The cleaning and treatment of fresh water and sewage is associated with hazards just as much as the maintenance of the sewage system itself: The presence of toxic or flammable gases and oxygen deficiencies are potentially risky. If you know the risks, you can control them and provide employees with reliable protection.
The challenge

The water industry bears great responsibility. It has to deal with limited resources and contributes to the health of billions of people.

Despite all the technological progress, it is still people – employees of the water and sewage industry – who ensure that everything runs smoothly. This includes inspection patrols, cleaning and maintenance work, repairs and dismantling; despite careful risk analysis, there is always the potential of contact with hazardous substances, which can be dangerous or even fatal to health.

Employees who work supporting the ongoing cycle of water recovery, cleaning, supply or discharge pipes, as well as reprocessing and disposal of sewage sludge, must be given special protection to enable them to perform their jobs safely. If the risks cannot be permanently diminished via a ›safe system of work‹, a protection concept tailored to the specific activity is required. The concept will focus on the key aspects of gas detection, respiratory protection, personal protection and training.

Higher need for water treatment: The need for clean water will grow faster than the number of accessible clean water resources. Therefore, the demand for waste water treatment techniques will increase.

The risks

There are specific risks to staff and facilities in each stage of the water recovery and treatment process, which in particular include toxic gases, flammable gases and low oxygen levels.

Even today, working on water or sewage channels still requires manual visual inspection, fixing faults, maintenance and cleaning. A lack of ventilation combined with biological fermentation processes and chemical reactions encourage the accumulation of methane (CH₄) or even hydrogen sulphide (H₂S) at critical concentrations. CH₄ is extremely flammable and can react explosively. Even at very low concentrations, H₂S is extremely toxic to the human body.

There is also a range of chemical and biological reactions which can reduce the level of oxygen in breathable air and increase the risk of asphyxiation if workers are inadequately protected.

Furthermore, the chlorine used for water disinfection is derived from a highly noxious gas which, even in the smallest quantities, is harmful to the respiratory system.
Recognising, analysing and assessing risks are important pre-conditions in order to develop solutions for work in confined spaces, handling hazardous substances, plant safety and emergencies.

The plant-specific hazard assessment provides a detailed list of risk factors for certain activities and areas of the plant. To find the right solution for every one of these stages of water purification and waste water handling is challenging.

Gas measuring devices with fast responding sensors, personal protective equipment such as respiratory protection with adequate filters and protection classes as well as appropriate escape devices are needed. The right devices at the right time, at the right location can protect employees against upcoming hazards. The goal is to achieve a healthy balance between sufficient protection and minimal physical strain on workers to avoid the consequent restrictions on efficiency. It must also feature a portfolio, which can be utilised economically and dependably throughout its life cycle.

If you are faced with the challenge of procuring the best material for you and your employees, you can trust Dräger. Our portfolio has an answer to the most diverse requirements of your working practice.
Working in confined spaces

The water industry is faced with a range of different confined spaces in which to work: treatment units, tanks, service reservoirs, chemical handling and storage areas, pumping stations, wells, sumps, overflows, boreholes, sewers and manholes. The most frequently occurring hazards are methane, hydrogen sulphide and a lack of oxygen.

Working in confined spaces, such as tanks, sewers, manholes, water towers, and sumps can be part and parcel of working within the water industry. However, it should never be regarded as a simple routine task because it often involves accumulated gases or low oxygen levels. This is why working in confined spaces should only be performed with the right safety equipment to protect your employees against upcoming risks.

Portable gas detection devices, respiratory protection and the use of emergency escape equipment ensure that your employees are able to do their work.

Workers in confined spaces must be able to rely on the personal gas-measurement instrument they are carrying and have confidence in their self-rescuer to feel safe whenever they are working.
Gas area monitoring and mobile gas detection devices

Dräger X-am® 7000

The Dräger X-am 7000 is the appropriate solution for the simultaneous and continuous measurement of up to five gases. It is the ideal companion in a variety of applications where the reliable detection of oxygen, toxic and combustible gases and vapours is required.

Dräger X-am® 2500

The Dräger X-am 2500 was specially developed for use as personal protection. This 1-to-4 gas detector reliably identifies combustible gases and vapours, as well as O₂, CO, NO₂, SO₂ and H₂S. Accurate and durable sensors provide a high degree of safety with extremely low operating costs.

Dräger X-am 1/2/5000 external pump

The Dräger X-am 1/2/5000 external pump for hose length of up to 30 meters. Makes it possible to use the detector for pre-entry measurements into confined spaces such as tanks, shafts, etc.

Respiratory protection and personal protective equipment

Dräger Panorama Nova®

The Panorama Nova respiratory mask meets the strictest requirements for protection efficiency, leak tightness and quality. Tried-and-tested over decades across the world, this full mask stands for completely dependable eye and respiratory tract protection.

Dräger PAS® Lite

For use in industrial applications where a simple, robust and easy-to-use breathing apparatus is required, the Dräger PAS® Lite self-contained compressed air breathing apparatus (SCBA) combines reliability with comfort and performance.

Dräger CPS 5800

The Dräger CPS 5800 is a limited-use chemical protection suit for industrial applications. It provides protection against a variety of gaseous, liquid and solid hazardous substances.
Plant Safety Operations

Employees working at the plant should be able to depend on a monitored workplace where risks are minimised as far as possible. The same applies to those living near a water management company.

Water treatment and wastewater disposal plants involve a wide array of process steps and plant structures. These all require particular orchestration to ensure the processes are performed smoothly and, most importantly, in a safe manner. Companies have a duty to ensure the lowest possible accident rate and design their processing and operating steps as efficiently as possible: As many alarms as are needed but with as few false alarms as possible – this is where the challenge lies. The main focus is on monitoring gas concentrations for: ozone (O₃), hydrogen peroxide (H₂O₂), sodium hypochlorite (NaClO) and chlorine dioxide (ClO₂) (used in water disinfection), hydrogen sulphide (H₂S) and methane (CH₄) occurring as wastewater residues; as well as hydrochloric acid (HCl) and sulphur dioxide (SO₂) (used in dechlorination).

Gas area monitoring is an ideal way of continually observing large work areas featuring a severe risk of explosion or toxicity.
Gas area monitoring

Dräger Polytron® 7000
The Dräger Polytron 7000 is a stationary gas detector that can satisfy all the requirements of toxic and oxygen gas measurement applications on a single platform. It meets industry-standard requirements as well as the high specification requirements of customised solutions.

Dräger PIR 7000
The Dräger PIR 7000 is an explosion-proof, optical infrared gas detector for continuously monitoring flammable gases and vapours. With its SS 316L stainless steel enclosure and drift-free optics, this detector is built to withstand the harshest industrial environments.

Dräger REGARD® 3900
The Dräger REGARD 3900 is a stand-alone, self-contained control system for detecting toxic-, oxygen- and explosion-related hazards. It is fully configurable between 1 and 16 measurement channels, depending upon the type and number of input/output boards installed.

Personal Protective Equipment

Dräger X-am® 2500
The Dräger X-am 2500 was specially developed for use as personal protection. This 1-to-4 gas detector reliably identifies combustible gases and vapours, as well as O₂, CO, NO₂, SO₂ and H₂S. Accurate and durable sensors provide a high degree of safety with extremely low operating costs.

Dräger X-am® 5600
The Dräger X-am 5600 is the smallest gas detection instrument for measuring up to 6 gases. Ideal for personal monitoring applications, this robust and water-tight detector provides accurate, reliable measurements of explosive, combustible and toxic gases and vapours as well as oxygen.

Dräger X-plore® 4700
The Dräger X-plore 4700 is a robust half mask which offers excellent comfort and an outstanding seal for demanding applications. Thanks to the wide range of filters available for protection against gases, vapours and particles, it is ideally suited for use in water treatment industry.
Handling hazardous substances

Chlorine and ozone require particularly careful handling, precise dosing, continual monitoring and reliable respiratory protection.

Using and preparing doses of chlorine and ozone in chemical disinfection processes pose an ongoing risk to those working in the water treatment industry. Depending on the concentration and accompanying conditions, they can lead to explosions, fires, poisoning and inhibit oxygen consumption. This is why the workplace exposure thresholds for ozone and chlorine are set very low. Chlorine gas containers are generally stored in a gas-tight chlorine chamber. Its surrounding air must be continually monitored by a stationary gas-measuring device.

Chemicals should only be stored, dosed and processed if there are special preventative measures in place. Gas-measuring devices and chemical protective suits are used to protect workers.
Respiratory protection

**Dräger WorkMaster Industry**
Particularly resistant against alkaline solutions and acids: the chemical protection suit WorkMaster Industry provides reliable protection during tank cleaning, maintenance and repair work, chemical transportation, clean-up operations and many other dangerous types of work.

**Dräger X-plore® 6300**
The Dräger X-plore 6300 is an efficient yet low-cost full mask for price-conscious users not wishing to compromise on comfort or quality. It is the successor to the Dräger Panorama Nova®, a mask which has proven itself over decades – now redesigned and improved with an integrated bar code.

**Dräger PSS® 3000**
The Dräger PSS 3000 is a new generation of high-performance breathing apparatus. Combining comfort with modern pneumatic performance, it is designed for applications where simplicity and ease of use are essential. This breathing apparatus is lightweight yet robust, and easy to don.

Personal protective equipment

**Dräger X-am® 2500**
The Dräger X-am 2500 was specially developed for use as personal protection. This 1-to-4 gas detector reliably identifies combustible gases and vapours, as well as O₂, CO, NO₂, SO₂ and H₂S. Accurate and durable sensors ensure a high degree of safety with extremely low operating costs.

**Dräger Pac® 7000**
Safety in the workplace always takes priority: depending on the sensor selected, the single-gas Dräger Pac® 7000 detector reliably warns against dangerous concentrations of 14 different gases. An optional 5-year warranty is available for the H₂S-, O₂- and CO devices.

**Dräger X-plore® 3500**
Dräger has worked together with users from the industry and the skilled professions to develop a new line of twinfilter respirators – the X-plore 3500. It combines usability and comfort. The use of new materials coupled with a modern, attractive design are what makes it popular amongst users.
Self-rescue is always the first choice. This is why escape hoods and self-rescuers should always be within reach.

Emergency Escape

Only a couple of breaths of H₂S can be enough to inflict permanent injury or even cause death. In the event of an alarm, employees must first of all ensure that they are safe. They must be capable of rescuing themselves.

One of the greatest risks in the water/wastewater industry is the potential contact with hazardous substances. Life-threatening situations can arise at many workplaces in a water management plant. Always keeping escape equipment within reach helps the workforce get themselves to safety as soon as possible. The better staff is prepared for these types of emergencies, the better their reaction times in a real emergency. And it’s a good thing too: if there are high levels of hydrogen sulphide, methane, or a lack of oxygen, saving a life can be a matter of seconds. Easy-to-operate oxygen self-rescuers that can be put on within seconds give workers up to 15 minutes time to reach a safe gathering point or rescue chamber.

Personal protective equipment and respiratory protection

**Dräger Saver CF**

The Dräger Saver CF hood escape device provides the wearer with a constant air supply via overpressure. It prevents any penetration of hazardous substances. The breathing air supply activates automatically if the device bag is opened. The hood is also ideal for workers with beards or glasses.

**Dräger Oxy 3000/6000**

The robust Dräger Oxy 3000 and 6000 oxygen self-rescuers are designed to withstand the harshest conditions. Their new product concept reliably protects the internal functional unit against damage. The Safety Eye allows the user to assess whether the device is operational within seconds.

**Dräger PAS® Colt**

The Dräger PAS Colt is a highly versatile breathing protection device featuring a modern design. Worn on the hip, this short-term/escape respiratory device is easy to put on. The compressed air cylinder can be unlatched and positioned in front of the body for entering and exiting confined spaces and containers.
A TIP: REGULAR MAINTENANCE AND EFFICIENT SERVICING WILL KEEP YOUR EQUIPMENT IN TOP CONDITION.

Maintenance and service

The regular maintenance of technical safety products increases their durability and ensures that they function. If a task cannot be corrected in-house, then the Dräger service technicians offer advice and practical solutions.

Precise measuring results depend on the careful calibration of mobile gas detection devices with a suitable test gas. Self-contained breathing apparatus must be cleaned, disinfected, and serviced after each use. Reusable chemical protection suits may only be reused if they have been subjected to proper cleaning, disinfection and testing processes. For all of these processes, Dräger provides the necessary accessories, training, and supporting know-how.

Dräger Services – more than you expect

**Product Service**
Our product service department supports you with a range of service packages – in our shops or on site in your plant. Care, servicing and maintenance are key factors when it comes to safety. Preventive checks, service procedures and original replacement parts make your investment last longer.

**Rental Service**
From bridging a temporary shortage of equipment to procuring special equipment for applications involving specific requirements: Dräger Rental Service with a broad range of rental equipment is an economical alternative to purchasing. Fast, straightforward and with a wide range of additional services available on request.

**Training**
The Dräger Academy has imparted well-founded and practical knowledge for over 40 years. With over 110 authorized trainers and more than 600 available topics, we conduct more than 2,400 training sessions per year. We equip your employees with the knowledge required for real-life situations.
Not all products, features or services are available in all countries.
Mentioned Trademarks are only registered in certain countries and not necessarily in the country in which this material is released. Go to www.draeger.com/trademarks to find the current status.