www.optimumdryiceblasting.co.uk

Info@optimumdryiceblasting.co.uk

Dry Ice Cleaning – Frequently Asked Questions

1. What is CO2 blasting?
2. How does it remove contaminants?
3. How does this differ from how sandblasting works?
4. What happens to the dry ice once it strikes the surface?
5. What happens to the contaminant?
6. Does the process damage the substrate?
7. Can CO2 be used to clean hot online?
8. Does the CO2 cool the substrate?
9. Will the process create condensation?
10. How is dry ice made?
11. How are dry ice pellets made?
12. How did the dry ice blasting technology originate?
13. What are the best cleaning applications for CO2?
14. How is dry ice blasting used in foundries?
15. What are some successful rubber molding applications?
16. How is CO2 used in the food industry?
17. What are some examples of applications where CO2 does not work well?
18. Can CO2 be used to remove paint?
19. Will CO2 remove greases, oils, or weld slag?
20. Can CO2 be used to remove rust?
21. Can CO2 be used to clean wood? For mold remediation, for example?
22. What are the primary safety issues relating to the use of dry ice blasting systems?
23. Is the system noisy?
24. Do the contaminants or dry ice particles ricochet?
25. Does the process generate static electricity?
26. Is it okay to blast in an enclosed area?

1. What is CO_2 blasting?

It is a process in which dry ice particles are propelled at high velocities to impact and clean a surface. The particles are accelerated by compressed air, just as with other blasting systems.

2. How does it remove contaminants?

It depends on what you're cleaning. If you're removing a brittle contaminant such as paint, the process creates a compression tension wave between the coating and the substrate. This wave has enough energy to overcome the bonding strength and literally pop the coating off from the inside out. If you're removing a malleable or viscous coating such as oil, grease, or wax, the cleaning action is a flushing process similar to high pressure water. When the particles hit, they compress and mushroom out, creating a high velocity snow flow that actually flushes the surface.

3. How does this differ from how sandblasting works?

Sandblasting is similar to using an ice pick whereas dry ice blasting is similar to using a spatula. Sand cuts or chisels away the contaminant. Dry ice lifts it away.

4. What happens to the dry ice once it strikes the surface?

It sublimates and returns to the atmosphere as carbon dioxide (CO_2) gas. CO_2 is a naturally occurring element that constitutes less than 1% of our atmosphere.

5. What happens to the contaminant?

People sometimes think it disappears too, but it does not. All cleaning involves the relocation of dirt. When you mop a floor, the dirt moves from the floor to the mop to the water in the bucket. With dry ice, the dirt moves from an undesirable area to an area where you can better deal with it. If it is a dry substance, it generally falls to the floor where it is swept away or vacuumed during normal maintenance. If it is a wet substance like grease, you take a methodical approach similar to hosing down a driveway. You start at one end and guide the grease to the other end where it is vacuumed or squeegeed up.

6. Does the process damage the substrate?

Generally no, but it depends on the substrate. There is an energy threshold at which disbonding will occur and a threshold at which damage will occur. When the disbonding threshold is lower than the damage threshold, you can clean. If the reverse is true, damage can occur. Most of our applications deal with production equipment (cast iron, tool steel, tool grade aluminum), so there is no damage. We do have success with softer substrates such as plastics, wiring, pure copper, and fabrics, but these must be examined on a case-by-case basis.

7. Can CO_2 be used to clean hot online?

The process cleans best hot. Most contaminants have weaker adhesive strength when hot. In many applications, you may be able to clean three to five times faster hot than cold. In addition, because dry ice sublimates on impact, entrapment of the blasting media is not an issue. Grit entrapment is an important reason those who clean with sand, walnut shells, or other grit media cannot clean online.

8. Does the CO_2 cool the substrate?

Yes, but generally not as much as you might think. The amount of cooling is dependent upon three main factors: mass of the targeted surface, dwell time, and ice usage rate.

9. Will the process create condensation?

Once again, it depends on the mass of the object you're blasting, your dry ice usage rate, and your dwell time. There will be condensation if you cool the substrate below the dewpoint (the dewpoint varies depending on local climate). Of course, if you're cleaning a hot mold it is rare to have condensation because you seldom cool the mold below the dewpoint. Condensation is not a factor most of the time. When it is, it can be dealt with quite easily. Use of a hot air knife can be highly effective.

10. How is dry ice made?

It is made from liquid carbon dioxide. Dry ice exists as a liquid only under high pressure. When it drops to ambient pressure (the normal pressure that surrounds us), approximately half turns to gas and half turns to solid. The solid, usually in the form of fluffy snow, is then compressed to form dry ice blocks, pellets, or nuggets.

11. How are dry ice pellets made?

Pellets are made by taking liquid CO_2 from a pressurized storage tank and dropping it to ambient pressure to produce snow. The snow is then pushed through a die to make pellets

12. How did the dry ice blasting technology originate?

Dry ice blast cleaning originated at Lockheed in the 70's when a coatings engineer, Calvin Fong, was researching ways to strip paint off aircraft. The technology did not become commercially available until Alpheus bought the license and patents from Lockheed and introduced it to the marketplace in 1987.

13. What are the best cleaning applications for CO_2?

The range of cleaning applications for dry ice are phenomenal and is easily demonstrated: core boxes for an automotive manufacturer; delicate wiring in copy machines; conveyors; tyre molds; dry ice blasting shines in cleaning production equipment online, because it eliminates the need for masking, cool down and disassembly. Users minimize downtime which maximizes production efficiency. We have achieved outstanding results cleaning production equipment for foundries, molded rubber producers, food processors, printers, and the semiconductor industry. Dry ice blasting is also widely used in the nuclear industry for decontamination. Anytime waste volume or health risks are a concern, the viability of CO_2 should be examined. Because CO_2 disappears on impact, it creates no additional waste. Competing processes such as grit blasting or solvents often present disposal problems or health hazards.

14. How is dry ice blasting used in foundries?

Dry ice blasting equipment is used in foundries worldwide to clean core boxes and permanent molds. Not only does dry ice blasting increase production by decreasing downtime, but it also eliminates mold damage, preserving the critical tolerances and greatly extending the life of the expensive tooling.

15. What are some successful rubber molding applications?

Virtually every major tyre manufacturer uses dry ice blasting equipment to clean tire molds. We also clean rubber molds for manufacturers of gaskets, O-rings, shoes, and many other products. A good rule of thumb in the rubber industry is, if you can see it, you can clean it with CO_2.

16. How is CO_2 used in the food industry?

CO_2 is perfectly suitable for use in this industry because it is food grade quality, the ingredient that provides the carbonation in soft drinks. It is used to clean ovens, conveyor belts, molds, dry mixers, laminators, and packaging equipment

17. What are some examples of applications where CO_2 does not work well?

Dry ice Blasting will not etch or profile most surfaces. If you need to clean large quantities of small parts, CO_2 is not generally as efficient as other alternatives such as ultrasonics. Because dry ice blasting is primarily a line-of-sight cleaning process, if you can't see what you need to clean, you probably can't clean it with dry ice.

18. Can CO_2 be used to remove paint?

Yes, however, the removal rate is dependent on a great many factors including: the underlying surface profile of the substrate; the thickness of the coating; the adhesive bond strength of the coating; and the cohesive strength of the coating (generally a function of age). Generally speaking, if you have concerns with contamination, toxic substances, waste disposal, or substrate damage, dry ice blasting should be considered as a cleaning option.

19. Will CO_2 remove greases, oils, or weld slag?

A methodical approach similar to hosing down a driveway is required if dry ice is to be effective on these and other wet contaminants. You must start at one end and work the grease to the other end where it can pass through a grate or be vacuumed or squeegeed for disposal. Some customers use a paper or plastic backdrop to catch the wet contaminant as it is removed from the substrate. Dry ice doesn't dissolve the oil and doesn't make it disappear so you must have an acceptable way of handling it when it is relocated by the blasting process.

20. Can CO_2 be used to remove rust?

It tends to remove the loosely adhered oxidation and salts, but will not remove the deeply adhered oxidation.

21. Can CO_2 be used to clean wood?

Yes indeed. One of the exciting areas of dry ice use today is in mold remediation and fire restoration. Dry ice blasting will slightly raise the grain on the wood, leaving a finish similar to that of very light sandblasting. If you need a smooth wood finish, dry ice blasting will have to be followed by sanding or some other smoothing method. Because dry ice disappears as it strikes the surface, the only waste that must be disposed of is the removed contaminant and some wood fiber particles.

22. What are the primary safety issues relating to the use of dry ice blasting systems?

One safety issue, as in any factory setting, is protecting workers from moving parts. The issue that comes up most often is noise.

23. Is the system noisy?

Yes. Noise is a function of air volume and air velocity. Within the nozzle, the stationary air is sheared by the high velocity air causing turbulence which creates noise. The level can range from 80 - 130 db. Hearing protection is required.

24. Do the contaminants or dry ice particles ricochet?

As long as it strikes the surface head on, dry ice does not ricochet because it sublimates (turns into a gas) on impact. As for the contaminant, you usually do not see or feel it as it disbonds and leaves the substrate, however, it is removed with some force which is why eye protection is recommended at all times.

25. Does the process generate static electricity?

Yes. Any dry air process will generate static electricity and dry ice blasting is no exception. As long as both the blasting unit and the piece you are blasting is properly grounded, you are unlikely to have static discharge problems.

26. Is it okay to blast in an enclosed area?

Yes, with proper ventilation. Because CO_2 is 40% heavier than air, placement of exhaust vents at or near ground level is recommended when blasting in an enclosed area. In an open shop environment, existing ventilation is sufficient to prevent undue CO_2 buildup.