ice MicroParticles

- Sugar-sized particles (~0.3mm)
- Used to clean delicate and sensitive surfaces
- Less aggressive than pellets
- More media strikes the surface per second and per square inch
- Increased coverage area
- Less air power is needed to accelerate dry ice (less noise)
- MicroParticles are the result of shaving dry ice (pellets, block, etc)



Can I make my own dry ice?

Dry ice can be produced on demand using a dry ice production machine, also known as a pelletizer. Producing your own dry ice must be economically viable and the amount of dry ice used on a daily and weekly basis must be considered.

Pelletizers can be equipped with multiple dies to produce a range of extrusion sizes (3mm to 19mm). From nuggets to pellets, pelletizers can produce multiple sizes of dry ice for a broad range of solutions.



What type of air pressure (air compressor) do you need for dry ice blasting?

Dry ice blasting equipment using pellets typically consume 100 cfm (2.8 m³/min) at 80 psi (5.5 bar), while MicroParticle systems typically consume 30 cfm (0.9 m³/min) at 80 psi (5.5 bar). Low flow nozzles for MicroParticle systems can consume as little as 12 cfm (0.3 m³/min) at 80 psi (5.5 bar). However, your needs will depend on your application.

Dry ice blasting machines can run on either shop air or a diesel air compressor.



Shop Air



Diesel Compressor

Is dry ice blasting safe?

Dry ice cleaning machines are safe in typical industrial environments when proper safety protocols are adhered to. CO₂ concentrations present minimal risk to operators, particularly in large open areas where natural air circulation prevents CO₂ accumulation.

Dry ice blasting in confined spaces requires specific safety considerations. In confined areas or poorly ventilated spaces, proper ventilation systems and CO₂ monitoring become essential to prevent gas accumulation. Open-area operations typically require only standard PPE.

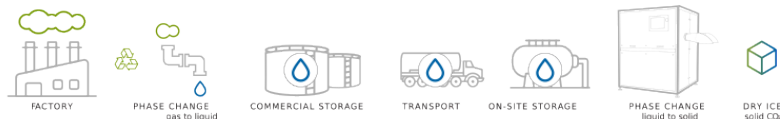


Is dry ice blasting environmentally friendly?

Dry ice blasting is an ideal solution for those looking for an environmentally sustainable cleaning solution.

Dry ice is made of recycled CO₂

Dry ice is the product of a carbon capture and utilization (CCU) process. CO₂ is captured at industrial and biogas facilities, recycled, and converted to dry ice. The CO₂ that would have otherwise been discarded as waste is given a second life as a cooling and cleaning medium. The dry ice does not add to emissions or produce more CO₂.



Dry ice blasting reduces or eliminates water usage in sanitation

Water risk has become a major environmental concern and it has been estimated that up to 40% of water used at industrial facilities is used for sanitation purposes. Dry ice blasting eliminates the need for water in sanitation processes.

Dry ice blasting eliminates harmful secondary waste

When the dry ice impacts the surface being cleaned, it sublimates and does not produce secondary waste. Similar techniques leave behind a residue that must be cleaned up with the contaminant. This media can become hazardous and create downstream contamination and harm the surrounding area and installations.

Dry ice blasting is non-toxic and eliminates the need for chemical solvents

The dry ice used in the dry ice blasting process is a food grade media and is EPA, FDA, and USDA approved for use around food manufacturing. It is colorless, tasteless, odorless, and non-toxic. Dry ice blasting eliminates the need for chemical cleaning solvents in many applications.

Frequently Asked Questions

How much does a dry ice blasting machine cost?

Cold Jet has a number of different machine options depending on your application, air supply, and budget. There are a variety of factors that impact cost, including: hopper capacity, blasting pressure, and special features like IoT capability and Particle Control Systems. Professional grade dry ice blasters range from \$15,000 to \$55,000.

There are many low quality and knock off dry ice blasters that can be purchased on Amazon or Alibaba for much less, however these machines provide an extremely poor clean, are inefficient, and often break within just a few uses.

What PPE is needed for dry ice blasting?

Cleaning and maintenance teams should be equipped with personal protective equipment, including: gloves, eye protection, and hearing protection.



How loud is dry ice blasting?

The noise level of dry ice blasting varies based on the application. For many applications, blasting pressure can be turned down, which results in a noise level of as little as 85 dB. For more difficult applications that require higher blasting pressure (130 cfm/80 psi), at the max, the noise level will be at 118 dB at the operator's ear.

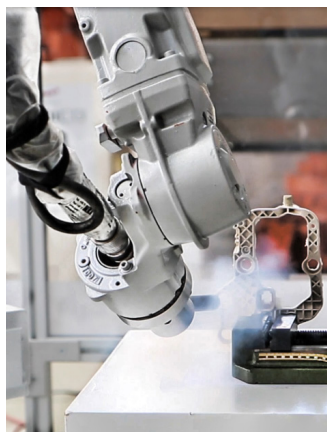
When dry ice blasting, cleaning is intermittent, which means that the operator will only be exposed to these noise levels intermittently.

Can I automate the dry ice blasting process?

Integrated dry ice blasting systems combine dry ice production and one or more blasting systems into one unit, allowing for continuous, completely automated blasting.

From simple customization to full automation, each integrated system can be engineered to meet specific customer requirements.

These systems are commonly used to provide cost-effective cleaning and surface preparation solutions and are used extensively in automotive OEM, tire, aerospace, semiconductor, and many other industries.



Applications include

- Surface preparation – Plastic, metal, and composite parts
- Plastic injection molds and permanent aluminum molds
- Deflashing and deburring
- Tire molds
- Paint fixtures/paint booths/paint lines
- Welding robots and fixtures
- Semiconductor component cleaning

Can dry ice blasting remove paint?

While dry ice blasting cleaning machines are effective at removing failing paint and paint that has a weak bond, dry ice is a gentle medium and in some applications it is not always successful with just dry ice alone. There are many variables that determine whether dry ice blasting can be successful or not, such as how well the paint is adhered and the type of paint and primer. Even high-pressure dry ice blasting can be too slow, too gentle, or ineffective depending on the application.

Cold Jet's dry ice blasting + abrasive solution, the E-CO₂ 150, adds an abrasive to the dry ice blasting stream. The solution boosts its aggression and effectively removes paint and coatings, while eliminating the issues with traditional methods of removal, such as excessive dust and waste.

Will dry ice blasting remove rust?

Dry ice blasting alone will remove any loosely adhered rust, surface rust, oxidation, and salts (SP 6), but it will not remove the deeply adhered or pitted oxidation. Due to the non-abrasive characteristics of dry ice, it is not aggressive enough to create a profile or a white metal finish.

Cold Jet's dry ice blasting + abrasive solution, the E-CO₂ 150, adds an abrasive to the dry ice blasting stream. The solution boosts its aggression and effectively removes deeply pitted rust and corrosion, while eliminating the issues with traditional methods of removal, such as excessive dust and waste.

Does dry ice blasting remove mold?

Dry ice blasting removes 99.9% of mold spores faster than traditional cleaning methods when IAQA standards are followed. The process eliminates time-consuming manual cleaning and does not create secondary waste, which reduces mold remediation time and reduces total labor costs and project time. The dry ice blasting process does not utilize chemicals and has the ability to deodorize affected areas.



Can dry ice blasting remove grease?

Yes, dry ice blasting is highly effective at removing grease from a wide variety of surfaces and equipment.

What types of surfaces can dry ice blasting clean?

Dry ice blasting can safely clean most surfaces due to its low hardness (1.5–2.0 on Mohs Scale of Hardness), making it softer than many materials. It effectively cleans metals, plastics, composites, electrical components, rubber, wood, concrete, and even some fabrics, without causing damage or leaving residue.

Where does the contaminant go during dry ice cleaning?

The dry ice sublimates into gas, while the contaminant breaks off and falls to the ground.

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