



Safety instruction. Carbon dioxide CO₂



Carbon dioxide CO₂ (Industrial)

Features

Carbon dioxide can occur as a gas, liquid or solid (dry ice). Gaseous carbon dioxide is colourless and almost odourless. The maximum permitted concentration in the working air is 0.5%. Gaseous carbon dioxide is about 1.5 times heavier than air. At pressures above 5.2 bar and temperatures between -56.6°C and 30.6°C, carbon dioxide can occur in liquid form. Liquid carbon dioxide is colourless. One litre of liquid carbon dioxide yields about 440 litres of gaseous carbon dioxide. Carbon dioxide cannot exist in liquid form at atmospheric pressure.

Security risks

Increased levels of carbon dioxide in breathable air pose a risk of asphyxiation and cannot be detected without equipment. Breathing pure carbon dioxide causes immediate unconsciousness and almost immediate death. When liquid carbon dioxide vaporises, the vaporised gas is very cold and much heavier than air. It can therefore accumulate in drains and basements, for example, and cause an increase in carbon dioxide levels.

Frostbite

Liquid carbon dioxide and cold carbon dioxide vapours can cause skin damage similar to burns. Contact of bare skin with uninsulated parts of the device may cause the skin to stick and tear when removed. If this happens, the damaged areas should be immediately rinsed with plenty of lukewarm water and not rubbed. Contact the medical staff.

Choice of material

Certain steels, such as carbon steel and some other materials, are unsuitable for use at low temperatures because they lose their impact resistance and become very brittle. Carbon dioxide in combination with water, especially at high pressures, corrodes some metals such as carbon steels and copper alloys. Materials normally suitable for use at low temperatures are stainless steel, aluminium and their alloys. Where liquid CO and CO ice are handled, it must be ensured that they do not come into contact with unsuitable materials such as cold-working steel or vehicle tyres.

Security measures

The premises where carbon dioxide is stored or used must be well ventilated. Do not enter a room where there may be elevated levels of carbon dioxide. When in doubt, air should be tested with an analyser and/or respiratory equipment should be used. When handling liquid carbon dioxide, wear suitable gloves and eye protection, safety shoes and body protection.

First aid Any person showing symptoms of oxygen deprivation should be moved immediately to fresh air. A person who is unconscious or not breathing must be given artificial respiration immediately - it is a matter of seconds. Medical personnel must be called immediately. The person must be kept warm and at rest. It is very important that the personnel who carry out rescue operations minimise their own risk factors.
A rescuer should not enter an area where there is an oxygen barrier without suitable breathing equipment.

Fire prevention Carbon dioxide is not flammable and no special fire-fighting equipment is needed. (In fact, many fire extinguishers use carbon dioxide as an extinguishing agent). If possible, move the cylinders to a safe place. Protect gas cylinders from heating to avoid the risk of explosion.