



Quicker, safer, more efficiently: clearance with innovative methods

The clearance of confined spaces prior to entering is an extremely safety-relevant and at the same time costly process. Every simplification is an investment in safety and efficiency.

No entry without clearance

Working in confined spaces and containers is always linked with risk: the threat of an explosion, toxic hazards and lack of oxygen. Before beginning work, clearance of these spaces by gas analysts is the responsibility of every plant's safety management. But: This are always costly processes. Every simplification is an investment in safety and efficiency.

Clearance as it was

A few decades ago, the existence of dangerous gases or vapours in a container, which was going to be entered, was often assessed by means of the oxygen concentration and monitoring the explosion limit. Fact: an uncritical oxygen concentration or a substance's shortfall of the explosion limit says nothing about the possible co-existence of other toxic gas concentrations. Therefore, on the basis of the risk assessment on-site, it is necessary to check which

dangerous substances could be present in a specific situation and in what concentrations. This is dependent on the type of container and its ventilation possibilities, as well as the possible production residues and the cleaning and working materials to be used.



POSSIBLE GAS HAZARDS WHEN WORKING IN CONFINED SPACES (SELECTION)

Tanks

- Petrol
- Toluene
- Organic solvents

Mines, shafts, ducts

- Methane
- Carbon dioxide
- Hydrogen sulphide

Sewage systems

- Methane
- Carbon dioxide
- Hydrogen sulphide

Cooling tanks

- Ammonia

Clearance as it is

Nowadays, if a tank or column requires clearance prior to cleaning or internal repair works, the gas analyst reads from the risk assessment which hazardous substances could be problematic for workers and the plant. They select the appropriate equipment for the clearance contract: a portable multi-gas detector system, fitted with the correct sensors, correctly adjusted and tested for functionality. Promptly before the works starting they measure, with the help of this equipment and an appropriate pump hose for the detector, the relevant hazardous substance concentrations. The measuring depth and location are dependent on the hazardous substance: is it a heavy or a light gas?

Preparation for clearance – you require this information:

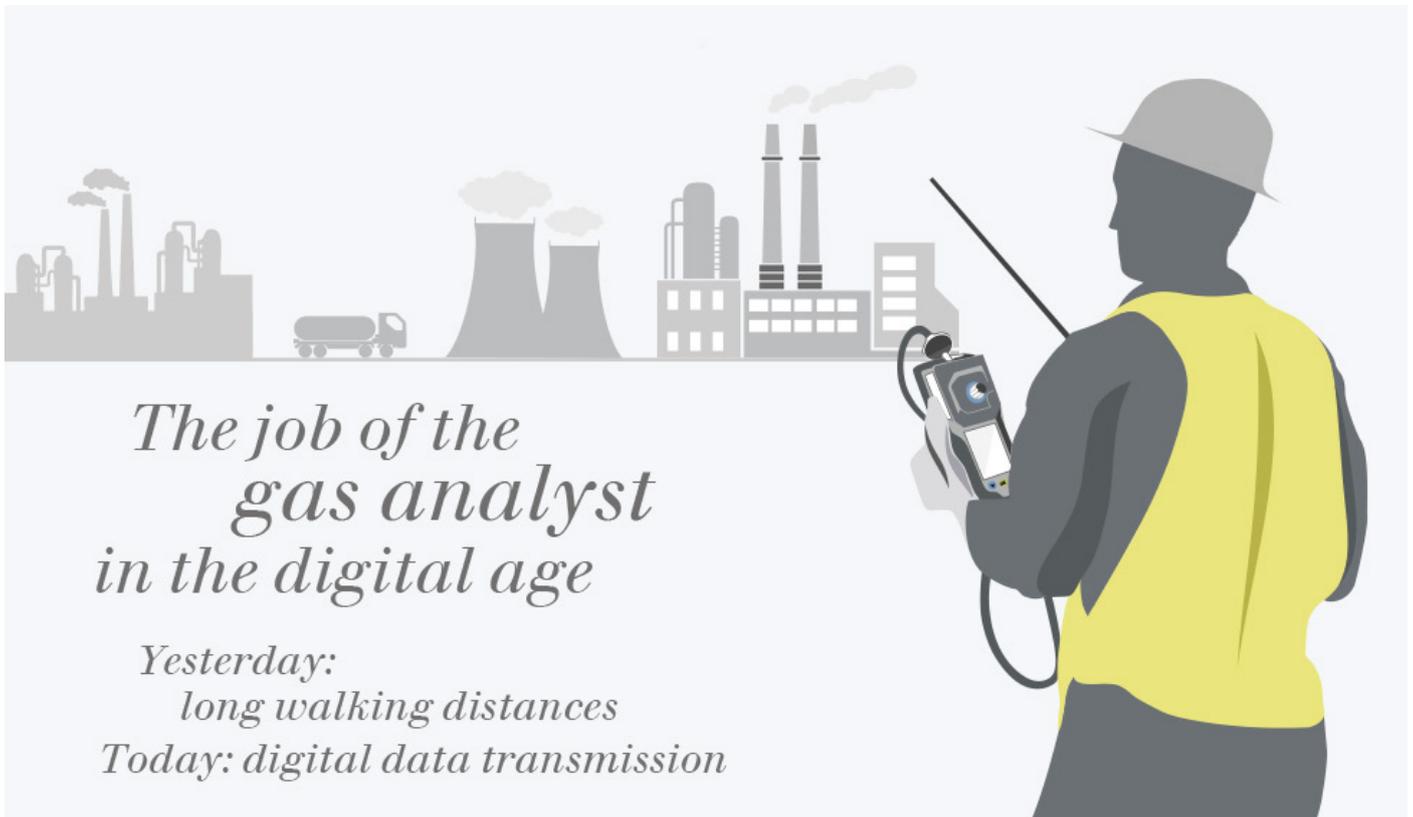
- which gases are to be expected?
- from which direction are they coming?
- in which direction are they going?
- what danger (Ex/Tox/Ox) do they pose?
- what risk is acceptable?
- how can the risk be reduced?

Costly documentation

The gas analyst generally records the procedure of measurement work and measurement results manually on-site in a measurement report. They should complete this accurately and legibly so that there can be absolutely no misunderstandings and errors when reading it. If the measurement values are above the admissible occupation limit value or should they allow other conclusions to be drawn of serious dangers, the workplace will subsequently be, for example, ventilated. This process of risk assessment recurs in the presence of the gas analyst until the values are acceptable or until it is decided that the area should only be entered with the use of protective equipment. The completed measurement report must be sent to the permit office. The safety manager documents the values and signs the protocol. A work permit is created.

Time-sensitive permit to work

Until the permit to work has been given by way of a signed release log, the internal works in permit-required confined spaces cannot begin. This becomes critical during tightly-timed projects, such as plant downtimes. In this case, each step must be correctly because every minute that production stops costs money. Works in containers and columns must not come to a bottleneck in such situations. All aspects, including the measurements, countermeasures such as ventilation, the documentation and the recording of conversations and decisions – require valuable time. How can this expense be reduced? Given the fact that complex procedures such as this can easily lead to steps being omitted and the shortening of processes – serious gaps in safety quickly arise. This circumstance, particularly in conjunction with work in confined spaces, can lead to fatal accidents time and time again.



*The job of the
gas analyst
in the digital age*

*Yesterday:
long walking distances
Today: digital data transmission*

Clearance as it will be

The main aim in the development of new clearance methods is to design the process to be simpler, quicker and safer. The more convenient and acceptable it is – the more likely it will be implemented accurately. Modern clearance systems have an assistant function. It guides the user precisely through every step of the clearance procedure and makes the user aware of errors. It also helps the user with the measurement duration determination. All displays and instructions are easy to read and understand. The measurement data and further information such as the time, date and the measurement device particularities are recorded by the measurement device itself and can potentially be transmitted to a remote approval location from

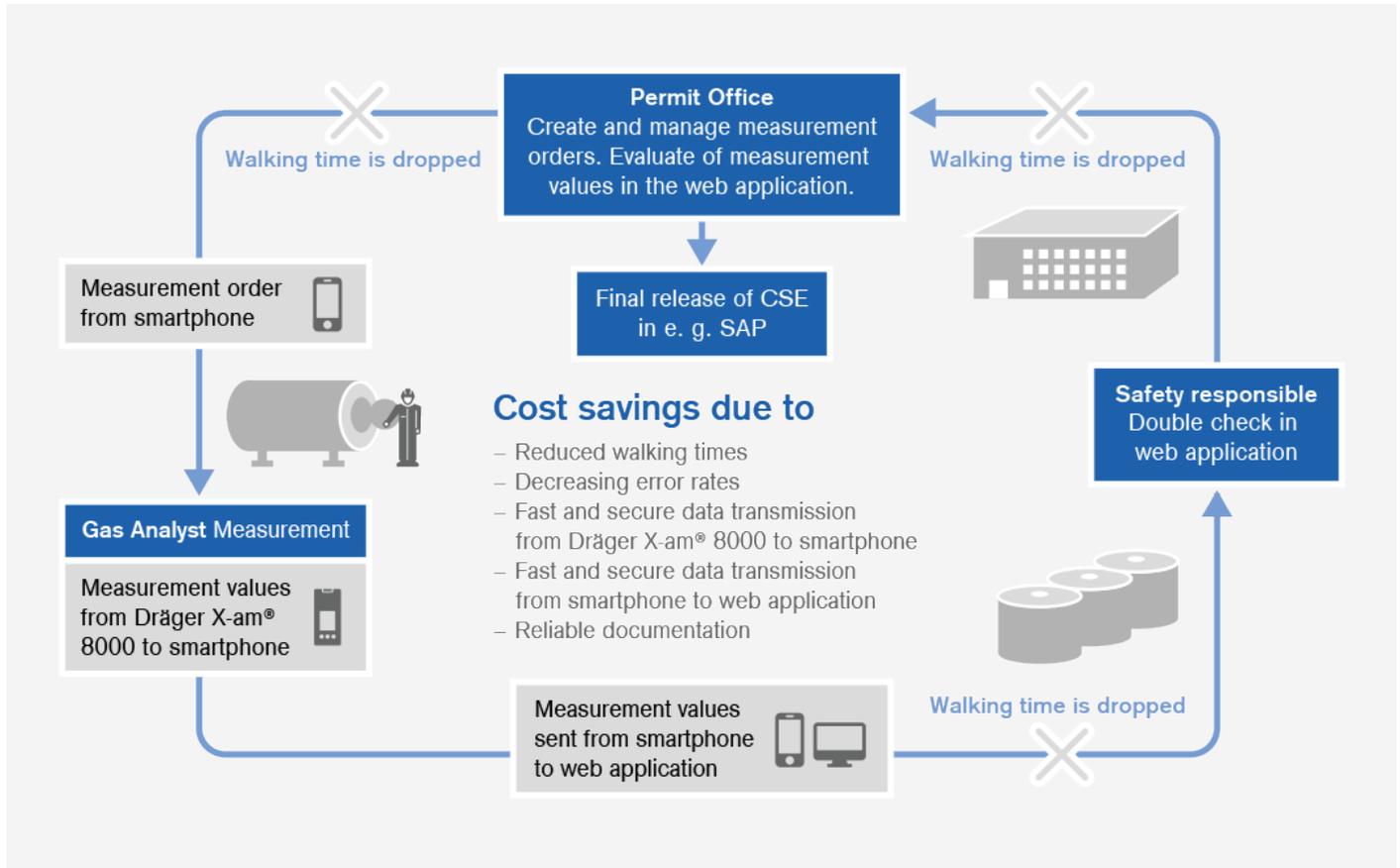
the place of measurement. The actual approval can likewise occur at a distance. Thus the transit times are omitted. Even the documentation of the measurement values is paperless.

More safety, more efficiency

Smooth and unambiguous communication in the run-up to hazardous work, such as tank cleaning, reduces the risk to workers and the plant. Less paperwork, shorter or omitted itineraries and the possibility to share information digitally (perhaps via a cloud): all of this supports safety managers in making the correct decisions.



Modern clearance processes: more safety, more efficiency



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GERMANY
Dräger Safety AG & Co. KGaA
Revalstraße 1
23560 Lübeck

www.draeger.com