

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Commercial name	Carbon dioxide E290
Our code	484400S / 484400-2 / 484400A / 484400-2A
Chemical description	Carbon dioxide EU Index No: ---- EC No: 204-696-9 CAS No: 124-38-9 Chemical formula: CO ₂

1.2 Relevant identified uses of substance or mixture and uses advised against

Industrial sector	Refrigeration
Relevant identified uses	Food applications, beverages applications, gas for aquariums.
Application	Industrial and professional.

1.3 Details of the supplier of the safety data sheet



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1.4 Emergency telephone number

Mariel Srl	+39 0322 838319	Mon/Fri: 8.30-12.30 / 13.30-17.30
CAV-CNIT Anti-Poison (toxicological) National Information Centre	+39 0382 24444	Hours: 24 h / 24 h

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to in Regulation (EC) No 1272/2008

Physical hazards Liquefied Gas H280

2.2. Label elements

Dangerous pictogram



GHS04

Signal word	Attention	
Hazard statements (H)	H280	Contains gas under pressure; may explode if heated
Precautionary statements (P)		
Storage	P410+P403	Protect from sunlight. Store in a well ventilated place.
Other information	Contains greenhouse gases disciplined by Kyoto Protocol.	

2.3. Other hazards

n.a.

3. Composition/information on ingredients

3.1. Substances

Substance name	%	EC No.	CAS No.	REACH No.	Classification Regulation (EC) No. 1272/2008 (CLP)
Carbon dioxide	100%	204-696-9	124-38-9	*	Press. Gas (Liq.), H280

* Pre-registered substance.

Contains no other components or impurities which will influence the classification of the product.

For more information, see section 8, 11, 12 and 16.

SECTION 4: First aid measures**General information:** If the person is unconscious, place it in the recovery position and get immediately medical attention. Do not give anything to an unconscious person. If breathing is irregular, give oxygen. If breathing stopped, administer artificial respiration. If symptoms persist, call a physician.**4.1. Description of first aid measures**

Inhalation	Remove patient from exposure to fresh air. Administer oxygen if necessary. Obtain immediate medical attention.
Skin contact	Adverse effects not expected from this product.
Eye contact	Adverse effects not expected from this product.
Ingestion	Adverse effects not expected from this product.

4.2. Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable extinguishing media	Water spray.
No suitable extinguishing media	High water jet.

5.2. Special hazards arising from the substance or mixture

The product is not flammable.

Specific hazards Contents under pressure.

On heating: heating will cause a rise in pressure with a risk of bursting. Toxic and corrosive vapours are released.

Cool down the containers exposed to heat with a water spray.

Vapours are heavier than air and can cause rapid suffocation by reducing oxygen available for breathing.

5.3. Advice for firefighters

Wear self-contained positive pressure breathing apparatus (SCBA) and protective suit.

Avoid contact with skin and eyes.

Do not breathe gas/fumes/vapour.

SECTION 6: Accidental release measure**6.1. Personal precautions, protective equipment and emergency procedures**

Immediately contact emergency personnel.

Immediately evacuate personnel to safe areas. Unprotected persons must be kept away.

Wear personal protective equipment refer to section 8 "Exposure controls/personal protection".

Remove all sources of ignition. Avoid contact with skin (possible frostbite).

Ventilate the area/local. In case of insufficient ventilation, wear self-contained breathing apparatus.

6.2. Environmental precautions

Do not allow product to spread into the environment.
Avoid spillage and prevent possible losses.

6.3. Methods and material for containment and cleaning up

Ventilate / aerate the area or local.

6.4. Reference to other sections

For further on personal protection, refer to section 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Technical measures	Handle and open container with care. Caution when opening, pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50° C (122 °F). Do not spray on a naked flame or any incandescent material. Do not use in area without adequate ventilation. Do not pierce or burn, even after use. Follow the general precautions for handling, storing, and using compressed gases.
Industrial hygiene	Ensure adequate ventilation of the working area. Do not drink, eat or smoke in the working area.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

Keep containers tightly closed in a dry, cool and well-ventilated place, away from any ignition or heat sources.
Store in original container. Protect from sunlight and do not expose to temperatures exceeding 50° C (122 °F).

7.3. Specific end use(s)

For professional and industrial use only.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

OEL			
Font	Environmental concentration	Exposition time	Parameters
UE	TWA IOELV	8 h	9000 mg/m ³ 5000 ppm
ACGIH	TWA (ACGIH) STEL (ACGIH) - Remark (ACGIH): Asphyxia	8 h 15 min.	5000 ppm 3000 ppm
Austria	TWA (AT) OEL STEL (AT) OEL	8 h 15 min.	9000 mg/m ³ 5000 ppm 18000 mg/m ³ 10000 ppm
Belgium	TWA (BE) OEL STEL (BE) OEL	8 h 15 min.	9131 mg/m ³ 5000 ppm 54784 mg/m ³ 30000 ppm
Bulgaria	TWA (BG) OEL	8 h	9000 mg/m ³
Denmark	TWA (DK) OEL	8 h	9000 mg/m ³ 5000 ppm
Estonia	TWA (EE) OEL	8 h	9000 mg/m ³ 5000 ppm
Finland	TWA (FI) OEL	8 h	9100 mg/m ³ 5000 ppm
France	TWA (FR) OEL Note (FR): Valeurs réglementaires indicatives	8 h	9000 mg/m ³ 5000 ppm

OEL			
Font	Environmental concentration	Exposition time	Parameters
Germany	TWA (DE) OEL Remark (DE): DFG.EU	8 h	9100 mg/m ³ 5000 ppm
Greece	TWA (GR) OEL STEL (GR) OEL	8 h 15 min.	9000 mg/m ³ 5000 ppm 54000 mg/m ³
Iceland	TWA (IE) OEL	8 h	9000 mg/m ³ 5000 ppm
Ireland	OEL (IE) Note (IE): IOELV	8 h 15 min.	9000 mg/m ³ 5000 ppm 27000 mg/m ³ 15000 ppm
Italy	TWA (IT) OEL	8 h	9000 mg/m ³ 5000 ppm
Latvia	TWA (LV) OEL	8 h	9000 mg/m ³ 5000 ppm
Lithuania	TWA (LT) OEL	8 h	9000 mg/m ³ 5000 ppm
Luxembourg	TWA (LU) OEL	8 h	9000 mg/m ³ 5000 ppm
Malta	TWA (MT) OEL	8 h	9000 mg/m ³ 5000 ppm
Norway	TWA (NO) OEL	8 h	9000 mg/m ³ 5000 ppm
The Netherlands	MAC TWA (NL)	8 h	9000 mg/m ³
Poland	TWA (PL) OEL STEL (PL) OEL	8 h 15 min.	9000 mg/m ³ 27000 mg/m ³
Portugal	TWA (PT) OEL STEL (PT) OEL	8 h 15 min.	5000 mg/m ³ 30000 ppm
United Kingdom	WEL – LTEL (UK) WEL – STEL (UK)	8 h 15 min.	9150 mg/m ³ 5000 ppm 27400 mg/m ³ 15000 ppm
Czech Republic	TWA (CZ) OEL STEL (CS) OEL	8 h 15 min.	9000 mg/m ³ 5000 ppm 45000 mg/m ³ 25020 ppm
Romania	TWA (RO) OEL	8 h	9000 mg/m ³ 5000 ppm
Slovakia	Maximum permissible exposure limite (SK)	8 h	9000 mg/m ³ 5000 ppm
Slovenia	TWA (SL) OEL	8 h	9000 mg/m ³ 5000 ppm
Spain	TWA (ES) OEL Note: VLI	8 h	9150 mg/m ³ 5000 ppm
Switzerland	TWA (CH) OEL Remark: Asphyxia - NIOSH	8 h	9000 mg/m ³ 5000 ppm
Sweden	TWA (SV) OEL STEL (SV) OEL	8 h 15 min.	9000 mg/m ³ 5000 ppm 18000 mg/m ³ 10000 ppm
Hungary	TLV (HU) TWA	8 h	9000 mg/m ³

DNEL (Derived No Effect Level): No data available

PNEC (Predicted No Effect Concentration): No data available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Ensure adequate ventilation. In case of insufficient ventilation, wear self-contained breathing apparatus. Wash the hands before and after using the gas. Do not smoke. Personal protective equipment must comply with EU directives: respiratory protective equipment EN 136, 140, 149; eye protection (protective goggles or safety glasses) EN 166; skin protection EN 340, 463, 468, 943-1, 943-2; hands protection (protective gloves) EN374, safety boots EN ISO 20345.

8.2.2 Individual protection measures, such as personal protective equipment

- a) Eye/face protection** Safety glasses with side-shields (according to directive EN 166).
- b) Skin protection**
- i) Hand protection Thermal-protective gloves resistant to chemical products (EN 374).
 Protective gloves against mechanical risk (EN 388) when handling gas containers.
 Cold insulating gloves (EN 511) when trans-filling or breaking transfer connections.
 The penetration time of the gloves must be greater than the period of expected use.
 - ii) Other Wear safety shoes (EN ISO 20345) while handling containers.
 Apron or protective clothing are not necessary.
- c) Respiratory protection** Mask filter for gases and vapours (EN141). To obtain an adequate protection, filter class you should choose according to the type and concentration of contaminants. The breathing apparatus with filters do not operate satisfactorily when the air contains high concentrations of vapours. In case of insufficient ventilation, wear self-contained breathing apparatus (EN529).



8.2.3. Environmental exposure controls

Handling in accordance with good industrial hygiene and safety practice. Prevent spillage or leakage of the product in watercourse or sewers (explosion danger). Avoid air emissions. See section 7 and 13.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- | | |
|--|--|
| a) Physical state: | Gas |
| b) Colour: | Colourless |
| c) Odour: | Odourless |
| d) Melting point/freezing point: | - 78,5 °C @ atmospheric pressure (dry ice sublimates into gaseous carbon dioxide) |
| e) Boiling point or initial boiling point and boiling range: | - 56,6 °C |
| f) Flammability: | No flammable gas |
| g) Lower and upper explosion point: | Absent |
| h) Flash point: | Not applicable to gases and gas mixtures |
| i) Auto-ignition temperature: | No flammable gas |
| j) Decomposition temperature: | n.a. |
| k) pH: | 3,2 - 3,7 II pH of CO ₂ saturated solutions varies from 3,7 @ 101 kPa (1 atm) @ 3,2 a 2370 kPa (23,4 atm) |
| l) Kinematic viscosity: | Not applicable to gases and gas mixtures |
| m) Solubility (in water): | 2000 mg/l |
| n) Partition coefficient n-octanol/water (log value): | 0,836 log Pow |
| o) Vapour pressure: | 57,3 bar @ 20 °C |
| p) Density and/or relative density: | 1,52 (air=1) |
| q) Relative vapour density: | 0,82 (water=1) |
| r) Particle characteristics: | Not applicable to gases and gas mixtures |

9.2. Other information

Molecular mass 44 g/mol.

Critical temperature	30 °C
Critical pressure	73,77 bar
Critical density	467,6 kg/m ³

SECTION 10: Stability and reactivity**10.1. Reactivity**

Stable under normal handling and storage conditions.

10.2. Chemical stability

Stable under normal handling and storage conditions.

10.3. Possibility of hazardous reactions

This product is non-reactive under normal handling and storage conditions.

10.4. Conditions to avoid

Contains under pressure, may explode if heated.

Protect from sunlight and do not expose to temperatures exceeding 50 °C.

Keep away from heat, sparks, open flame or other sources of ignition. Do not smoke.

Do not pierce or burn, even after use.

Do not spray on a naked flame or any incandescent material.

10.5. Incompatible materials

No reaction with common materials in dry or wet conditions.

10.6. Hazardous decomposition products

None.

SECTION 11: Toxicological information**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008****a) Acute toxicity**

Unlike simple asphyxiants, carbon dioxide has the ability to cause death even when normal oxygen levels (20-21%) are maintained. 5% CO₂ has been found to act synergistically to increase the toxicity of certain other gases (CO, NO₂). CO₂ has been shown to enhance the production of carboxy- or met-hemoglobin by these gases possibly due to carbon dioxide's stimulatory effects on the respiratory and circulatory systems.

For more information, see 'EIGA Safety Info 24: Carbon Dioxide, Physiological Hazards' at www.eiga.eu.

b) Skin corrosion/irritation Based on available data, the classification criteria are not met.

c) Serious eye damage/irritation Based on available data, the classification criteria are not met.

d) Respiratory sensitisation Based on available data, the classification criteria are not met.

e) Germ cell mutagenicity Based on available data, the classification criteria are not met.

f) Carcinogenicity Based on available data, the classification criteria are not met.

g) Reproductive toxicity Based on available data, the classification criteria are not met.

h) STOT – single exposure Based on available data, the classification criteria are not met.

i) STOT – repeated exposure Based on available data, the classification criteria are not met.

j) Aspiration hazard Based on available data, the classification criteria are not met.

11.2. Information on other hazards

n.a.

SECTION 12: Ecological information**12.1. Toxicity**

No ecological damage caused by this product.

Fish	CL50 96 h (mg/l): No data available
Aquatic invertebrates	EC50 48 h (mg/l): No data available
Algae	EC50 72 h (mg/l): No data available

12.2. Persistence and degradability

No ecological damage caused by this product.

12.3. Bioaccumulative potential

No ecological damage caused by this product.

12.4. Mobility in soil

No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

This product does not contain any substances classified as PBT or vPvB.

12.6. Endocrine disrupting properties

n.a.

12.7. Other adverse effects

Ozone Depletion Potential	ODP (R-11=1) = 0
Global Warming Potential	GWP (CO2=1) = 0

SECTION 13: Disposal consideration**13.1. Waste treatment methods**

General information	Take all necessary measures to prevent the production of residuals, value the possible methods of regeneration or recycling. Do not discharge into drains or environment. Dispose of contents and container in accordance with Directive 2008/98/EC and all local, regional, national or international regulations.
Disposal method	Refer to the EIGA Practice Code (Doc. 30 "Gas Disposal", downloadable from http://www.eiga.org) for better guidance on the disposal methods available. Contact the supplier for the correct disposal of the container. Discharging, treatment or disposal may be subject to national, state or local regulations.

European Waste Code (EWC)

Product 16 05 05* Gases in pressure containers other than those mentioned in 16 05 04.

Packaging 15 01 11* Metallic packaging containing a hazardous solid porous matrix (for example asbestos), including empty pressure containers.

SECTION 14: Transport information**14.1. UN number or ID number**

ADR-RID-ADN-IMDG-ICAO UN 1013

14.2. UN proper shipping name

ADR-RID-ADN-IMDG-ICAO CARBON DIOXIDE

14.3. Transport hazard class(es)

ADR-RID-ADN: 2
IMDG-ICAO: 2.2



Label: 2.2

Additional information

Tunnel restriction code (ADR)	C/E
EmS (IMDG)	F-C, S-V

14.4. Packing group

ADR-RID-ADN-IMDG-ICAO n.a.

14.5. Environmental hazards

Dangerous for the environmental	NO
Maritime pollution	NO

14.6. Special precautions for user

The transport, including loading and unloading, must be carried out by persons who have received appropriate training concerning required by the modal regulations.

Road transport must be carried out by vehicles authorized for the transport of dangerous goods in accordance with the requirements of the current edition of the ADR Agreement and the applicable national provisions. Avoid transport on vehicles where the load space is not separated from the driver's compartment.

Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Ensure that containers are firmly secured.

Ensure there is adequate ventilation.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): Pre-registered substance

Regulation (EU) No 517/2014 on fluorinated greenhouse gases (F-GAS): GWP 0

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances - Seveso III: Not included

Commission Directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC: Included

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work.

Council Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment.

National standards

Adoption of National legislation on working with chemical agents.

15.2. Chemical safety assessment

No Chemical Safety Assessment (CSA) has been made for this product.

SECTION 16: Other information

This Material Safety Data Sheet has been made in compliance with the European Directive in force.

Text of hazard (H) and precautionary (P) statements in section 2 and 3

H220 Extremely flammable gas

H280 Contains gas under pressure; may explode if heated

P210 Keep away from heat, sparks, open flames, hot surfaces – No smoking.

P377 Leaking gas fire – do not extinguish unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

P403 Store in a well-ventilated place

Text of “Hazard Class and Category Code” in section 2 and 3, according to Regulation (EC) No 1272/2008

Press. Gas (Liq.) Pressurized gas : Liquefied gas

History	Version 3 by Mariel Srl	Version 2	Version 1
	Revision date: 07/2021	Date: 06/2019	Date: 02/20147

b) Abbreviations and acronyms

ADN	Agreement Dangerous goods by inland waterways
ADR	Accord Dangerous Route
CAS	Chemical Abstracts Service number
CE / EC	European Community
CLP	Classification, Labelling, Packaging
CSA	Chemical Safety Assessment
DNEL	Derived No-Effect Level
EC50	Effective Concentration 50%
EIGA	European Industrial Gases Association
EmS	Emergency Schedule
EWC	European Waste Code
GHS	Globally Harmonised System
GWP	Global Warming Potential
HCFC	Hydro-Chloro-Fluoro-Carbons
HFC	Hydro-Fluoro-Carbons
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods code
IMO	International Maritime Organization
LC50	Lethal Concentration 50%
LOAEC	Lowest Observed Adverse Effect Concentration
Log K _{oc}	Logarithm Partition coefficient Soil/water
Log P _{ow} (K _{ow})	Logarithm Partition coefficient n-Octanol/water
n.a.	not applicable / not available
NOAEC	No Observed Adverse Concentration Level
NOAEL	No Observed Adverse Effect Level
ODP	Ozone Depleting Potential
OEL	Occupational Exposure Limit
PBT	Persistent Bio-accumulative Toxic
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Rail International Dangerous goods transport
STOT-RE	Specific Target Effect Concentration-repeated exposure
STOT-SE	Specific Target Effect Concentration-single exposure
TLV	Threshold Limit Value
TWA	Time Weighted Average
UE / EU	European Union
vPvB	very Persistent very Bioaccumulative

Notice of liability

This information should not constitute a guarantee for any specific product properties. This information are only a guidance for safe handling, use, processing, storage, transportation, disposal and release and are not to be considered a warranty or a quality specification.

The information contained in this safety data sheet are based on our current knowledge and EU and national laws; they describe the product only with regard to safety requirements. The conditions of the user are beyond our knowledge and control. The product should not be used for purpose other than those specified. It is always the responsibility of the user to take all the necessary measures to comply with the requirements of current legislation. The information contained in this form should not considered as a guarantee of its properties.