SECTION 1: Identification Of The Substance/Mixture And Of The Company/Undertaking

1.1. Product Identifier

Material Name Carbon dioxide (CO_2), refrigerated liquid

CAS Number 124-38-9

1.2. Relevant Identified Uses Of The Substance Or Mixture And Uses Advised Against Industrial and professional. Aerosol propellant. Balance gas for mixtures. Beverage applications. Biocidal uses. Blanketing gas. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Fire suppressant gas. Food packaging gas. Freezing, Cooling and heat transfer. Inerting gas. Inflation systems. Laboratory use. Laser gas. Plant growth promoter. Pressure head gas, operational assist gas in pressure systems. Process gas. Refrigerant. Test gas. Consumer use. Beverage applications. Propellant gas. Shielding gas in gas welding. Water treatment. pH/neutralising agent.

1.3. Details Of The Supplier Of The Safety Data Sheet

Company Identification GREEN ENERGY CHEMICALS ENERJİ KİMYASALLARI SAN. TİC. LTD. ŞTİ. Güneri Mah. OSB 8 Sokak No:7/Z01 Kozan / ADANA / TURKEY
Tel: +90 (0322) 504 99 44
Web: www.greenen.com.tr/
E-mail: info@greenen.com.tr

1.4. Emergency Phone # Emergency Health: 112
UZEM The National Counseling Center of Poison: 114

SECTION 2: Hazard Identification

2.1. Classification Of The Substance Or Mixture

According to Globally Harmonized System of Classification and Labelling of Chemicals and Regulation (EC) No 1272/2008 (CLP): Hazardous Physical hazards, Gases under pressure: Liquefied gas - H280

2.2. Label Elements

Labeling According to Regulation (EC) No 1272/2008 [CLP/GHS]

Signal Word: Warning

Hazard Statements: H281: Contains refrigerated gas; may cause cryogenic burns or injury.

Symbol

GHS04

Precautionary Statements

Prevention P282: Wear cold insulating gloves and either face shield or eye protection.

Response P336+P315: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

Storage P403+P410: Store in a well-ventilated place. Protect from sunlight.

Disposal P501: None

2.3. Other Hazards None known.

SECTION 3: Composition/Information On Ingredients

Chemical Name	Carbon dioxide
CAS Number	124-38-9
EC Number	204-696-9
Content (%)	100%

SECTION 4: First Aid Measures

4.1. Description Of First Aid Measures

General Advice: Symptoms may include loss of mobility/consciousness. Patient may not be aware of asphyxiation. Remove patient to uncontaminated area wearing self contained breathing apparatus. Keep patient warm and rested. Get medical attention. Apply artificial respiration if breathing stopped.

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Patient may not be aware of asphyxiation. Remove patient to uncontaminated area wearing self contained breathing apparatus. Keep patient warm and rested. Get medical attention. Apply artificial respiration if breathing stopped. Low concentrations of CO_2 cause increased respiration and headache.

Skin Contact: Contact with evaporating liquid may cause frostbite or freezing of skin. If clothing is saturated with the liquid and adhering to the skin then the area should be thawed with lukewarm water prior to removing the clothing. Not relevant, due to the form of the product.

Eye Contact	Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical attention. If medical assistance is not immediately available, flush an additional 15 minutes.
Ingestion	Ingestion is not considered a potential route of exposure.
Self-Protection Of First Aider	Not applicable

4.2. Most Important Symptoms And Effects, Both Acute And Delayed

Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

4.3. Indication Of Any Immediate Medical Attention And Special Treatment Needed

Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SECTION 5: Fire - Fighting Measures

5.1. Extinguishing Media

Suitable Extinguishing Media	Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.
Unsuitable Extinguishing Media	Do not use water jet to extinguish.

5.2. Special Hazards Arising From The Substance Or Mixture

Exposure to fire may cause containers to rupture/explode.

5.3. Advice For Firefighters

In Case Of Fire	Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. If possible, stop flow of product. Use water spray or fog to knock down fire fumes if possible. Move containers away from the fire area if this can be done without risk.
Hazardous Combustion Products	None

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment And Emergency Procedures	Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained opencircuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
6.2. Environmental Precautions	Prevent further leakage or spillage if safe to do so.
6.3. Methods And Material For Containment And Cleaning Up	Provide adequate ventilation. Liquid spillages can cause embrittlement of structural materials. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).
6.4. Reference To Other Sections	See Section 7 for information on safe handling See Section 8 for information on personal protection equipment See Section 13 for disposal information

SECTION 7: Handling And Storage

7.1. Precautions For Safe Handling

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2. Conditions For Safe Storage, Including Any Incompatibilities

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3. Specific End Use(s)

None known

SECTION 8: Exposure Controls/Personal Protection

8.1. Control Parameters

Component Exposure Limits

Carbon dioxide

OSHA PEL:	ACGIH TLV:	NIOSH TAW:
9000 mg/m^3	5000 ppm	9000 mg/m3
5000 ppm		5000 ppm

EU - Occupational Exposure (98/24/EC) - Binding Biological Limit Values And Health Surveillance Measures	No biological exposure limits noted for the ingredient(s).
ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)	Not available

8.2. Exposure Controls

Appropriate Engineering Controls	Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities. CO_2 detectors should be used when CO_2 may be released.

Appropriate Personal Protective Equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered: PPE compliant to the recommended EN/ISO standards should be selected.

Eye/Face Protection	Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.
Skin Protection	Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher. Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN 511 - Cold insulating gloves. Wear safety shoes while handling containers. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
Respiratory Protection	Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known. Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Gas filters do not protect against oxygen deficiency. Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks . Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
Enviromental Exposure Controls	None necessary.
General Hygiene Considerations	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

SECTION 9: Physical And Chemical Properties

9.1. Information On Basic Physical And Chemical Properties

Appearance	Gas (at 20 °C) - Form: Refrigerated liquefied gas
Color	Colorless
Odor	Odorless
Odor threshold	Odor threshold is subjective and is inadequate to warn of over exposure.
pH	Not applicable for gases and gas mixtures.
Melting point/freezing point	-78.5 °C At atmospheric pressure dry ice sublimes into gaseous carbon dioxide.
Boiling point	-56.6 °C
Flash point	Not applicable for gases and gas mixtures.
Evaporation rate	Not applicable for gases and gas mixtures.
Flammability (solid, gas)	Non flammable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not applicable
Explosive limit - upper (%)	Not applicable
Vapor pressure	45,1 bar (10 °C)
Vapor density	1,522 (21 °C)
Relative density	1,512 (-56,6 °C)
Water solubility	2,900 mg/l (25 °C) Completely soluble.
Partition coefficient (n-octanol/water)	0.83
Auto-ignition temperature	Non flammable
Decomposition temperature	Not applicable
Kinematic Viscosity	No data available
Explosion properties	Not applicable
Oxidising properties	Not applicable

9.2. Other Information

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability And Reactivity

10.1. Reactivity	No reactivity hazard other than the effects described in sub-sections below.
10.2. Chemical Stability	The product is stable under normal conditions.
10.3. Possibility Of Hazardous Reactions	None
10.4. Conditions To Avoid	Avoid moisture in installation systems.
10.5. Incompatible Materials	Cryogenic liquids can cause embrittlement of some metals and alter the physical properties of other materials. No reaction with any common materials in dry or wet conditions.
10.6. Hazardous Decomposition Products	None

SECTION 11: Toxicological Information

11.1. Information On Toxicological Effects

In high concentrations may cause rapid circulatory deterioration even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and even death.

Acute And Chronic Toxicity

Acute Toxicity	Unlike simple asphyxiants, carbon dioxide has the ability to cause death even when normal oxygen levels (20-21%) are maintained. 5% CO_2 has been found to act synergistically to increase the toxicity of certain other gases (CO, NO_2). CO_2 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. The substance/mixture has no endocrine disrupting properties.
Irritation/Corrosivity Data	No known effects from this product
Respiratory Sensitization	No known effects from this product
Dermal Sensitization	No known effects from this product
Germ Cell Mutagenicity	No known effects from this product
Component Carcinogenicity	No known effects from this product
Reproductive Toxicity	No known effects from this product
Specific Target Organ Toxicity - Single Exposure	No known effects from this product
Specific Target Organ Toxicity - Repeated Exposure	No known effects from this product
Aspiration Hazard	Not applicable for gases and gas mixtures.

SECTION 12: Ecological Information

12.1. Toxicity	No ecological damage caused by this product.
Components	Carbon dioxide
Algae (EC50)	No data available.
Fish (LC50)	No data available.
Invertebrate (EC50)	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. Not expected to bioaccumulate.
12.4. Mobility In Soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
12.5. Results Of PBT And vPvB Assessment	Not available.
12.6. Other Adverse Effects	When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Waste Disposal Methods:	May be vented to atmosphere in a well ventilated place. Discharge to atmosphere in large quantities should be avoided. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.
Component Waste Numbers:	Commission Decision 2000/532/EC as amended: 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.

SECTION 14: Transportation Information

UN Model Regulations (ADR/RID, IMDG, IATA/ICAO): Not regulated as dangerous for transport.

14.1. UN Number	UN2187
14.2. UN Proper Shipping Name	Carbon dioxide
14.3. Transport Hazard Class(es)	
Class	2
Label(s)	2.2
Hazard No (ADR)	22
Tunnel restriction code	(C/E)
14.4. Packing Group	-
14.5. Environmental Hazards	Not applicable
Marine Pollutant	Not applicable
14.6. Special Precautions For User	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. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation. Passenger and cargo aircraft: Allowed. Cargo aircraft only: Allowed.
EmS	F-C, S-V
14.7. Transport In Bulk According To Annex II Of MARPOL73/78 And The IBC Code	Not applicable

SECTION 15: Regulatory Information

15.1. Safety, Health And Environmental Regulations/Legislation Specific For The Substance Or Mixture

EU-Regulations
Restrictions on use: None.
National legislation: Ensure all national/local regulations are observed.
Seveso Directive : 2012/18/EU (Seveso III): Not covered.
Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 89/686/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives. This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

Specific Provisions Not available

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

SECTION 16: Other Information

This document has been prepared in accordance with the Regulation on Safety Data Sheets for Hazardous Substances and Mixtures, published in the 29204 numbered Official Gazette on 13.12.2014.
This document has been prepared by the certified author with certificate number IGU-135322.