



## 安全資料表

### 危害物料資料

<b>1. 產品與用途</b>							
1.1 物料名稱	Carbon Dioxide						
1.3 用途							
<b>2. 危害成份</b>							
2.1 危害分類及標籤							
	有害	有毒	腐蝕性	易燃	刺激性	爆炸性	助燃
	( )	( )	( )	( )	( )	( )	(✓)
2.2 酸鹼值(pH)	無資料			2.3 曝露限制(OEL)	無資料		
2.4 致癌物質	無資料			2.5 其他危害			
2.5 潛在危害	高濃度吸入：引致頭痛、噁心、不省人事，嚴重者會引致窒息						
	固態會引致凍傷						
<b>3. 火警和爆炸資料</b>							
3.1 燃燒物成份比例	無資料		3.2 沸點(°C)	-56.6		3.3 溶點(°C)	-219
3.4 閃點(°F)	不適用		3.5 比重	1.52		3.6 氣壓力	57.3@20°C
3.7 爆炸極限(濃度)	無資料		3.8 溶解度	可溶於水		3.9 氣味	高濃度有強烈氣味
3.10 滅火設備	不適用						
<b>4. 急救處理</b>							
4.1 眼睛接觸	用大量清水沖洗最少 15 分鐘以上及見醫生						
4.2 皮膚接觸	用大量清水沖洗最少 15 分鐘以上及見醫生						
4.3 吸入	移到清新空氣地方休息。						
<b>5. 個人防護裝備</b>							
<input type="checkbox"/> 橡膠手套		<input type="checkbox"/> 護眼罩			<input type="checkbox"/> 口罩		
<b>6. 處理及使用應知事項</b>							
6.1 儲存注意事項	<ul style="list-style-type: none"> <li>必需垂直擺放，並加以穩固</li> <li>避免受陽光直接照射</li> <li>存放於空氣流通位置</li> </ul>						
6.2 意外洩漏處理的方法	無資料						
<b>7. 其他資料</b>							
- 經常測試氣樽，確保沒有洩漏情況							

### Warning



## SECTION 1: Identification of the hazardous chemical and of the supplier

### 1.1. Product identifier

Trade name : Carbon dioxide, Purified Carbon dioxide  
Name : Carbon dioxide  
CAS-No. : 124-38-9  
Formula : CO<sub>2</sub>

### 1.2. Other means of identification

Product code : ALM/SDS/33

### 1.3. Recommended use of the chemical and restrictions on use

Recommended use : Test gas/Calibration gas.  
Laboratory use.  
Use for manufacture of electronic/photovoltaic components.  
Food application.  
Industrial and professional uses. Perform risk assessment prior to use.  
Contact supplier for more information on uses.

Restrictions on use : Consumer use.

### 1.4. Supplier details

AIR LIQUIDE MALAYSIA SDN. BHD.  
Lot PT 2317, No. 21, Jalan PTB 1  
Kawasan Perindustrian Tangga Batu, Mukim Sungai Udang,  
76400 Melaka  
Malaysia  
T +606-3513512

### 1.5. Emergency phone number

Emergency number : +606-3513512

## SECTION 2: Hazards identification

### 2.1. Classification of the hazardous chemical

Classification according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Gases under pressure : Liquefied gas H280

### 2.2. Label elements

Labelling according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Hazard pictograms (GHS MY) :



Signal word (GHS MY) : Warning  
Hazard statements (GHS MY) : H280 - Contains gas under pressure; may explode if heated  
Precautionary statements (GHS MY) : P410+P403 - Protect from sunlight. Store in a well-ventilated place

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according to ICOP 2014,2019

### 2.3. Other hazards that do not result in classification

Other hazards which do not result in classification : Asphyxiant in high concentrations,Contact with liquid may cause cold burns/frostbite,The substance/mixture has no endocrine disrupting properties.

## SECTION 3: Composition and information of the ingredients of the hazardous chemical

### 3.1. Substances

Name	Product identifier	%
Carbon dioxide (Main constituent)	CAS-No.: 124-38-9	100

Full text of H-statements: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of necessary first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.

First-aid measures after skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms/effects, acute and delayed

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. See section 11.

### 4.3. Indication of immediate medical attention and special treatment needed, if necessary

Other medical advice or treatment : None.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable extinguishing media

Suitable extinguishing media : Water spray or fog. Product does not burn, use fire control measures appropriate for the surrounding fire.

Unsuitable extinguishing media : Do not use water jet to extinguish.

### 5.2. Physicochemical hazards arising from the chemical

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

### 5.3. Special protective equipment and precautions for fire fighters

Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Specific methods : 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.

EAC code : 2T

# Carbon dioxide

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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment, and emergency procedures

##### 6.1.1. For non-emergency personnel

Emergency procedures : Act in accordance with local emergency plan. Try to stop release. Evacuate area. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Stay upwind. See section 8 of the SDS for more information on personal protective equipment.

##### 6.1.2. For emergency responders

Emergency procedures : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Oxygen detectors should be used when asphyxiating gases may be released. See section 5.3 of the SDS for more information.

#### 6.2. Environmental precautions

Try to stop release.

#### 6.3. Methods and materials for containment and cleaning up

Methods and material for containment and cleaning up : Ventilate area.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Safe handling of the gas receptacle : Refer to supplier's container handling instructions. Do not allow backfeed into the container. Protect containers from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. If user experiences any difficulty operating valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the content of the container. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.

Safe use of the product : The product must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid suck back of water, acid and alkalis. Do not breathe gas. Avoid release of product into work area.

#### 7.2. Conditions for safe storage, including any incompatibilities

Conditions for safe storage, including any incompatibilities : Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

### SECTION 8: Exposure controls and personal protection

#### 8.1. Control parameters

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<b>Carbon dioxide (124-38-9)</b>	
<b>Germany - Occupational Exposure Limits (TRGS 900)</b>	
Local name	Kohlenstoffdioxid
AGW (OEL TWA) [1]	9100 mg/m <sup>3</sup>
AGW (OEL TWA) [2]	5000 ppm
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Regulatory reference	TRGS900
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Carbon dioxide
WEL TWA (OEL TWA) [1]	9150 mg/m <sup>3</sup>
WEL TWA (OEL TWA) [2]	5000 ppm
WEL STEL (OEL STEL)	27400 mg/m <sup>3</sup>
WEL STEL (OEL STEL) [ppm]	15000 ppm
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Carbon dioxide
ACGIH OEL TWA [ppm]	5000 ppm
ACGIH OEL STEL [ppm]	30000 ppm
Remark (ACGIH)	TLV® Basis: Asphyxia
Regulatory reference	ACGIH 2023

### Exposure limit values for the other components

No additional information available

#### 8.1.1 Biological monitoring

No additional information available

#### 8.2. Appropriate engineering controls

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

#### 8.3. Individual protection measures, such as PPE

##### Hand protection:

Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN 511 - Cold insulating gloves. Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.

##### Eye protection:

Wear goggles when transfilling or breaking transfer connections. Standard EN 166 - Personal eye-protection - specifications

##### Respiratory protection:

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

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### Personal protective equipment symbol(s):



Thermal hazard protection

: None in addition to the above sections.

Environmental exposure controls

: None necessary.

## SECTION 9: Physical and chemical properties

Physical state	: Gas
Appearance	: No data available
Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point	: -78.5 °C Melting point at normal conditions does not exist. At atmospheric pressure solid carbon dioxide sublimates into gaseous carbon dioxide at -78.5°C
Freezing point	: No data available
Boiling point	: -56.6 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: No data available
Flammability (solid, gas)	: Non flammable.
Explosive limits	: Upper explosion limit: Not applicable. Lower explosion limit: Not applicable.
Vapour pressure	: Vapour pressure: 57.3 bar(a) Vapour pressure at 50°C: No reliable data available.
Relative vapour density at 20°C	: Not applicable.
Relative density	: 0.82 Relative gas density: 1.52
Solubility	: Water: 2000 mg/l
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: 0.83
Critical temperature	: 31 °C
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: Not applicable for gases and gas mixtures.
Viscosity, dynamic	: No reliable data available.
Explosive properties	: Not applicable.
Density	: Not applicable for gases and gas mixtures.
Critical pressure	: 7375 kPa
Molecular mass	: 44 g/mol
Oxidising properties	: Not applicable.
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

## SECTION 10: Stability and reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: None.
Conditions to avoid	: Avoid moisture in installation systems.
Incompatible materials	: None, For additional information on compatibility refer to ISO 11114.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified
Skin corrosion or irritation	: Not classified pH: Not applicable for gases and gas mixtures.
Serious eye damage or eye irritation	: Not classified
Respiratory sensitization	: Not classified
Skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (STOT) – single exposure	: Not classified
Specific target organ toxicity (STOT) – repeated exposure	: Not classified
Aspiration hazard	: Not classified

#### Carbon dioxide (124-38-9)

Viscosity, kinematic	Not applicable for gases and gas mixtures.
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Other information	: Unlike simple asphyxiants, carbon dioxide has the ability to cause death even when normal oxygen levels (20-21%) are maintained. 5% CO <sub>2</sub> has been found to act synergistically to increase the toxicity of certain other gases (CO, NO <sub>2</sub> ). CO <sub>2</sub> 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 <a href="http://www.eiga.eu">www.eiga.eu</a> . The substance/mixture has no endocrine disrupting properties.
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### SECTION 12: Ecological information

#### 12.1. Ecotoxicity

Ecology - general	: No ecological damage caused by this product.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

#### Carbon dioxide (124-38-9)

Partition coefficient n-octanol/water (Log Kow)	0.83
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#### 12.2. Persistence and degradability

#### Carbon dioxide (124-38-9)

Persistence and degradability	No ecological damage caused by this product.
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#### 12.3. Bioaccumulative potential

#### Carbon dioxide (124-38-9)

Partition coefficient n-octanol/water (Log Kow)	0.83
Bioaccumulative potential	No ecological damage caused by this product.

#### 12.4. Mobility in soil

#### Carbon dioxide (124-38-9)

Mobility in soil	No additional information available
Partition coefficient n-octanol/water (Log Kow)	0.83

# Carbon dioxide

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Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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### 12.5. Other adverse effects

Ozone	: Not classified
Effect on global warming	: When discharged in large quantities may contribute to the greenhouse effect,Contains greenhouse gas(es).
GWP 100 years	: 1
Effect on the ozone layer	: None.
Other adverse effects	: No known effects from this product.

## SECTION 13: Disposal information

### 13.1. Disposal methods

Waste treatment methods	: May be vented to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.
Additional information	: External treatment and disposal of waste should comply with applicable local and/or national regulations.

## SECTION 14: Transportation information

### 14.1. UN number

UN-No.(UN RTDG)	: 1013
UN-No. (IMDG)	: 1013
UN-No. (IATA)	: 1013

### 14.2. UN proper shipping name

Proper Shipping Name (UN RTDG)	: CARBON DIOXIDE
Proper Shipping Name (IMDG)	: CARBON DIOXIDE
Proper Shipping Name (IATA)	: Carbon dioxide

### 14.3. Transport hazard class(es)

#### UN RTDG

Transport hazard class(es) (UN RTDG)	: 2.2
Danger labels (UN RTDG)	: 2.2
:	:



#### IMDG

Transport hazard class(es) (IMDG)	: 2.2
Danger labels (IMDG)	: 2.2
:	:



#### IATA

Transport hazard class(es) (IATA)	: 2.2
Danger labels (IATA)	: 2.2
:	:





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### 14.4. Packing Group, if applicable

Packing group (UN RTDG) : Not applicable  
Packing group (IMDG) : Not applicable  
Packing group (IATA) : Not applicable

### 14.5. Environmental hazards

Dangerous for the environment : No  
Marine pollutant : No  
Other information : No supplementary information available

### 14.6. Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)

Special transport precautions : 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 there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure valve is closed and not leaking, - Ensure valve outlet cap nut or plug (where provided) is correctly fitted, - Ensure valve protection device (where provided) is correctly fitted.

### **UN RTDG**

Special provisions (UN RTDG) : 378  
Limited quantities (UN RTDG) : 120 ml  
Excepted quantities (UN RTDG) : E1  
Packing instruction (UN RTDG) : P200

### **IMDG**

Special provisions (IMDG) : 378, 392  
Limited quantities (IMDG) : 120 ml  
Excepted quantities (IMDG) : E1  
Packing instructions (IMDG) : P200  
EmS-No. (Fire) : F-C - FIRE SCHEDULE Charlie - NON-FLAMMABLE GASES  
EmS-No. (Spillage) : S-V - SPILLAGE SCHEDULE Victor - GASES (NON-FLAMMABLE, NON-TOXIC)  
Stowage category (IMDG) : A  
Properties and observations (IMDG) : Liquefied, non-flammable gas.Heavier than air (1.5). Cannot remain in the liquid state above 31°C.

### **IATA**

PCA Excepted quantities (IATA) : E1  
PCA Limited quantities (IATA) : Forbidden  
PCA limited quantity max net quantity (IATA) : Forbidden  
PCA packing instructions (IATA) : 200  
PCA max net quantity (IATA) : 75kg  
CAO packing instructions (IATA) : 200  
CAO max net quantity (IATA) : 150kg  
Special provisions (IATA) : A202  
ERG code (IATA) : 2L

### 14.7. Special precautions for user

IBC code : Not applicable.

### 14.8. Hazchem or Emergency Action Code

EAC code : 2T.

## SECTION 15: Regulatory information

### 15.1. Safety, health, and environmental regulations specific for the hazardous chemical in question

Carbon dioxide (124-38-9)	
EHS Notification and Registration Scheme	Not applicable
EHS Notification and Registration Scheme	Not applicable

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Environmental Quality (Chlorofluorocarbons Prohibition) Order 1993	
Environmental Quality (Industrial Effluent) Regulations 2009	
Environmental Quality (Scheduled Wastes) Regulations 2007	
Control of Industrial Major Accident Hazards Regulations 1996	
Prohibition of Use of Substance Order 1999	
Use and Standards of Exposure of Chemical Hazardous to Health Regulations 2000	
Chemical Weapons Convention Act	
Corrosive and Explosive Substances and Offensive Weapons Act	
Dangerous Drugs Act	
Pesticides Act	
Petroleum (Safety Measures) Act	
Poisons Act 1952	
Poisons (Psychotropic Substances) Regulations 1989	

### 15.2. International agreements

No additional information available

## SECTION 16: Other information

Version : 2.0  
Issue date : 3/16/2015  
Revision date : 24/04/2024  
Supersedes : 25/02/2025

Abbreviations and acronyms : ATE - Acute Toxicity Estimate  
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008  
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006  
EINECS - European Inventory of Existing Commercial Chemical Substances  
CAS# - Chemical Abstract Service number  
PPE - Personal Protection Equipment  
LC50 - Lethal Concentration to 50 % of a test population  
RMM - Risk Management Measures  
PBT - Persistent, Bioaccumulative and Toxic  
vPvB - Very Persistent and Very Bioaccumulative  
STOT- SE : Specific Target Organ Toxicity - Single Exposure  
CSA - Chemical Safety Assessment  
EN - European Standard  
UN - United Nations  
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road  
IATA - International Air Transport Association  
IMDG code - International Maritime Dangerous Goods  
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail  
WGK - Water Hazard Class  
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure  
UFI : Unique Formula Identifier

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training. For more guidance, refer to EIGA SL 01 "Dangers of Asphyxiation", downloadable at <http://www.eiga.eu..>

Other information : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP). Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

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according to ICOP 2014,2019

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Safety Data Sheet (SDS), Malaysia\_AL

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.