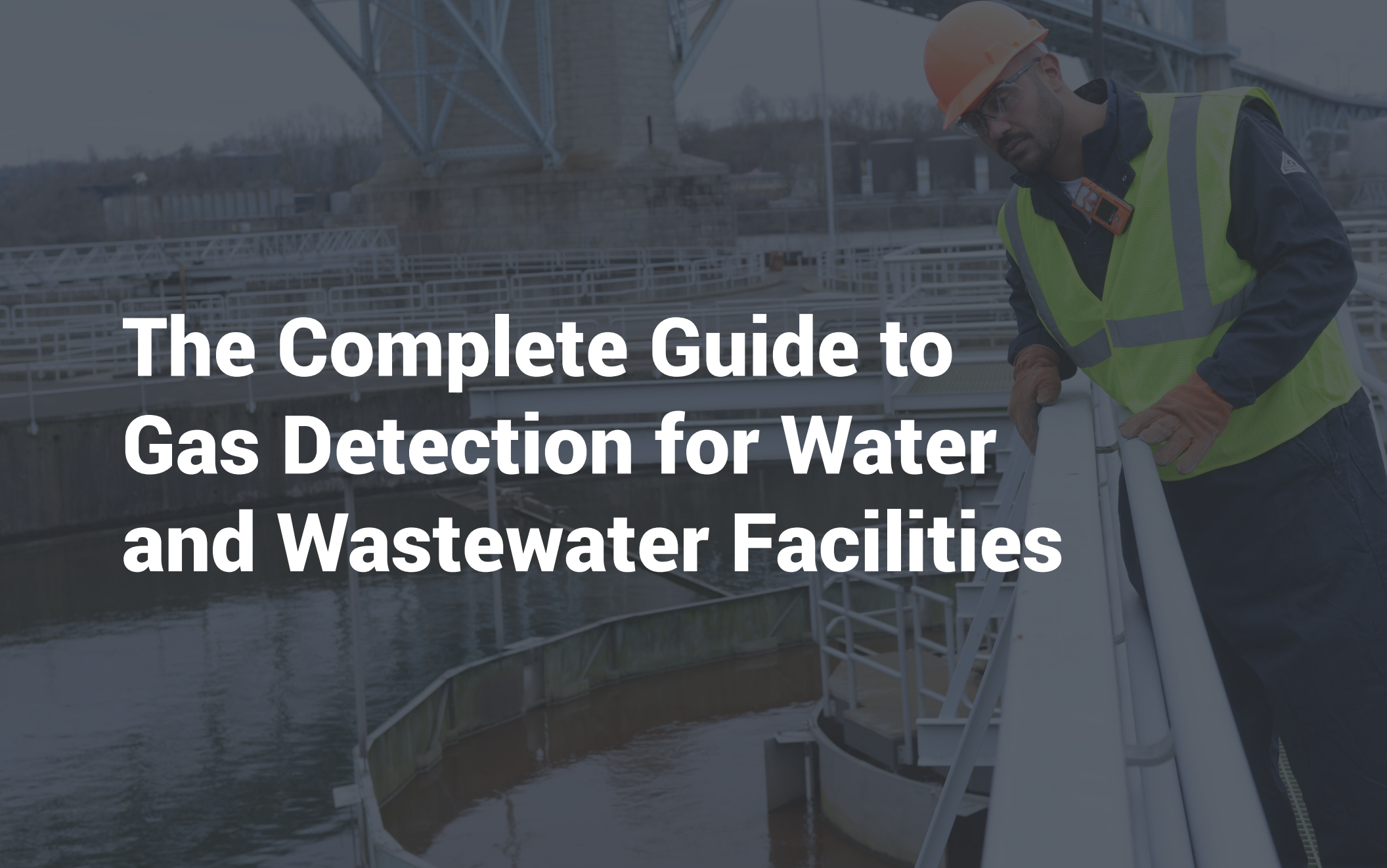


A worker wearing an orange hard hat, safety glasses, a high-visibility yellow vest over a dark jacket, and work gloves is leaning on a metal railing at a wastewater treatment facility. In the background, there are large circular tanks and industrial structures.

The Complete Guide to Gas Detection for Water and Wastewater Facilities

***INDUSTRIAL
SCIENTIFIC***

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Understand the Risks Your Workers Face

As a safety professional at a water or wastewater treatment facility, it's your job to protect workers from hazards, including dangerous gases. Workers are most likely aware of the dangers posed by slips and trips, but gas hazards often escape notice. However, gas hazards at a water or wastewater treatment facility can be a matter of life and death.

This is true across your entire facility, and even extends to remote workers in the field. Workers are most likely to encounter gas hazards in confined spaces like meter pits, manholes, dry/wet wells, lift stations, chemical storage tanks, and more.

The latest data from the National Institute for Occupational Safety and Health shows that 60% of worker deaths in confined spaces were those of would-be rescuers who attempted to save a team member overcome by dangerous gases, only to be overcome themselves.

To prevent situations like this, all workers need to use appropriate gas detection equipment and be aware of the gas hazards they could encounter on the job.



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Know Your Hazards

To keep your workers safe, you need to know where they could encounter gas hazards.

Many water and wastewater facilities rely on fixed gas detectors and confined space monitoring kits to identify gas hazards. While these solutions can be effective in their intended applications, they won't alert workers to gas hazards outside of those specific areas. Gases can and do escape from these areas, so it's important for workers to use **personal gas detectors** to identify gas hazards across your facility.

At the same time, everyone who could be exposed to dangerous gases — and those who will monitor them remotely — need to understand the potential hazards and their effects. When exposed to gas hazards, workers can experience dizziness; irritation of the eyes, nose, or throat; poisoning; choking; unconsciousness and more.

Without gas monitors, it can be difficult or even impossible to properly assess these risks.

Water and Wastewater Treatment Facilities Typically Monitor:

	Chlorine (Cl ₂)	Carbon monoxide (CO)	Hydrogen sulfide (H ₂ S)	LEL (Lower Explosive Limit)	Ammonia (NH ₃)	Oxygen (O ₂)	Sulfur dioxide (SO ₂)
Water Collection (Dams, reservoirs, lakes, rivers, collection and storage tanks)	•	•	•	•			
Storm and Wastewater Collection (Dry/wet wells, manholes, sumps, treatment plants)		•	•	•		•	
Water Treatment (Treatment areas, chemical storage tanks, injection stations)	•					•	
Wastewater Treatment (Gas treatment and storage areas, digester, sediment, holding, aeration and clarification tanks)			•	•	•	•	•
Water Transmission and Distribution (Meter pits, vaults, pipelines, trenches)	•	•	•	•		•	
Plant Operations	•		•				



All monitors must be intrinsically safe to avoid explosive hazards and must be able to withstand extreme conditions.

Choosing Your Personal Monitors:

Single-Gas vs. Multi-Gas

Your gas detection program should include personal gas detectors to alert your team to gas hazards outside the range of fixed monitors. By equipping workers with the right personal detectors, they will be alerted to gas hazards, no matter where they're working.

Personal gas monitors come in two configurations: single-gas and multi-gas.

If workers on your site risk exposure to one common gas, a single-gas monitor is ideal. Single-gas monitors for H₂S or Cl₂ are commonly used by plant operations personnel.

If your workers could encounter multiple gases simultaneously, a multi-gas monitor is essential. Storm and wastewater collection, treatment, and transmission and distribution workers typically need multi-gas monitors.

Connected multi-gas monitors can take personal monitoring a step further by alerting all team members when one monitor is in alarm. Monitors that send real-time location and alarm data to a live monitoring network can be particularly helpful by giving remote safety managers visibility into the conditions workers face.

Adding Area Monitors for Extra Protection

Area monitors are moveable units that you can use to monitor an open space or to create a fence line between a safe area and one where hazards are likely present. Area monitors are easy to “drop and go,” making them easier to install than their fixed counterparts.

Area monitors improve site safety by evaluating the atmosphere and alerting your workers or remote safety managers when conditions shift. Area monitors are especially useful for monitoring gas concentrations in places where people cannot easily or safely work.

Because they are often used in noisy or busy work areas, you should look for an area monitor with loud alarms and bright warning lights. Some area monitors can also share alarm readings with nearby personal monitors and display customizable warnings such as “Evacuate” and “Ventilate” so everyone knows exactly what to do. That way, when dangerous levels of gas are detected, the monitor will quickly and clearly alert everyone in the space.





Detecting Gas Hazards in Confined Spaces

The 2x2 Rule

Wait two minutes plus two seconds for every foot of tubing.

From pumping stations and manholes to trenches and chemical storage tanks, confined spaces are common. To stay safe, workers need to test the atmosphere before anyone enters the space, and then continuously throughout the entry.

For pre-entry sampling, use a gas detector with a sampling pump and tubing to draw samples from the confined space to a safe location outside. When using a pump, follow the 2x2 Rule, waiting two minutes plus two seconds for every foot of tubing. With 20 feet of tubing, first wait two minutes, then add 40 seconds. Repeat this process at the top, middle and bottom of the space because different gases settle at different heights.

Workers should also **monitor the confined space continuously** during the entry because atmospheric conditions can quickly deteriorate. If conditions trend toward danger, workers will have the notice they need to exit the confined space safely.

If a monitor indicates dangerous levels of toxic gases, combustible gases or oxygen deficiency (or enrichment), workers must evacuate the confined space, ventilate, and retest the atmosphere before re-entering.

Safety Needs Beyond Gas Detection:

Panic, Man-Down, and Alarm Sharing

Modern gas detectors can do more than monitor exposure to gas hazards. They can also alert workers and supervisors to other dangerous situations.

A **panic button** built into a monitor can be useful in many situations, including if a worker is caught in equipment, feels dizzy, or has some other medical emergency. **Man-down alarms** alert safety contacts when a worker hasn't moved for a pre-determined amount of time.

Some gas detectors can send and receive **instant alerts** and gas readings to peer monitors up to a mile away or to a control room hundreds of miles away. This functionality not only alerts nearby teammates and remote safety personnel that someone is in trouble, but also tells them who needs help, where they are, and what kind of trouble they're in. This makes it easy for peers to take appropriate safety precautions before they attempt to rescue someone.





Supervisors can gain real-time visibility into the location and wellbeing of mobile workers in remote areas.

Protecting Lone Workers

Lone workers are common in the water and wastewater treatment industry. They may be in the field checking meters, monitoring water quality at a pump station or reservoir, or even working alone at the remote end of a large facility.

When these lone workers encounter a threat, whether a gas hazard, dangerous weather, or a medical emergency, they can't rely on peers nearby to help. One way to improve mobile and lone worker safety is to connect them to safety contacts through live monitoring software. Supervisors can gain real-time visibility into the location and wellbeing of mobile workers in remote areas. Instant notifications through text message, email, and on-screen alerts allow you to respond quickly in the event of a gas alarm, man-down, or panic situation.

Look for a gas detector that offers lone worker functionality to automatically relay live updates on location, gas hazards, and worker status to safety contacts. A variety of connectivity options, including cellular, satellite, wi-fi, and gateways ensure coverage no matter where your workers roam.

Managing Your Data

If you manually track gas exposure data, you're likely spending a lot of time on a process that yields little insight. Manual reports rely on workers remembering and reporting all the gas alarms they received that day, so they're often incomplete or unreliable.

Industrial Scientific statistics suggest that **automated data collection systems** can record five times as many alarms as manual reports, giving you an accurate picture of safety across your facilities.

To get the most out of your gas detection program, you need automated data collection. Putting together historical data — that is, all the gas events collected over months or years of work — and real-time information can allow you to see trends that would not be visible in a manual report.

Real-time data provides an edge over historical data by offering instant alerts when a worker is in danger. Instead of discovering the issue days or even weeks later, you can see the incident in real time and intervene to prevent the issue in the future.



Automated data collection systems can record five times as many alarms as manual reports.

A person wearing a white lab coat and a black wristwatch is holding a red gas detector. A large orange circular arrow icon is overlaid on the image, pointing clockwise. The background is a blurred industrial setting with various pipes and equipment.

Maintaining Your Gas Detectors

All gas detectors require some amount of maintenance. Monitors need to be bump tested daily and calibrated at least monthly. This is the only way you can be sure your gas monitors will detect gases and alert workers.

You need a system that allows workers to charge and bump test their monitors before every use and calibrate them as needed. The most common solution is a docking station that can charge the gas monitor, automatically bump test before each use, and calibrate on a schedule you set.

As a bonus, these docking stations can also generate reports on worker exposure, alarm activity, and maintenance history, making it fast and easy to access the compliance reports you need.

To make maintenance even easier, you can use a subscription-based service program like iNet® Exchange to automate routine maintenance and eliminate repairs. When a monitor begins to decline, your docking station automatically orders a replacement. Once you receive the replacement monitor, you send back the old one.

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Gas Detection Ownership Options: Purchase, Rent, or Lease

Once you decide which monitors are right for you, you'll need to choose an ownership option. Purchasing, renting, and leasing are the most common.

Purchasing and leasing are ideal when your gas detection needs are long-term and relatively stable. If you have workers who can maintain the monitors, purchasing may be right for you. If you don't have staff to maintain the monitors, leasing is a better and safer option. In either case, you can work with a manufacturer or distributor partner to choose the gas detectors, sensors, and accessories you'll need.

Leasing programs, like Industrial Scientific's iNet® Exchange, offer major benefits over other options. With iNet Exchange, Industrial Scientific manages all gas detector maintenance and repair — even replacing the instruments before they fail — to eliminate downtime and simplify your gas detection program.

Rentals are perfect if your gas detection needs are short-term or irregular, like:

- Temporary maintenance jobs
- Replacing gas detectors under repair
- Testing monitors before a purchase
- Turnarounds and shutdowns

iNet® Exchange eliminates the cost of extra parts and equipment and gives you back the time you would spend on maintenance and repair.



Get in touch with our experts today to learn how we can help you find the right gas detection solutions to meet your needs now and in the future.

Training Your Team

Even if you have the best gas monitors in the world, they're not going to be effective if workers don't know how to use them.

While technology is making gas detection easier, your workers must be trained to ensure their own — and their team's — safety.

At Industrial Scientific there are plenty of training options to meet your specific needs, including:

- In-person training
- Virtual training
- Videos
- Webinars

No matter your gas detection needs, we're here to help.

INDUSTRIAL ***SCIENTIFIC***

**Find the right gas detection program
for your water or wastewater facility.**

Talk to an Expert

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