

**Warning**



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

#### 1.1. Product identifier

Trade name : BLUESHIELD™ 28  
SDS no : 2009477

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional use for chemical analysis, calibration, (routine) quality control, laboratory use, under controlled conditions.  
Perform risk assessment prior to use.

Uses advised against : Consumer use.  
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

#### 1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE SINGAPORE PTE LTD  
HEAD OFFICE : 2 VENTURE DRIVE, VISION EXCHANGE, #22-28, SINGAPORE 608526  
T +65 6265 3788 - F +65 6 265 1441  
[Sg-info@airliquide.com](mailto:Sg-info@airliquide.com) - <https://sg.airliquide.com/resources/safety-data-sheets-sds>

#### 1.4. Emergency telephone number

Emergency telephone number : +65 6265 3788, +65 9619 9229 (After Office Hour)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards Gases under pressure : Compressed gas H280

#### 2.2. Label elements

##### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) : Warning  
Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.  
Precautionary statements (CLP)  
- Storage : P403 - Store in a well-ventilated place.

### 2.3. Other hazards

- : Asphyxiant in high concentrations.
- Not classified as PBT or vPvB.
- The substance/mixture has no endocrine disrupting properties.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Argon	CAS-No.: 7440-37-1 EC-No.: 231-147-0 EC Index-No.: --- REACH-no: *1	96	Press. Gas (Comp.), H280
Carbon dioxide	CAS-No.: 124-38-9 EC-No.: 204-696-9 EC Index-No.: --- REACH-no: *1	3	Press. Gas (Liq.), H280
oxygen	CAS-No.: 7782-44-7 EC-No.: 231-956-9 EC Index-No.: 008-001-00-8 REACH-no: *1	1	Ox. Gas 1, H270 Press. Gas (Comp.), H280

Full text of H- and EUH-statements: see section 16

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

\*1: Listed in Annex IV / V REACH, exempted from registration.

\*3: Registration not required: Substance manufactured or imported < 1t/y.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- 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.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

- : Low concentrations of CO2 cause increased respiration and headache.  
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 any immediate medical attention and special treatment needed

: None.

## SECTION 5: Firefighting measures

### 5.1. 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. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None.

### 5.3. Advice for firefighters

- 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.
- 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.

## SECTION 6: Accidental release measures

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

- For non-emergency personnel : 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
- For emergency responders : 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 material for containment and cleaning up

- : Ventilate area.

### 6.4. Reference to other sections

- : See also sections 8 and 13.

**SECTION 7: Handling and storage****7.1. Precautions for safe handling**

- 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.
  - Use only oxygen approved lubricants and oxygen approved sealings.
  - Avoid suck back of water, acid and alkalis.
  - Do not breathe gas.
  - Avoid release of product into work area.
- 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.

**7.2. 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.

**7.3. Specific end use(s)**

- : None.

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

<b>Carbon dioxide (124-38-9)</b>		
OEL : Occupational Exposure Limits		
ACGIH	ACGIH OEL TWA [ppm]	5000 ppm
	ACGIH OEL STEL [ppm]	30000 ppm
	Remark (ACGIH)	TLV® Basis: Asphyxia

DNEL (Derived-No Effect Level) : None available.

PNEC (Predicted No-Effect Concentration) : None available.

**8.2. Exposure controls**
**8.2.1. 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.
- CO2 detectors should be used when CO2 may be released.

**8.2.2. Individual protection measures, e.g. 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 : Wear safety glasses with side shields.  
Standard EN 166 - Personal eye-protection - specifications.
- Skin protection
  - Hand protection : Wear working gloves when handling gas containers.  
Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.
  - Other : Wear safety shoes while handling containers.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- 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.  
When indicated by a risk assessment, Respiratory Protective Equipment must be used. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD.
- Thermal hazards : None in addition to the above sections.

**8.2.3. Environmental exposure controls**

- : None necessary.

**SECTION 9: Physical and chemical properties**
**9.1. Information on basic physical and chemical properties**

- Appearance
- Physical state at 20°C / 101.3kPa : Gas.
  - Colour : Colourless.
- Odour : Odourless.
- Melting point / Freezing point : Not applicable for gas mixtures.

Boiling point	: Not applicable for gas mixtures. It is technically not possible to determine the boiling point or range of this mixture. Component with lowest boiling point: Argon -186 °C
Flammability	: Non flammable.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: Not applicable for gases and gas mixtures.
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
pH	: Not applicable for gases and gas mixtures.
Viscosity, kinematic	: No reliable data available.
Water solubility [20°C]	: Mixture is partially soluble in water
Partition coefficient n-octanol/water (Log Kow)	: Not applicable for gas mixtures.
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Density and/or relative density	: Not applicable.
Relative vapour density (air=1)	: Heavier than air.
Particle characteristics	: Not applicable for gases and gas mixtures.

## **9.2. Other information**

### **9.2.1. Information with regard to physical hazard classes**

Explosive properties	: Not applicable.
Explosion limits	: Non flammable.
Oxidising properties	: Not applicable.

### **9.2.2. Other safety characteristics**

Molar mass	: Not applicable for gas mixtures.
Evaporation rate	: Not applicable for gases and gas mixtures.
Other data	: 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.  
Data for mixtures are not available.

### **10.2. Chemical stability**

: 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**

: For additional information on compatibility refer to ISO 11114.

### **10.6. Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## **SECTION 11: Toxicological information**

### **11.1. Information on toxicological effects**

<b>Acute toxicity</b>	: Toxicological effects not expected from this product if occupational exposure limit values are not exceeded.
<b>Skin corrosion/irritation</b>	: No known effects from this product.
<b>Serious eye damage/irritation</b>	: No known effects from this product.
<b>Respiratory or skin sensitisation</b>	: No known effects from this product.
<b>Germ cell mutagenicity</b>	: No known effects from this product.
<b>Carcinogenicity</b>	: No known effects from this product.
<b>Toxic for reproduction : Fertility</b>	: No known effects from this product.
<b>Toxic for reproduction : unborn child</b>	: No known effects from this product.
<b>STOT-single exposure</b>	: No known effects from this product.
<b>STOT-repeated exposure</b>	: No known effects from this product.
<b>Aspiration hazard</b>	: Not applicable for gases and gas mixtures.

### **11.2. Information on other hazards**

Other information : The substance/mixture has no endocrine disrupting properties.

## **SECTION 12: Ecological information**

### **12.1. Toxicity**

Assessment	: No data available.
EC50 48h - Daphnia magna [mg/l]	: No data available.
EC50 72h - Algae [mg/l]	: No data available.
LC50 96 h - Fish [mg/l]	: No data available.

### **12.2. Persistence and degradability**

Assessment : No data available.

### **12.3. Bioaccumulative potential**

Assessment : No data available.

### **12.4. Mobility in soil**

Assessment : 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**

Assessment : No data available.  
Not classified as PBT or vPvB.

### **12.6. Endocrine disrupting properties**

Assessment : The substance/mixture has no endocrine disrupting properties.

### **12.7. Other adverse effects**

Other adverse effects : No known effects from this product.  
Effect on the ozone layer : None.  
Effect on global warming : Contains greenhouse gas(es).

## **SECTION 13: Disposal considerations**

**13.1. 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.
- : 16 05 05 : Gases in pressure containers other than those mentioned in 16 05 04.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended)

**13.2. Additional information**

- : External treatment and disposal of waste should comply with applicable local and/or national regulations.

**SECTION 14: Transport information**

**14.1. UN number**

UN-No. : 1956

**14.2. UN proper shipping name**

- Transport by road/rail (ADR/RID)** : COMPRESSED GAS, N.O.S. (Argon, Carbon dioxide)
- Transport by air (ICAO-TI / IATA-DGR)** : Compressed gas, n.o.s. (Argon, Carbon dioxide)
- Transport by sea (IMDG)** : COMPRESSED GAS, N.O.S. (Argon, Carbon dioxide)

**14.3. Transport hazard class(es)**

Labelling :



2.2 : Non-flammable, non-toxic gases.

**Transport by road/rail (ADR/RID)**

- Class : 2
- Classification code : 1A
- Hazard identification number : 20
- Tunnel Restriction : E - Passage forbidden through tunnels of category E

**Transport by air (ICAO-TI / IATA-DGR)**

Class / Div. (Sub. risk(s)) : 2.2

**Transport by sea (IMDG)**

- Class / Div. (Sub. risk(s)) : 2.2
- Emergency Schedule (EmS) - Fire : F-C
- Emergency Schedule (EmS) - Spillage : S-V

**14.4. Packing group**

- Transport by road/rail (ADR/RID) : Not applicable
- Transport by air (ICAO-TI / IATA-DGR) : Not applicable
- Transport by sea (IMDG) : Not applicable

**14.5. Environmental hazards**

- Transport by road/rail (ADR/RID) : None.
- Transport by air (ICAO-TI / IATA-DGR) : None.
- Transport by sea (IMDG) : None.



**14.6. Special precautions for user****Packing Instruction(s)**

Transport by road/rail (ADR/RID)	: P200
Transport by air (ICAO-TI / IATA-DGR)	
Passenger and Cargo Aircraft	: 200.
Cargo Aircraft only	: 200.
Transport by sea (IMDG)	: P200

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: <ul style="list-style-type: none"><li>- Ensure there is adequate ventilation.</li><li>- Ensure that containers are firmly secured.</li><li>- Ensure valve is closed and not leaking.</li><li>- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.</li><li>- Ensure valve protection device (where provided) is correctly fitted.</li></ul>
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**14.7. Transport in bulk according to Annex II of Marpol 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**

Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

**National regulations**

Regulatory reference : Ensure all national/local regulations are observed.

**15.2. Chemical safety assessment**

: A CSA does not need to be carried out for this product.

**SECTION 16: Other information**

Indication of changes : Safety data sheet in accordance with commission regulation (EU) No 2020/878.

- 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 : Receptacle under pressure.  
 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>.
- Further information : Classification using data from databases maintained by the European Industrial Gases Association (EIGA). Data is maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at : <http://www.eiga.eu>.  
 Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).

Full text of H- and EUH-statements	
H270	May cause or intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Comp.)	Gases under pressure : Compressed gas
Press. Gas (Liq.)	Gases under pressure : Liquefied gas

- DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.  
 Details given in this document are believed to be correct at the time of going to press.  
 Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.