



Dry Ice Blasting for Steam Engines

Preservation cleaning for traction engines, locomotives and stationary engines

Steam engines are working machines, and they get filthy: oil, grease, soot, ash, char and road dirt build up on frames, motion, wheels, tenders and smokeboxes. Cleaning them is part of preservation, and part of every overhaul and boiler inspection.

Most cleaning still relies on paraffin, rags, scrapers, wire brushes and pressure washers. It works, but it is slow and messy, water gets into bearings and joints, and abrasive methods can damage paintwork, lining, brass and original markings.

Dry ice blasting offers a different approach. In this guide I want to explain how it works and where it delivers real advantages for traction engines, locomotives, rollers and stationary engines.

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 cuts through oil, grease and soot

Thermal shock makes old oil, grease and soot brittle, and the expanding gas lifts it away from frames, motion, wheels and tenders, including recesses where a rag will not reach.

2. No water in bearings and joints

Pressure washing drives water into bearings, axleboxes, joints and lagging. Dry ice is a dry process, so nothing is left to cause corrosion.

3. Gentle on paint, lining and brass

At the right pressure, dry ice removes oil and grime without stripping sound paint or lining. Turned up, it can strip failing paint for repainting. It does not wear away brass, castings or stamped markings.

4. Ready for overhaul and inspection

Before an overhaul or boiler inspection, components need to be clean enough to inspect. Dry ice speeds up that preparation and shows cracks, wear and corrosion clearly.



5. No grit and no paraffin

Grit gets into motion work and bearings and causes wear. Paraffin and solvents bring fumes and waste. Dry ice leaves neither.

6. Mobile

We come to the shed, workshop or rally field, with our own power and air.

Environmental credentials

Preservation societies and owners increasingly look at how they clean as well as what they clean. 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.
- **No oily wash water.** There is no contaminated water running into drains or onto the ground.
- **Fewer solvents.** Less paraffin and degreaser to buy, store and dispose of.
- **No blast media waste.** Nothing to send to landfill except the dirt removed.
- **Preserving originals.** Non-abrasive cleaning helps keep original parts and finishes in service.

At a glance

	Paraffin, brushes and washing	Dry ice blasting
Water introduced	Pressure washing adds water	None
Solvents	Paraffin and degreasers	None
Media left behind	Grit in motion and bearings	None
Paint and lining	Brushes and grit can damage	Can be preserved
Markings and brass	Can be worn away	Preserved
Time	Days of hand cleaning	Often much quicker

Typical applications for steam

- **Traction engines, rollers and wagons:** frames, motion, wheels, tenders and canopies.
- **Locomotives:** frames, wheels, motion, cabs and tenders.
- **Smokeboxes and fireboxes:** soot and char removed for inspection.
- **Stationary and mill engines:** beds, flywheels, governors and surrounding plant.
- **Components during overhaul:** cleaning parts for inspection and assessment.
- **Paint preparation:** stripping failing paint before repainting.



- **Rolling stock and carriages:** underframes, bogies and running gear.

Our setup at Vortex Ice Labs, and why it matters for steam engines

Vortex Ice Labs is a fully mobile service. We bring a complete, self-contained system to site, so we do not need your power or compressed air. 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. That matters on an engine. The aim is to leave metal clean and dry, not to put oil or water back into motion work and bearings.
- 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 gentle cleaning around lining and brass to heavy oil and soot build-up.

Every stage protects the result. Clean, dry air means a clean, dry engine.

Working safely, and where it fits

Dry ice blasting is a powerful tool, and we plan each job with the owner or society before we start.

- **Ventilation.** As the ice sublimates it releases CO₂ gas. In sheds, pits and smokeboxes this is managed with ventilation and gas monitoring. CO₂ is heavier than air and collects in pits.
- **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 oil, soot and grime can travel, so we sheet off the area, protect nearby engines and visitors, and clear up afterwards.
- **Cold engine.** We work on engines that are out of steam and made safe.

Used this way, it is most valuable before overhauls and inspections, before repainting, and for regular preservation cleans.

Final thoughts

Owners and societies need engines clean for inspection, overhaul and display without damaging them. Traditional methods will always have a role, but they bring water, solvents, grit and hours of work with them.

Dry ice blasting removes many of those trade-offs. It cleans dry, preserves paint and originals, and we bring it to the engine.



If you would like to see how it could work on your engine, I would be happy to arrange a demonstration or 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

[#SteamEngine](#) [#TractionEngine](#) [#HeritageRailway](#) [#Preservation](#) [#DryIceBlasting](#) [#Steam](#) [#VortexIceLabs](#)