FAQs

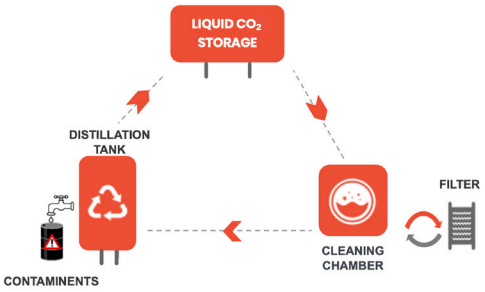
TotalCare®

What is RedZone℠ CO_2 cleaning?

RedZone CO_2 cleaning is part of LION's TotalCare® Advanced PPE Cleaning, Inspection and Repair family of services. **It is successful at eliminating, on average, 98% of dangerous polycyclic aromatic hydrocarbons (PAHs), a class of chemicals produced by the partial burning of certain materials commonly found at typical structural fires.** It's an efficient, cost-effective, less harsh and more environmentally-friendly process that can be used on all turnout gear—including boots, helmets, hoods, DRDs and gloves, regardless of manufacturer.

How does the process work?

RedZone CO_2 cleaning is a closed loop system that decreases both waste and environmental harm. We reclaim CO_2 from local industries, purify it with an active distillation system, then reuse it in a waterless process that greatly reduces water consumption. *RedZone CO_2 cleaning reclaims 95% of the CO_2 used in each cycle.*



AT A GLANCE:

RedZone CO_2 cleaning cycle

The machine is equipped with a high-pressure pump capable of moving liquid CO_2 and compressing gas CO_2 at 200/L per min. This proprietary pump adds the ability to circulate high volumes of liquid CO_2 from the cleaning vessel and through a filter, enabling a constant cleaning of the CO_2 during the wash cycle. Contaminants are then captured in a 55-gallon drum and disposed of appropriately.

How is RedZone CO_2 cleaning better for the environment?

RedZone CO_2 cleaning does not require the use of manufactured chemicals, takes no electricity to dry and does not use water, greatly reducing the financial and environmental costs of cleaning PPE.

How does this method help protect fire professionals?

NFPA 1851 cleaning efficiency data indicate that CO_2 cleaning removes a higher level of contaminants from PPE than conventional water washing.

What impact does RedZone CO_2 cleaning have on departmental costs?

A significant one, over time. In 2024, U.S. departments that used this LION service were able **to return 98% of their gear into service, a combined savings of more than $750K in replacement gear.**

How does RedZone CO_2 cleaning differ from other methods?

RedZone CO_2 cleaning is less harsh on materials than conventional cleaning, saving on gear replacement costs and requiring no drying times so PPE can begin its return to service in just approximately 60 minutes.

While LION's water-based Ozone Advanced Cleaning effectively removes biological contaminants like bacteria and viruses, **RedZone CO_2 cleaning not only removes biologicals without the additional of added chemicals, but also targets PAHs while completely eliminating odors and keeping gear durable because it lacks harmful cleaning agents.**

How Clean Is Clean? The process uses liquid carbon dioxide (CO_2) as its main cleaning fluid, with no more than 2% of additives or detergents.

	DEPARTMENT WASH	REDZONE™ CO_2 CLEAN
Biologicals Removal	Does NOT meet NFPA 1851*	Meets NFPA 1851
PAH/SVOC Removal	50%-55%	On average, 98%
Drying Time	Up to 6 hours	0 hours
Wash	Water *(up to 105°F)*	Liquid CO_2 *(no water)*
Basket Rotation *(wear and tear)*	Strong mechanical action	Little mechanical action

**without the use of additional sanitizers*

What other departments use RedZone CO_2 cleaning?

- Marin County (CA) Fire Department
- Houston (TX) Fire Rescue
- Boulder (CO) Fire Rescue
- Orange County (CA) Fire Authority
- Loudoun County (VA) Fire Rescue
- Jacksonville (FL) Fire and Rescue Department
- And more

> *While helping save costs and protect resources, this technology enables us to deepen the commitment we've honored for more than a century: supporting first responders with safe, well-maintained PPE at all times.*
>
> – Mark Smith, *CEO, LION Safety Solutions*

Other Notable Facts

CO_2 is filtered every 2.5 minutes during each bath to remove and capture particles. There are 4 baths per cycle and after each bath the CO_2 is channeled to the distillation vessel for purification.

Purified CO_2 is introduced for every bath, treating each bath as a distinct cleaning cycle and unlike water washing, which typically involves a single cleaning cycle followed by 3 rinse baths.

All cycles can be customized based on contamination, including but not limited to: adjusting RPM speed, increasing or decreasing agitation, adjusting bath cycle length and increasing or decreasing the number of bath cycles.

Machines are made in the USA, where all of LION's RedZone CO_2 cleaning operations are based.