



Dry Ice Blasting for Fire and Smoke Damage

Soot and char removed from structures without water or grit

After a fire, soot, char and smoke residue coat everything: roof timbers, joists, brick, block, stone and metalwork. Before a building can be repaired, the damage has to be cleaned back so it can be assessed and treated.

The usual methods are chemical sponges, wire brushes, sanding and abrasive blasting. They work, but they are slow and labour-heavy, abrasive methods remove good timber along with the char and leave media everywhere, and wet methods add water to a building that has often already been soaked by firefighting.

Dry ice blasting offers a different approach. In this guide I want to explain how it works and where it delivers real advantages in fire and smoke damage restoration.

What is dry ice blasting?

Dry ice is solid carbon dioxide (CO_2) at around -78.5°C . Instead of melting, it turns straight back into gas when it warms, a process called sublimation.

In dry ice blasting, small pellets of this material are fired at a surface using compressed air. Three things happen on impact:

- **Impact energy** breaks up and dislodges the deposit.
- **Thermal shock** makes the residue brittle and weakens its bond to the surface beneath.
- **Sublimation** turns the pellet into gas, which expands rapidly and lifts the residue away from behind.

The pellets disappear into the air. The only thing left to collect is the residue that has been removed. There is no water, no detergent and no blast media to clean up afterwards.

Where dry ice blasting really outperforms traditional cleaning

1. It removes soot and loose char

Thermal shock and expanding gas lift soot and loose char from timbers, brick and stone, including joints, rafters and awkward corners.

2. It preserves sound timber

Dry ice is non-abrasive. It removes soot and loose char without grinding away sound timber, so more of the original structure can often be kept and assessed honestly.

3. No water

Buildings are often wet from firefighting. Dry ice adds no water, so drying out is not set back.

4. No grit to clear up

Abrasive media gets into cavities and voids and must be removed. Dry ice leaves only the soot removed.

5. Faster than hand cleaning

Roof spaces and structures that take days with sponges and brushes can often be cleaned much faster.

6. Ready for assessment and sealing

Clean surfaces let surveyors and loss adjusters see the real condition, and prepare surfaces for sealing and odour treatment.

Environmental credentials

Restoration contractors and insurers increasingly look at waste and chemicals. Dry ice blasting can help on several fronts.

- **Recycled CO₂.** The CO₂ used to make dry ice is typically recovered as a by-product of other industrial processes, such as fertiliser production and fermentation, rather than produced specially. Blasting returns it to the atmosphere it would otherwise have reached, so the process adds no new CO₂ of its own.
- **Less material replaced.** Preserving sound timber reduces replacement and waste.
- **No blast media waste.** No grit to bag and send to landfill.
- **Fewer chemicals.** Less use of chemical cleaners.
- **No water.** No contaminated run-off from the building.

At a glance

	Sponges, brushes and abrasive blasting	Dry ice blasting
Water introduced	Wet methods add water	None
Timber loss	Abrasives remove sound timber	Non-abrasive
Media left behind	Grit in cavities	None
Speed	Slow, labour-heavy	Often much faster
Secondary waste	Soot plus media	Only the removed soot

Typical applications in fire and smoke restoration

- **Roof timbers:** rafters, purlins and joists.
- **Brick, block and stone:** soot and smoke staining.
- **Structural steel:** soot and smoke residue.
- **Industrial and commercial buildings:** machinery and structures after fires.
- **Heritage buildings:** careful removal of soot from historic fabric.
- **Contents:** machinery and some robust items.



Our setup at Vortex Ice Labs, and why it matters for restoration work

Vortex Ice Labs is a fully mobile service. We bring a complete, self-contained system to site, so there is no reliance on your own air supply. The air passes through four stages before it reaches the surface.

- 1 Compressor.** This supplies the large, steady volume of air needed to drive the pellets. Consistent flow means consistent cleaning, with no drop in performance halfway through a job.
- 2 Aftercooler.** Compressing air heats it, and hot air carries a lot of moisture. The aftercooler cools the air straight away so that moisture condenses and can be drained off. Without it, water would freeze inside the blaster, causing pellets to clump and block, and could be sprayed onto the surface being cleaned.
- 3 Filtration.** Filters then remove the remaining water, any oil carried over from the compressor, and fine particles. This matters in a damaged building. The aim is to leave surfaces clean and dry, not to add oil or moisture to timber and masonry.
- 4 Dry ice blasting unit.** The pellets are metered into the conditioned airstream and delivered through the hose and nozzle. Pressure, ice feed and nozzle choice are adjusted for each task, from soot on historic fabric to heavy deposits on structural timber.

Every stage protects the result. Clean, dry air means clean, dry surfaces ready for assessment.

Working safely, and where it fits

Dry ice blasting is a powerful tool, and it should be planned with the contractor, loss adjuster or owner before we start.

- **Ventilation.** As the ice sublimates it releases CO₂ gas. Roof spaces and enclosed rooms are managed with ventilation and gas monitoring.
- **Noise and PPE.** Blasting is loud, and operators use hearing protection, eye and face protection, and insulated gloves. People nearby need to be kept clear of the work area or protected too.
- **Containment.** Removed soot is fine and travels, so we seal the work area, protect unaffected areas, and use extraction and collection as needed.
- **Structural safety.** Work starts only once the building is confirmed safe to enter.
- **Odour.** Removing soot removes much of the odour source. Remaining odour may still need sealing or specialist treatment.
- **Asbestos.** In older buildings, asbestos must be ruled out or managed before any blasting.

Used this way, it is most valuable for roof spaces and structural timber, heritage fabric, and jobs where water or grit would cause further damage.

Final thoughts

Restoration needs damaged buildings cleaned quickly without making things worse. Traditional methods will always have a role, but they bring water, grit, timber loss and long hours with them.



Dry ice blasting removes many of those trade-offs. It cleans dry, preserves sound material, and speeds up the job.

If you are a restoration contractor, loss adjuster or property owner, I would be happy to discuss a job or arrange a trial area. Get in touch with us at Vortex Ice Labs.

Ian Glover, Vortex Ice Labs

Tel: 07438 409188 | Email: ian@vortexicelabs.co.uk

Web: www.vortexicelabs.co.uk

[#FireDamage](#) [#SmokeDamage](#) [#Restoration](#) [#InsuranceRestoration](#) [#DryIceBlasting](#) [#VortexIceLabs](#)