



Real-Time VOC Detection at Harbours and Marine Terminals

ION SENSE®





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Executive Summary

Harbours and marine terminals are among the most demanding industrial environments for gas detection. Every day, large quantities of petroleum products, chemicals and hazardous liquids are transferred between ships, storage tanks and transport networks. These operations create numerous opportunities for volatile organic compound (VOC) emissions.

Even minor leaks during loading, unloading or storage can present significant risks to personnel, equipment and the environment. Continuous VOC monitoring enables operators to identify leaks at an early stage, helping prevent incidents while supporting regulatory compliance and operational efficiency.

PID technology offers a reliable solution for continuous VOC monitoring, providing rapid response, broad compound detection and excellent sensitivity across a wide concentration range.

VOC Risks in Marine Environments

Marine terminals routinely handle a diverse range of products, including:

- Petrol (gasoline)
- Diesel
- Marine gas oil
- Sustainable marine fuels
- Aviation fuel
- Crude oil
- Methanol
- Ethanol
- Benzene
- Toluene
- Xylene
- Industrial solvents
- Petrochemicals

The transfer and storage of these products can generate fugitive VOC emissions that require continuous monitoring.



Key Monitoring Applications

Ship Bunkering Operations

Marine bunkering involves transferring fuel from shore facilities or bunker vessels to ships. Transfer hoses, loading arms and couplings are all potential leak points.

Continuous monitoring provides early warning of hydrocarbon vapour releases before hazardous concentrations develop.

Recommended monitoring locations include:

- Loading arms
- Fuel transfer hoses
- Ship manifolds
- Dockside transfer points

Pipeline Transfer Systems

Ports often operate extensive pipeline networks transporting fuels and chemicals across large facilities.

Potential leak locations include:

- Pump stations
- Valve manifolds
- Flanged joints
- Pipe connections
- Transfer stations

Continuous monitoring improves maintenance planning while reducing operational risk.

Chemical Storage Areas

Marine terminals frequently store bulk chemicals awaiting transportation.

VOC monitoring provides additional protection around:

- Bulk storage tanks
- Intermediate storage vessels
- Loading bays
- Chemical warehouses

Container Terminals

Damaged containers carrying solvents, chemicals or hazardous goods may release VOCs during storage or handling.

Portable or fixed PID monitoring systems provide rapid detection before personnel enter affected areas.

Tank Farms

Storage tanks are common sources of fugitive VOC emissions due to breathing losses, pressure changes and equipment degradation.

Monitoring around tanks, pumps and valves helps identify leaks before they result in significant product loss or environmental impact.

Environmental Monitoring

Many ports operate environmental monitoring stations to measure VOC emissions beyond the facility boundary.

These systems help operators demonstrate compliance with environmental permits while identifying long-term emission trends.



Advantages of PID Technology

PID provides significant advantages over conventional gas sensing technologies where multiple VOCs may be present.

Benefits include:

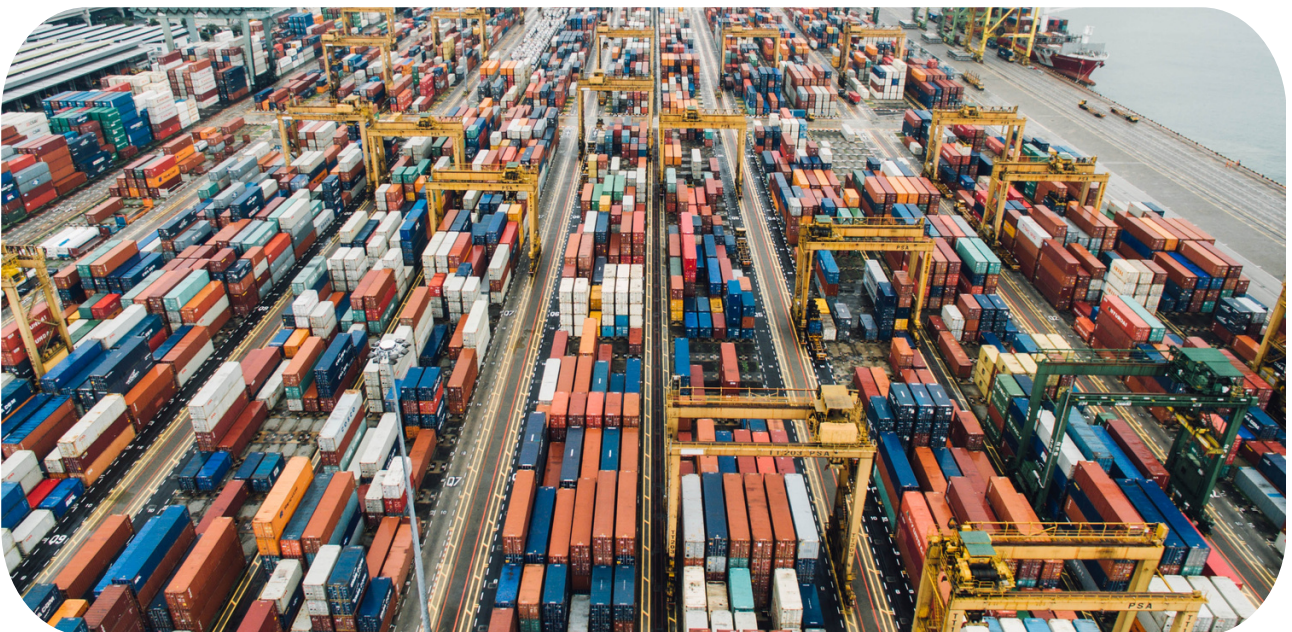
- Broad VOC detection capability.
- Fast response to changing concentrations.
- Detection from sub-ppb to thousands of ppm.
- Continuous, real-time monitoring.
- Low maintenance requirements.
- Excellent repeatability.
- Compact OEM integration.

Why Choose ION SENSE® PID Sensors?

ION SENSE® PID sensors have been developed to provide dependable VOC monitoring across demanding industrial environments.

Key advantages include:

- Patented Fence Electrode Technology for improved stability and reduced humidity effects.
- Fast response for early leak detection.
- Compact OEM package for seamless system integration.
- Long UV lamp lifetime.
- Stable long-term performance.
- Measurement capability from sub-ppb to 10,000 ppm.



Sensors Tailored for Specific Applications

Application	Sensor	Benefits
Marine fuel transfer	MiniPID 2 PPM	Wide measurement range for hydrocarbon vapours.
Tank farms	MiniPID 2 PPM	Continuous monitoring around storage infrastructure.
Petrochemical terminals	MiniPID 2 PPM	Suitable for industrial VOC concentrations.
Chemical storage	MiniPID 2 PPM	Reliable monitoring across a broad range of VOCs.
Environmental monitoring	MiniPID 2 PPB XF	High sensitivity for low-level fugitive emissions.
Container inspection	MiniPID 2 PPB XF	Early detection of leaking cargo.
Methanol transfer terminals	MiniPID 2 11.7 eV	Enhanced capability for compounds with higher ionisation potentials.
Research & specialised monitoring	MiniPID 2 HS	Ultra-sensitive detection of trace VOC concentrations.

Conclusion

Marine terminals and harbours play a critical role in the global supply chain but also present unique challenges for VOC monitoring. Continuous PID-based monitoring allows operators to detect fugitive emissions early, protect personnel, reduce environmental impact and improve the reliability of critical infrastructure.

Whether monitoring fuel transfer operations, petrochemical storage, dockside facilities or environmental boundary stations, the ION SENSE® sensor family provides flexible solutions that enable OEM manufacturers and system integrators to build high-performance VOC monitoring systems tailored to the needs of modern marine terminals.

Disclaimer

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