

# POWER GENERATION INDUSTRY

► OUR PORTFOLIO



There is little doubt that sources of energy are key drivers of human progress. This fact shows the importance of the power generation industry. Our mission is to support you in making these processes safe and protecting the employees involved.

**MORE POWER. BETTER SAFETY.**

**HEALTHY EMPLOYEES.**

## The challenge

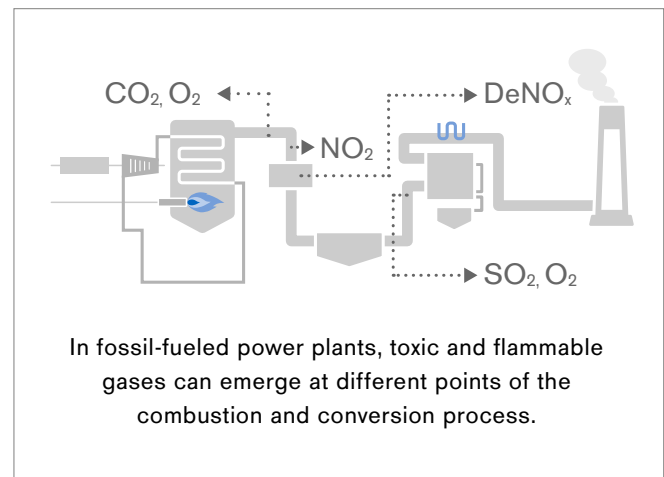
As the power generation industry is the backbone of industrial progress, solutions are needed to ensure safe workplaces and healthy employees.

The power generation sector is essential in supporting the increasing demand for power from emerging countries and a rising world population. Due to the sector's social and economic impact, companies are under strong pressure to improve their efficiency to achieve not only greater cost competitiveness, but also an outstanding level of environmental performance and a higher safety level. Workers in the power generation industry are potentially exposed to a variety of serious hazards in the workplace.

The dangers of the power generation industry are as diverse as the jobs they work on: the facilities can range from fossil-fueled and nuclear power plants to renewable energy facilities with wind turbines or hydro-electric dams. Each presents a unique combination of hazards.

## The risks

Every kind of power generation facility has its own particular risks when it comes to safety.



The example of a coal-fired power station can be used to illustrate the wide range of risks that may arise: Coal dust exposure may occur in all stages of coal handling. The dust has a great potential to ignite, which is accompanied by the release of hazardous substances like methane, carbon dioxide and carbon monoxide. Another substance that has the potential to affect workers health is ammonia. This hazardous substance is used within the flue gas cleaning process to remove nitrogen oxides. Furthermore the exposure to sulfur dioxide is a risk, which can occur from the burning process through to the final cleaning step and can cause respiratory and heart problems. Workers can also be affected by sulfur dioxide when it is inhaled or if it comes into contact with eyes or skin.

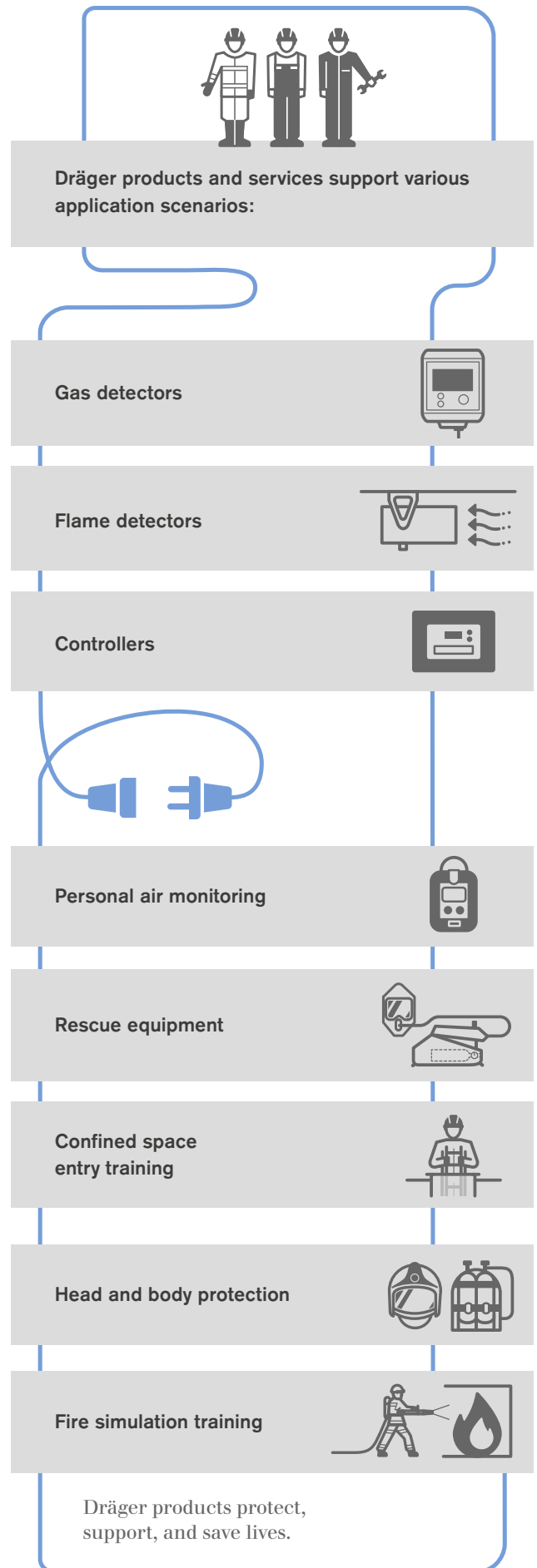
The hazards of the electrical power generation process include explosions, fires and contact with hazardous substances. Risks will differ depending on the type of power station: fossil-fueled, nuclear or renewable energy. These risks include toxic gases, flammable gases and low oxygen levels for the employees.

## The solution

Hazardous substances occur at different stages of the power generating process. Permanent monitoring of the potential dangers in plants and the protection of employees is crucial.

Investment in a safety program that focuses on hazard identification, training, prevention and assessment will not only help reduce injuries and increase safety, but it will also help the industry to become more competitive in the marketplace. Regardless of the type of power plant involved, it is necessary to have gas measuring devices with fast responding sensors, personal protective equipment such as respiratory protection with adequate filters and protection class, and the appropriate escape devices. The right devices at the right time and in the right location can protect your employees and your plant against potential hazards.

If you are tasked with the challenge of procuring excellent equipment, you can trust us. Our portfolio has a solution for the most diverse requirements of your working practice.



**SAFETY ISN'T ABOUT RULES OR REQUIREMENTS;  
IT'S ABOUT THE SAFE EXECUTION OF PROCESSES.**

## Plant Safety Operations

Based on individual safety and protection goals, we support you with an extensive range of equipment and provide services that help to reduce costs and save resources.

Keeping the system running, reducing downtimes and making operations more effective: these are the key elements of plant safety operation. At the same time, the safety of staff and the public must be of paramount concern in operating any kind of power plant. All the various process steps and structures have to be well organized to make sure that they can all be performed smoothly and safely. For example, there should be as many alarms as are needed but with as few false alarms as possible. Within a coal power plant, the main focus is on monitoring gas concentrations for carbon monoxide (CO<sub>2</sub>), carbon dioxide (CO) and methane (CH<sub>4</sub>) in storage areas and during transportation. Ammonia (NH<sub>3</sub>) and nitrogen oxides (NO<sub>x</sub>) are measured within the SCR system. At a nuclear power plant, hydrogen (H<sub>2</sub>) or hydrazine (N<sub>2</sub>H<sub>4</sub>) is measured in the generator room and nitrogen in the injection system.



Gas detection devices and personal protective equipment protect workers in the power generation industry from harmful concentrations of hazardous substances.

## Stationary gas detection systems

### 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 customized solutions.

### Dräger Polytron® 8700 IR

The Dräger Polytron® 8700 IR is an advanced explosion-proof transmitter for the detection of combustible gases in the lower explosion limit (LEL). It uses a high performance infrared Dräger PIR 7000 sensor, which will detect most common hydrocarbon gases. It also offers Modbus and Fieldbus, making it compatible with most control systems.

### Dräger REGARD® 7000

The Dräger REGARD® 7000 is a highly expandable analysis system for monitoring various gases and vapors. It is suitable for gas warning systems with various levels of complexity and numbers of transmitters.



## Personal Protective Equipment and Area Monitoring

### Dräger X-plore® 6570

The Dräger X-plore® 6570 is the high comfort silicone full-face mask used by professionals in a wide variety of applications. It meets the highest demands for quality, reliability, secure fit and comfort. This full-face mask is the successor to the Panorama Nova masks, a range that has proven itself over decades of use worldwide.

### Dräger X-zone® 5500

Whether you work in a wide area or in confined spaces, gas leaks may occur: With the portable X-zone® 5500, in combination with the X-am® 5000, 5100 or 5600 gas detection instruments, you can monitor up to six gases at any time. It extends the portable gas detection technology to a comprehensive system with many applications.

### Dräger X-am® 5600

The Dräger X-am® 5600 is a compact 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 vapors as well as oxygen.



**WORK IN A CONFINED SPACE SHOULD ONLY BE PERFORMED  
WITH THE RIGHT SAFETY EQUIPMENT.**

## Confined Space Entry

**Confined space entry is often considered to be a dangerous type of work performed in power generation settings. It is therefore important that the entry is strictly controlled and detailed precautions are taken.**

Examples of confined spaces include conveyor belts, the Selective Catalytic Reduction (SCR) system within a coal power plant, and capacitors, accumulators or pipes in a nuclear power plant. Confined spaces may contain hazardous atmospheres, they can trap entrants, and they can generally increase the hazards associated with otherwise common tasks. Lack of oxygen, toxic and flammable gases are risks that can occur during work in confined spaces, which should never be considered as simple or routine. However, the hazards of working in confined spaces can be predicted, monitored, and mitigated. Portable gas detection devices, respiratory protection, area monitoring and the use of emergency escape equipment ensure that your employees are able to do their work in safety.



When the risks are not recognized, workers all too often regard incidents as surprises, but the hazards of working in confined space can be predicted, monitored, and mitigated.

## Gas Area Monitoring and Training

### Dräger X-zone® 5500

State-of-the-art area monitoring – the Dräger X-zone® 5500 in combination with the Dräger X-am® 5000, 5100 or 5600 gas detection instruments can be used for the measurement of up to six gases and extends the portable gas detection technology to a comprehensive system with many applications.

### Dräger X-am® 8000

Clearance measurement was never this easy: The Dräger X-am® 8000 measures up to seven toxic as well as flammable gases, vapors and oxygen all at once – either in pump or diffusion mode. Innovative signaling design and handy assistant functions ensure complete safety throughout the process.

### CSE-Training

The hands-on simulation-based training prepares workers for entry into confined spaces and containers. Participants acquire all knowledge required to perform CSE work safely and efficiently. Special attention is given to gas measurement, personal protective equipment and emergency procedure.



## Personal Protective Equipment

### Dräger Sampling Tubes and Systems

The Dräger Sampling Tubes and Systems are very reliable in use even with complex compounds and mixtures of substances. They allow the identification and measurement of different substances under difficult conditions.

### 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® AirPack 1

Designed using leading technology and materials, our range of heavy-duty airline apparatus is ideal for use where an extended duration of breathing air is called for. Whenever an airline solution is needed the Dräger PAS® AirPack 1 is an easy and comfortable solution.



## MINIMISE THE RISKS AND INTRODUCE EFFECTIVE HAZMAT HANDLING WITH OUR HELP – FOR YOUR STAFF AND PLANT.

### HAZMAT handling



Your business is HAZMAT handling, where you need efficient support. Our business is your safety – from gas monitoring and protection equipment to tailored safety solutions.

Gas detection requirements for power generation can vary widely depending on the fuel source. Regardless of the type of power facility, gas and other hazards pose significant risks to employee safety. Ammonia, hydrogen, hydrazine and propane are just some examples of gases and vapors that can be found in the power generation industry. To start with, nitrogen oxides (NO<sub>x</sub>) present in flue gases are converted into nitrogen and water by injecting ammonia ahead of a special catalyst (SCR). The bullet tanks, pumping, vaporization and injection areas in the coal-fired facilities have to be monitored. Propane is used as a fuel for the burners in the burning chamber of a coal power plant. Hydrogen and hydrazine are used as cooling agents for turbines in the complete range of power generation.

### Personal protective equipment

#### Dräger X-am® 5100

The Dräger X-am® 5100 portable single-gas detector ensures that you use some of the safest methods possible for handling HF, HCl, H<sub>2</sub>O<sub>2</sub> or hydrazine – thanks to proven Dräger sensor technology and a device design which is perfectly customized to reactive gases.

#### Dräger PSS® 7000

Developed by professionals for professionals, the Dräger PSS® 7000 breathing apparatus is a major milestone in our continuing development of breathing devices for the professional firefighter.





**BETTER DETECTION OF TOXIC GASES AND DUSTS ENSURE**

**BETTER PROTECTION – EVEN DURING MAINTENANCE AND REPAIRS.**

## Plant maintenance and repair



Recognizing, analyzing and assessing risks associated with toxic gases and dust are important preconditions in order to develop solutions for all work in different hazardous areas.

What sounds like simple routine work is in fact a dangerous application scenario in the power generation industry. Hazardous gases and dust can be constantly present in the ambient air. They are often invisible and not perceptible by the human senses, which makes them especially dangerous.

To minimize the risk of exposure to hazardous gases, it is highly recommended that workers are provided with reliable gas detectors for personal air monitoring. Furthermore, working in a dusty and hazard environment requires reliable respiratory protection equipment. An area monitoring system offers additional safety.

## Respiratory protection equipment

### Dräger X-am® 5000

Dräger X-am® 5000 is a small 1-5 gas detection instrument for personal air monitoring. In combination with the double sensor CO/H<sub>2</sub>S a simultaneous measurement of up to 5 gases is possible. This allows a reliable monitoring of the ambient air to toxic and flammable gases and vapors, as well as oxygen.

### 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 X-plore® 8000

The Dräger X-plore® 8000, a powered Air-Purifying Respirator (PAPR), offers a new level of intuitive handling. With intelligent electronics that provide the highest degree of safety, so you can focus on the task at hand.



**EVERY SECOND COUNTS IN AN EMERGENCY SITUATION.**

**ESCAPE DEVICES SAVE LIVES.**

## Emergency escape and rescue



At almost every workplace in the power generation industry, employees could potentially face life-threatening concentrations of toxic gases. In the event of an alarm, employees must first of all ensure their own safety.

Important to consider: Only a couple of breaths of CO can be enough to inflict permanent damage to the heart and nervous system or even cause death in a fossil-fueled power plant. An emergency situation in a nuclear power plant means that for emergency escape you have to be independent of the ambient air. Always keeping escape equipment within easy reach gives the workers a couple of valuable minutes in hazardous areas. The better prepared employees are for such situations, the faster their reaction times are in the event of an emergency. In order to save the victims, the rescue personnel also need reliable equipment. We provide you with training, and rescue strategies, risk management advice, and protective equipment.

## Escape equipment

### Dräger PARAT® 4290 NIOSH

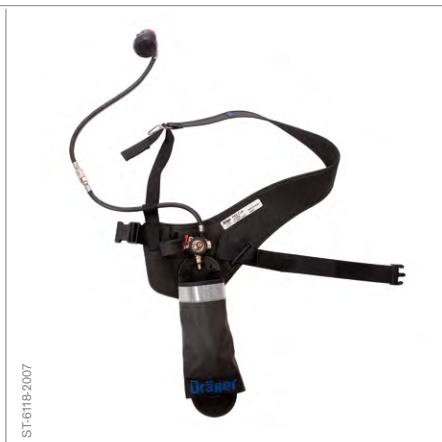
The combined fire and industrial escape hood Dräger PARAT® 4290 was developed with users, placing the focus on the fastest possible escape. Optimized operation and wearing comfort, a robust housing and a NIOSH tested ABEK CO P3 filter ensure protection from toxic industrial and fire-related gases, vapors and particles for at least 15 minutes.

### 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.

### Dräger PSS® 5000

The Dräger PSS® 5000 SCBA is a high-performance breathing apparatus for the professional firefighter. Combining advanced ergonomics with a wide range of configurable options, our SCBA provides you with the comfort and versatility wherever breathing protection is required.



**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 and Dräger Channel Partner Services – more than you expect

### Product Service

Product service solutions support 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: Rental service solutions 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 global Dräger Academy has imparted well-founded and practical knowledge for over 40 years. With over 110 authorized trainers worldwide 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.



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