

# STEEL AND METAL INDUSTRY

► OUR PORTFOLIO



Steel and metal production is the backbone of each economy. Every year, millions of tons of raw steel are produced, as are copper, aluminum and lead. Despite all the technical innovations, the steel and metal workers are still facing tough challenges with high safety risks.

**STRONG STEEL. SAFE PRODUCTION.**

**HEALTHY EMPLOYEES.**

## The challenge

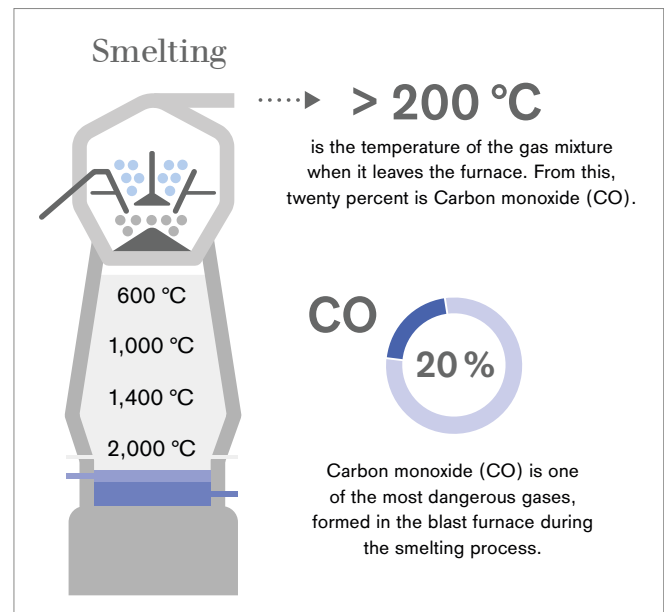
Even in state-of-the-art facilities, workers may still come into daily contact with hazardous substances in blast furnaces, rolling lines and foundries.

The steel and metal production and processing has to run around the clock. Any interruption or standstill represents a severe economic loss. Some production steps cannot be replaced by machine-based processes – such as spot checks directly at the blast furnace or converter. The people involved in these processes are specialists, genuine experts in their work. Given the many risks posed by toxic and explosive gases and vapors, dust particles and heat, not all of which are totally preventable, employees should always carry out their work with the optimum protection. Any additional risk must be avoided.

One of the greatest risk in the steel and metal production is the exposure to a high concentration of CO. Only a couple of breaths of CO can be enough to inflict permanent damage to the heart and nervous system or even cause death.

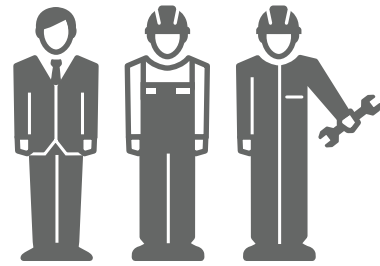
## The risks

Whether they cause acute toxicity or chronic illness, hazardous substances in the steel and metal industry pose a threat to workers' health.



During the steel production, many toxic gases (e.g. carbon monoxide/CO, carbon dioxide/CO<sub>2</sub>) as well as explosive gases (e.g. methane/CH<sub>4</sub>) are released. This means that the atmosphere must be permanently monitored using powerful gas measuring devices to comply with the current occupational exposure limits. In addition to that, the simultaneous occurrence of hydrogen (H<sub>2</sub>) can contaminate the CO sensor in the gas measuring devices, leading to false alarms. This might trigger a costly interruption in the production, or may even cost human lives: If employees learn to ignore the alarm signal, a genuine alarm in an emergency will no longer be taken seriously.

In very small concentrations (ca. 0,039 Vol%), CO<sub>2</sub> is a natural part of the breathing air. However, in higher concentrations, it becomes life-threatening, as it displaces the oxygen. Furthermore, the methane (CH<sub>4</sub>) represents an explosion risk with potentially catastrophic consequences for both personnel and plant.



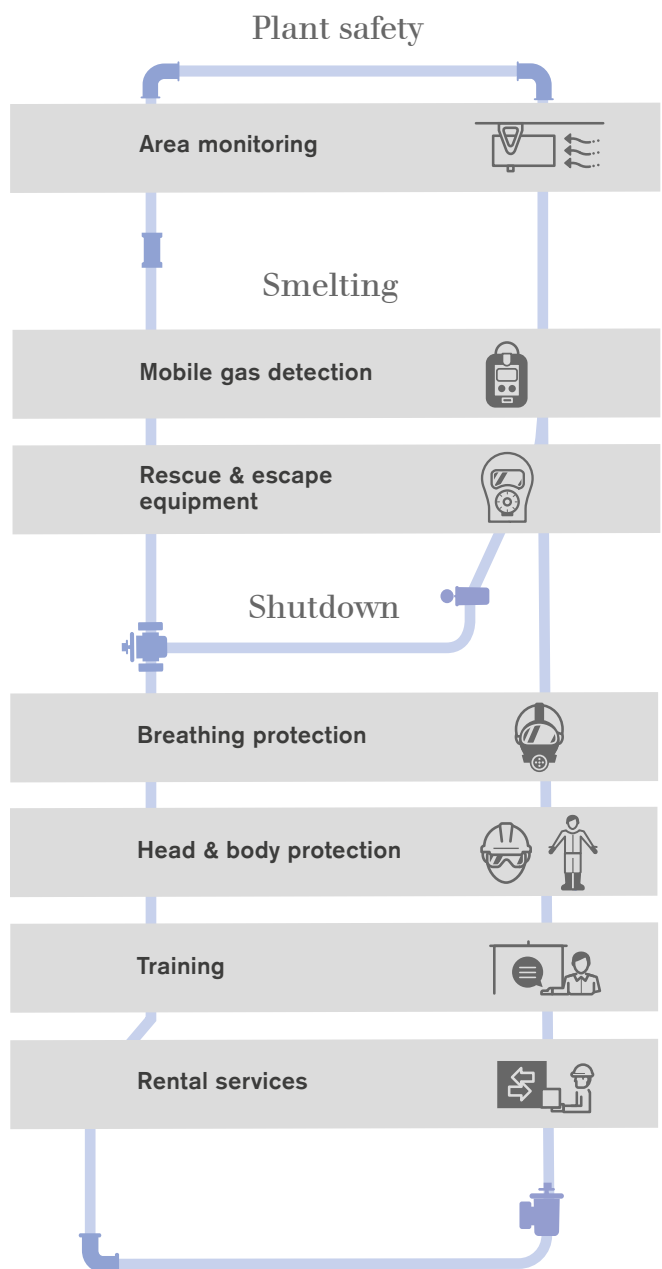
## The solution

Any work involving steel production, smelting and metal casting processes as well as maintenance work on the plant must be permanently supervised and monitored for concentrations of toxic and explosive gases.

A detailed and regularly updated risk assessment makes it possible to develop an optimum, plant-specific occupational safety concept. This includes the installation or wearing of suitable gas warning devices, which in the case of CO will not trigger a false alarm through cross-sensitivities involving H<sub>2</sub>. The same applies to personal protective clothing, which provides effective protection against mechanical or physical dangers without impeding the wearer from carrying out strenuous jobs. For emergency situations, escape and rescue equipment should be at hand and easy to use.

As an experienced safety manufacturer, we advise you on the choice of gas detection devices and useful personal protective equipment, as well as on their optimal installation and maintenance. And in our training courses, your employees learn how to integrate a high standard of occupational safety into their everyday working lives.

Dräger products and services support various application scenarios:



## EFFICIENT PRODUCTION, BUT NOT AT THE EXPENSE OF PERSONNEL AND PLANT SAFETY.

### Plant safety operations

In the highly competitive steelmaking market, the requirements towards production efficiency are enormous. Against this background, stops in production due to accidents or alternatively false alarms need to be avoided. We can help you with this highly responsible job.

Carbon monoxide in particular, is an insidious danger in the steel industry. It is colorless, odorless and extremely toxic. Therefore, our human senses are unable to perceive it. Even in small concentrations, CO dulls consciousness and therefore represents a direct safety risk. Also, CO poisoning might cause permanent damage to the heart and nervous system. Reliable safety equipment is an important precondition to minimize the risk for workers' lives.

For this and also more than 400 other hazardous gases, we offer suitable fixed as well as portable detection solutions.



A portable, personal, multi-gas measuring device protects workers in the steel and metal 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 PIR 7000

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



### 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.



## Mobile gas detection

### Dräger Pac® 8500

The Dräger Pac® 8500 single-gas detection device is a reliable and precise instrument even under the toughest of conditions. The device can be equipped with a hydrogen-compensated CO sensor or a Dräger dual sensor. This gives you the option of measuring two gases at once - like O<sub>2</sub> with CO.



### 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 vapors, as well as O<sub>2</sub>, CO, NO<sub>2</sub>, SO and H<sub>2</sub>S. Accurate and durable sensors provide a high degree of safety with extremely low operating costs.



### Dräger X-dock®

The Dräger X-dock® series provides you with full control of your portable Dräger gas detection instruments. Automatic bump tests and calibrations with reduced test gas consumption and short testing times save time and money. Comprehensive documentation and evaluations provide you with a clear overview.



**PLANT INSPECTIONS ARE NECESSARY.**

**PREPARATION IS ESSENTIAL HERE FOR ACCIDENT PREVENTION.**

## Shutdowns and turnarounds

**Steelworks requires regular maintenance and modernization works to increase their efficiency. Such projects must be carefully planned to ensure that everything runs smoothly.**

Shutdown projects are some of the most challenging undertakings within the steel and metal industry. Not only are there tough requirements related to cost management and minimization of downtime, but also there is an increased risk for the health and safety of workers. When hazardous gases are constantly present, they may suddenly leak into the air in concentrations that cause health impairment or even death. With well-trained and well-equipped personnel, however, there is a good chance of navigating the plant shutdown smoothly. Where necessary, Dräger experts can support you with issues of safety supervision, device administration and maintenance, and gas measuring technology during this tense time.



Additional safety personnel help to maintain an overview during plant shutdowns and to create a universal safety standard.

## Gas detection

### Dräger Pac® 8500

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### 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 vapors as well as oxygen.



### Dräger X-zone® 5500

Combined with the mobile Dräger X-am® 5000/5600 gas detection devices, the Dräger X-zone 5500 is a mobile area monitoring to form a wireless fence. Best of all: Up to 25 Dräger X-zones may be connected in wireless fence. This enables the simultaneous control of diverse work areas.



## Personal protection

### Dräger X-plore® 6300

The Dräger X-plore® 6300 is an efficient yet low-cost full-face mask with no compromise in comfort or quality. It offers a secure and comfortable fit, as the mask body is made from durable and skin-friendly EPDM, with double-layer face seal and triple sealing edges which provides a secure and comfortable seal for every type of face.



### Dräger PAS® AirPack 1

A circulating self-contained compressed air hose system like the Dräger PAS® AirPack 1 is recommendable, wherever an extended duration of breathing air is necessary. It improves mobility and is less of a burden for the wearer than compressed air bottles. This is important for working in confined spaces with optimal mobility.



## MASTERING COMPLEX SAFETY RISKS IN CONFINED SPACES IS NO LONGER A MISSION IMPOSSIBLE.

### Confined Space Entry



Anyone involved in maintenance or repair work in confined spaces must be accompanied by a competent safety official, valid measurement technology, protective clothing and an emergency plan.

Performing repairs on a furnace, servicing a fuel tank, silo, bunker or any other act of entering enclosed areas can be dangerous: you have to step into a dark space where ambient air supply might be limited and toxic or flammable gases might build up. All these adversities can, however, be reduced or controlled by means of a risk assessment followed by training, gas detection technology and protective equipment. If an emergency does arise, ideally a pre-agreed emergency plan goes into effect.

### Personal protective equipment and respiratory protection

#### Dräger X-am® 8000

Clearance measurement was never this easy: The 1 to 7 gas detector detects toxic and flammable gases as well as vapors and oxygen all at once – either in pump or diffusion mode. Innovative supportive solutions like signaling design and CSE Connect ensure complete safety.

#### Dräger X-plore® 3500

A perfect combination: modern design and light weight offer you extra safety and comfort. Dräger X-plore® 3500 is optimal for long lasting protection under tough conditions.





**THEY ARE OFTEN COLORLESS AND ODORLESS.**

**THEY ARE INVISIBLE DANGERS: TOXIC GASES IN THE METAL INDUSTRY.**

## Plant maintenance



What sounds like simple routine work, is in fact a dangerous application scenario in the steel and metal industry, as hazardous gases and dust are constantly present in the ambient air. Being often invisible and not perceptible by the human senses are what makes them really dangerous.

To minimize the risk of exposure to hazardous gases, it is highly recommendable to provide the workers with reliable gas detectors for personal air monitoring. Furthermore, working in a dusty environment for many years poses an increased risk for silicosis, which is one of the main preconditions for developing lung cancer. However, using reliable respiratory protective equipment minimizes the risk considerably.

## Mobile gas detection devices and personal protective 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 your workers can focus on the task at hand.



ST-9466-2007



ST-2479-2003



D-116996-2013

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

**RELIABLE ESCAPE DEVICES CAN SAVE LIVES.**

## Emergency escape and rescue



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 the event of an alarm, employees must first of all ensure their own safety.

At almost every workplace in the steel and metal industry, employees might face potentially life-threatening concentrations of toxic gases. Always keeping escape equipment within easy reach gives the workers a couple of valuable minutes to escape from the hazardous area. 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 needs reliable equipment as well. Dräger provides you with training, escape and rescue strategies, risk management advice and protective equipment.

## Personal protective equipment and respiratory protection

### Dräger PARAT® 4290 NIOSH

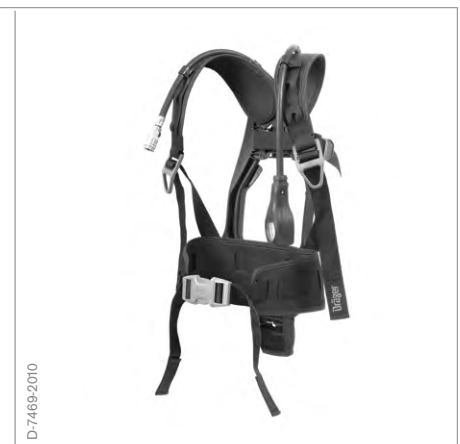
The combined fire and industrial escape hood Dräger PARAT® 4290 was developed with users, placing the focus on the fastest possible escape. Optimized operation and wearing comfort, a robust housing and a NIOSH tested ABEK CO P3 filter ensure protection from toxic industrial and fire-related gases, vapors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



**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**

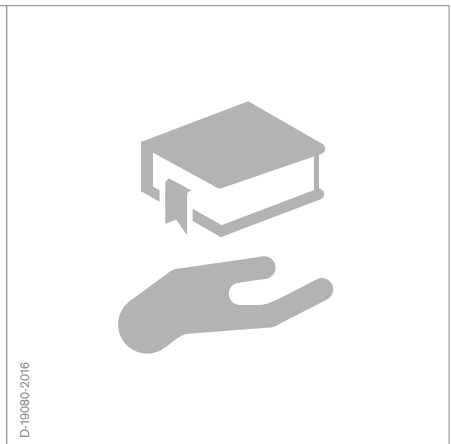
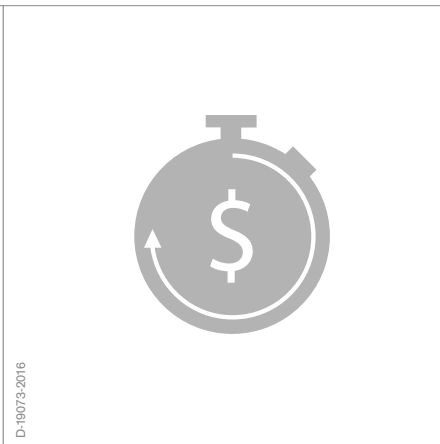
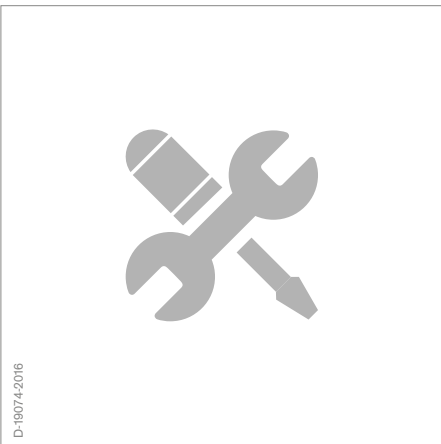
Product service solutions support you with a range of service packages – in our shops or on site in your plant. Care, servicing and maintenance are key factors when it comes to safety. Preventive checks, service procedures and original replacement parts make your investment last longer.

**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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