Using gases to drive efficiency levels in the construction industry

Global competition is making efficiency an increasingly hot topic for companies in the construction industry. Industrial gases are a cost-effective way of optimising a range of tasks without impacting on the environment, quality or safety.

Cooling with nitrogen, neutralising with carbon dioxide

In the construction industry, pressure to reduce costs and meet tight deadlines can often have a negative impact on quality. Industrial gases can reduce project costs without compromising on quality, safety or environmental impact. In many cases, they are used for dedicated steps or specialised tasks on a large project, for example to accelerate turnaround or prepare for downstream processes. Liquid nitrogen (N_2), for instance, can help ensure high-quality concrete by cooling fresh mixtures to the optimum temperature for pouring. Carbon dioxide (CO_2), on the other hand, can be used as an environmentally sound method of neutralising alkaline wastewater from construction sites. When it comes to stabilizing site terrain, soil freezing with liquid nitrogen is often a fast, safe and, above all, environmentally friendly solution. This not only accelerates project turnaround, but also reduces the footprint required for construction work.

Artificial ground freezing with liquid nitrogen

Artificial ground freezing is used, for example, in underground or tunnel construction projects. This type of work has to be carried out under increasingly adverse geological conditions given the growing construction density in urban spaces. Walls and buildings need to be stabilised and supported as a result of irregular soil formations or groundwater inflows. This can be achieved by freezing the ground with liquid nitrogen. Ground freezing is also the ideal way to comply with statutory environmental regulations. In order to freeze soil, the exact amount of liquid nitrogen required is calculated and fed into the subsurface through pipes inserted into the ground. At a temperature of -196°C, the liquid nitrogen extracts heat from the surrounding soil and vaporizes. This process causes water in the soil around the pipe to freeze. After around five to ten days, a solid wall of ice forms. At this stage, the ground is stable and work can begin. This process offers major environmental benefits in comparison with conventional methods. Hazardous substances are not released into the soil and no groundwater is removed.