EC SAFETY DATA SHEET according to 93 / 112 / EC
Trade name of the product: Carbon dioxide, liquefied under pressure
Revised: 2024-06-06

1. Substance/preparation and company name

Product Name	Carbon dioxide (CO_2 carbonic acid), liquefied under pressure
	Aquis Systems AG Balgacherstrasse 17 9445 Rebstein Switzerland T +41 71 7759 500

2. Composition/information on ingredients

Chemical characterisation	Molecule
Name, chemical formula	CO_2 carbon dioxide
CAS No.	00124-38-9
EC No./EINECS No.	2046969
Additional notes	Contains no other components or impurities that could influence the classification of this product

3. Possible dangers

Pressurised liquefied gas, contact with the product may cause cold burns or frostbite.

High concentrations may cause asphyxiation. Symptoms may include loss of mobility and consciousness.

Victims do not realise they are suffocating. Low concentrations of CO_2 cause an increase in respiratory rate and headache. MAK 5000 ppm = 0.5 % (air concentration: approx. 0.035 % CO_2)

4. First aid measures

After inhalation	Victims must be brought into fresh air using self-contained breathing apparatus. In the event of respiratory arrest, provide artificial respiration and oxygen if necessary
After skin contact	In case of cold burns, rinse with lukewarm water for at least 15 minutes. Cover sterile, consult a doctor
After eye contact	Immediately flush eyes with water for at least 15 minutes
After ingestion	Ingestion is not considered a possible route of exposure

5. Fire-fighting measures

Suitable extinguishing agents	All known extinguishing agents can be used
Unsuitable extinguishing agents	---
Hazardous combustion products	None
Special protective equipment	In closed spaces, emergency personnel must wear self-contained breathing apparatus. Equip respiratory protection.
Special procedures	Remove container or cool from a protected position (risk of bursting). If possible, stop gas leakage.

6. Measures in the event of unintentional release

Personal protective measures	Cordon off the endangered area in the "wind direction". Remove uninvolved persons. Use protective clothing. When entering the area use self-contained breathing apparatus.
Environmental protection measures	Try to stop the gas leakage. Prevent penetration into sewerage system, cellars, working pits or other low-lying places, where an accumulation of CO_2 is possible.

General information

Air	No special measures
Water	No special measures
Soil	No special measures

7 Handling and storage

Store in a well-ventilated place. Protect container against impact, shock and falling over, protect from direct sunlight, do not heat above 50 °C.

Prevent liquid from entering the pressure vessel. Prevent backflow from the user's system into the pressurised container. Only use equipment that is suitable for this product and the intended pressure and temperature. In case of doubt, obtain information from the supplier.

Follow the operating instructions
The provisions of the technical rules for pressure vessels (TRG) must be observed, in particular TRG 280, operation of pressurised gas containers.

8. Exposure controls and personal protective equipment

8.1 Exposure limitation	MAK values 0.5 Vol.%
8.2 Personal protective equipment	Ensure adequate ventilation, protect eyes, face and skin from liquid splashes, dry ice particles and cold gas • Respiratory protection - self-contained • Hand protection • Eye protection • Body protection

9 Physical and chemical properties

9.1 General information

Shape	Liquefies under pressure
Colour	Colourless
Odour	Odourless
Molar mass	44.01 g
Triple point	-56.5 °C (5.185 bar)

9.2 Safety-relevant data

Sublimation point	78.5 °C (1.13 bar)
Boiling point	Sublimates at ambient pressure
Flash point	Inert gas, non-flammable
Flammability	not applicable
Ignition temperature	not applicable
Auto-ignitability	not applicable
Explosion limits	Inert gas, non-explosive
Critical temperature	31 °C (73.83 bar)
Vapour pressure	No specification
Relative density (air = 1)	1.5629
Density (gaseous)	1.9768 kg/m³ (0 °C, 1.013 bar) (gaseous)
Density (liquid)	933.315 kg/m³ (0 °C, 40.00 bar)

9.3 Further information

Solubility in water (at +20 °C) Solubility in organic solvents	e.g. 3.42 g/l (0 °C, 1.013 bar) not specified
Thermal decomposition	starts from 1200 °C
Hazardous decomposition product	Carbon monoxide (CO) at temperatures ≥ 1200 °C
Viscosity	137 . 10-7 Pa . (20 °C)

10. Stability and reactivity

Quasi inert gas. Stable under normal conditions. Leaking liquid may lead to embrittlement of plastic materials. Reacts with alkalis (ammonia, ethylamine, methylamine, dimenthylamine, trimethylamine) to form carbonates and hydrocarbonates.

11. Information on toxicology

Carbon dioxide is a non-toxic gas. It is heavier than air, so it displaces the oxygen in it. The effect on the organism depends on the concentration in the air and the duration of exposure.

Hazard and effect of the CO_2 concentration in the breathing air

Up to 0.5 vol.%	Maximum permissible workplace concentration = MAK value = 5000 ppm with only short-term inhalation still no particular impairments, increasing irritation of the breathing air
Approx. 0.5 - 1 vol.%	
Approx. 2 - 3 % vol. %	With activation of breathing and pulse rate
Approx. 4 - 7 vol.%	Intensification of the aforementioned complaints, additional circulatory problems in the brain; occurrence of dizziness, nausea and ringing in the ears
Approx. 8 to over up to vol. 10 %	Intensification of the aforementioned symptoms, convulsions and loss of consciousness with respiratory arrest and then short-term death from asphyxiation

12. Information on ecology

May damage plant growth due to frost.

13. Notes on disposal

- Return the product to the manufacturer
- Do not discharge into drains, cellars, work pits and low-lying areas. Increase in concentration in low-lying areas. Avoid releasing large quantities into the atmosphere.
- In case of doubt, request information from the supplier

14. Information on transport

Land transport ADR/RID	UN-No. 1013
Designation	Carbon dioxide 2
Class	-
Packaging group	2 A
Classification code	2.2
Hazard label	20

Number for labelling the hazard

Inland navigation ADN/ANDR	Class 22, 3 A
Sea transport IMDG/PG/Page	Class 2, Marine pollutant: no
Air transport ICAO/IATA-DGR	Class 2, UN No. 1013
Passenger aeroplane	Max . net/ packing unit 50 g
Cargo aircraft	Max . net/ packst. 500 g
Labelling	No. 2, green

Further information

If possible, do not transport in vehicles whose load compartment is not separated from the driver's cab. The driver must be aware of the potential hazards of the load and must know what to do in the event of an accident or emergency. Secure containers during transport. Transport horizontal gas cylinders at right angles to the direction of travel. The cylinder valve must be tight and fitted with a valve protection device. The valve protection device must be correctly attached. Ensure adequate ventilation. Do not smoke in and around the vehicle. Observe GGVSE.

15. Regulations

15.1 Labelling according to EC directives

Hazard designation	A Suffocating Non-flammable, non-toxic gas
EC classification	Not classified as a hazardous substance
R-record	Ras asphyxiating in high concentrations RFb. can cause frostbite
S-phrases	S36A, wear suitable protective equipment during work S23, do not inhale gas S9 store container in a well-ventilated place

15.2 National regulations

Technical regulations for gases	Including TRG 280, TRG 101

15.3 Water hazard class

0

16. Other information

The above