



Priority Learning Moment

Industry-Submitted Incident Notification

IN-014-2026 | Process Cooler Cleaning & Atmospheric Hazards

This Priority Learning Moment has been submitted to Energy Safety Canada by a company wishing to share a safety lesson.

Description:

Process coolers (fin-fan coolers) are critical to facility operations. Routine cleaning of cooler fins is required to maintain safe and reliable performance by removing debris such as poplar cotton and dust, which can reduce heat transfer. Two common cleaning methods are used:

- High-pressure CO₂ (dry ice blasting)
- Liquid cleaning agents (foam/soap wash)

Each method introduces specific hazards that must be assessed and controlled.

High Pressure CO₂ (Dry Ice Blasting):

Dry ice blasting uses solid CO₂ pellets accelerated with compressed air to remove contaminants. The pellets sublime (transition from solid to gas) on impact, lifting debris without damaging the surface. This sublimation also releases CO₂ gas into the surrounding atmosphere.

CO₂ is mildly toxic (causing acidification of bloodstream) and is generally considered an asphyxiant that can displace oxygen. Exposure limits are:

- 5,000 ppm (8-hour time-weighted average)
- 30,000 ppm (15-minute ceiling)

Field monitoring has identified the following exposure ranges:

- One site recorded levels consistently near or exceeding the 8-hour occupational exposure limit (OEL), with readings up to 8,900 ppm during cleaning.
- At another facility, hopper filling activities reached up to 13,500 ppm.



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- During active cooler cleaning at the same facility, levels ranged from 6,000 to 10,000 ppm on average.

Use in enclosed or partially enclosed areas can create significant atmospheric hazards. Additional exposure risks exist when handling dry ice in enclosed trailers or during hopper loading. Direct contact can cause severe cold burns.

Foam / Soap or Liquid Wash Cleaning:

- Foam cleaning involves applying a cleaning agent (e.g., “Powerfoam”) to fins, allowing dwell time, and then rinsing with water.
- These products may be marketed as environmentally friendly; however, some can still pose environmental risks or reporting requirements.
- Certain agents may contain hazardous chemicals (e.g., Ethylene Glycol Monobutyl Ether) or may be flammable.
- The Safety Data Sheet (SDS) must be reviewed during planning to identify all health, safety, and environmental hazards.
- Consult local Safety and Environmental Advisors for product evaluation and approval.

Required Actions:

- Assess workspace classification and atmospheric hazards using the Confined Space Code of Practice. Any use of dry ice in enclosed or partially enclosed areas shall be treated as a confined space.
- CO₂ levels must be continuously monitored using a calibrated, active pump-style monitor equipped with a CO₂ sensor. This must be used in conjunction with a standard 4-gas monitor capable of monitoring O₂, LEL, CO, and H₂S, as CO₂ can displace oxygen and create an oxygen-deficient atmosphere.
- Select respiratory protection based on identified or anticipated hazards. CO₂ is an asphyxiant; half masks and particulate respirators do not provide protection against CO₂. Where exposure limits may be exceeded (e.g., above OEL) or oxygen deficiency is possible, SABA/SCBA must be considered.
- Appropriate PPE must be worn in accordance with the SDS (Dry Ice – Solid CO₂).



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- Ensure vendors:
 - Are ISNetworld compliant
 - Have completed Contractor Health and Safety Qualifications
 - Have appropriate WCB Industry Codes for industrial cleaning
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Learning Together

Energy Safety Canada (ESC) facilitates the sharing of safety knowledge to support industry-wide learning and continuous improvement. By making lessons learned and leading practices accessible, ESC helps organizations of all sizes learn from one another and strengthen safe work performance.

This resource is intended to support learning and informed decision-making. Every organization is responsible for determining how the information applies to its own operations. For the full legal disclaimer, visit energysafetycanada.com/legal.

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