



# SAFER. GREENER. LESS COSTLY.

## 90% LESS TIME TO A GAS FREE FUEL TANK



For as long as oil and petrochemicals have been in use by transportation and other industries, safely managing their highly flammable, toxic, and environmentally damaging vapors has been an ever-present challenge. Even with the increasing emphasis on safety procedures and better training, these invisible and dangerous vapors continue to result in the loss of life and property. But now, nanotechnology can provide safer and faster solutions that were not thought possible with conventional methods.

The NanoVapor technology uses compressed air and the ST-1000M application unit to create a fine spray of the patented TankSafe™ liquid. This non-flammable, non-toxic and bio-degradable liquid contains surface-active molecules which link with the hydrocarbon molecules to prevent their evaporation. The protective layer is only a few molecules thick and lasts up to several days. It has self-repairing properties, e.g. when people work inside the tank any disturbance of the surface will close again quickly. This saves a significant amount of time, generating higher throughput for the maintenance provider and increased asset uptime for the barge owner.

Through Ecochlor's global distribution network, NanoVapor's ground-breaking technology is finally available to the maritime industry! Seafarers can realize the dramatic improvements in workplace health and safety made possible by more effective suppression of these dangerous vapors in confined spaces.



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NanoVapor is an affiliate of the EcoOne® Marine Technologies Group



# GAS FREEING CONFINED SPACES

When purging or gas freeing a fuel or cargo tank, NanoVapor's system can virtually stop vapor formation at its source where oil, fuel and other petrochemicals are present. The molecular mechanism is so powerful that only a small amount of the nano-engineered suppressant is needed to fully suppress vapor to safe levels, creating several key advantages over conventional methods:

- Nanovapor produces a gas free environment more quickly than any other method available, reducing your time above the lower explosive limit
- Because no reactive chemical or inert gases are used breathable air is never displaced in the confined space allowing normal oxygen level to be maintained and reducing the risk of asphyxiation for workers
- Fuel does not need to be drained to create a gas free environment suitable for hot work. Your vessel can save hours or days of downtime by bypassing the need to drain fuel (or product) for maintenance (impossible with current methods)
- After use, no measurable residue or byproduct is left behind, minimizing the need for costly and time-consuming recovery operations whilst still allowing you to meet the increasingly strict environmental regulations



## CASE STUDIES

### Cargo Operations on Small Tankers Without IG Systems

Typically inert gas (IG) systems are used to reduce the explosion risk during cargo operations on tank vessels. However, according to SOLAS regulations small tankers below 8000 dwt (before 2016: below 20,000 dwt) are exempt from mandatory installation of an IG system. A large portion of the global tanker fleet is exposed to severe explosion hazards during cargo operations. Consequently, fires and explosions with casualties, loss of ships, cargo and environmental pollution happen all too often.

**NanoVapor Solution:** Venting with NanoVapor during cargo operations as a supplement to current cargo operation procedures suppresses the formation of a flammable atmosphere inside the tanks. Fire and explosion risk is greatly reduced.

#### NanoVapor Advantage:

Faster and safer cargo operations at a fraction of the cost of retrofitting an IG system. Possibly reduced insurance P&I club premiums. No need for major revisions of approved processes and procedures.

### Tank Cleaning of Inland Tank Barges

Cleaning of inland tank barges often requires a safe atmosphere inside the tank before the actual washing process can start. Venting with blowers can take many hours or even days and results in large quantities of odorous and often toxic or carcinogenic fumes released into the environment. To combat environmental damage and health hazards for crew members and the public, governments start to enforce the additional use of land-based degassing stations. These flares or gas condensation further add to the tank cleaning cost.

**NanoVapor Solution:** Venting with NanoVapor significantly cuts down the formation of fresh VOC from cargo residues. Tank cleaning can commence in a fraction of the time.

**NanoVapor Advantage:** Much faster tank degassing, shorter turnaround times for barges and tankers, reduced degassing cost, less environmental pollution, reduced carbon footprint.

### Degassing of Storage Tanks at Cargo Terminals

On a regular basis above and underground storage tanks at cargo terminals have to be drained and cleaned for inspection and maintenance. This requires degassing to achieve safe, non-explosive VOC concentrations inside the tank, which can take days or weeks.

**NanoVapor Solution:** The application of a NanoVapor suppressive layer stops the evaporation of hydrocarbons which usually results in saving 50% degassing time, often a lot more.

**NanoVapor Advantage:** Reduced down time, less environmental pollution and nuisance to local population.

### Enclosed Space Entry / Repair Work Next to Fuel Tanks

Frequently, tanks and enclosed spaces have to be accessed for inspection or repair work. Very often this requires hours or days of venting with blowers to lower VOC concentration to safe levels. This causes losses from off-hire time, delays at cargo terminals or lost contracts.

**NanoVapor Solution:** Venting of enclosed spaces with NanoVapor quickly stops the formation of fresh VOCs. A safe atmosphere is achieved quickly and for extended periods of time.

**NanoVapor Advantage:** Tanks and enclosed spaces can be accessed much faster including hot work like welding or grinding in adjacent spaces.



*NanoVapor's Vapor Suppression Systems have been formally designated as a Global Best Practice Standard by Shell Oil for degassing of underground petrol tanks for maintenance and inspection*

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