

ARCAL™Force, ARCAL™5**2015251**

2.2 : Non-flammable, non-toxic gases

Warning**SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : ARCAL™Force, ARCAL™5
SDS Nr : 2015251

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas. Laboratory use. Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE SINGAPORE PTE LTD
HEAD OFFICE : 438B ALEXANDRA ROAD,
BLOCK B, ALEXANDRA TECHNOPARK #07-01
119968 SINGAPORE
SPECIAL GASES OFFICE : NO 24 JALAN BUROH SINGAPORE 619480

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****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

• Physical hazards : Gases under pressure - Compressed gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

: Not classified as dangerous substance / mixture.

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

• Hazard pictograms



• Hazard pictograms code : GHS04
• Signal word : Warning

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SECTION 2. Hazards identification (continued)

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

2.3. Other hazards

: Asphyxiant in high concentrations.

SECTION 3. Composition/information on ingredients
3.1. Substance / 3.2. Mixture
Mixture.

| Substance name | Contents | CAS No EC No Index No Registration no | Classification(DSD) | Classification(CLP) |
|----------------|----------|--|----------------------|------------------------------|
| Argon | : 82 % | 7440-37-1 231-147-0 ----- * 1 | Not classified (DSD) | Press. Gas Compressed (H280) |
| Carbon dioxide | : 18 % | 124-38-9 204-696-9 ----- * 1 | Not classified (DSD) | Press. Gas Liquefied (H280) |

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

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

* 2: Registration deadline not expired.

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

Full text of R-phrases see section 16. Full text of H-statements see section 16.

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. Apply artificial respiration if breathing stopped.
- Skin/eye contact : In case of contact with eyes or skin, rinse immediately with plenty of water.
- Ingestion : Ingestion is not considered a potential route of exposure.

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.
Refer to section 11.

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

: None.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 5. Firefighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
- 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 fire-fighters

- Specific methods : If possible, stop flow of product.
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.
Use water spray or fog to knock down fire fumes if possible.
- Special protective equipment for fire fighters : 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**

- : Evacuate area.
Try to stop release.
Ensure adequate air ventilation.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Monitor concentration of released product.

6.2. Environmental precautions

- : Try to stop release.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.

6.4. Reference to other sections

- : See also sections 8 and 13.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 7. Handling and storage****7.1. Precautions for safe handling****Safe use of the product**

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

Safe handling of the gas receptacle

: Suck back of water into the container must be prevented.
Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect cylinders 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 cylinder 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 cylinder contents.
Containers should be stored in the vertical position and properly secured to prevent toppling.

7.2. Conditions for safe storage, including any incompatibilities

: Keep container below 50°C in a well ventilated place.
Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Containers should be stored in the vertical position and properly secured to prevent toppling.
Stored containers should be periodically checked for general condition 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 materials.

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection**8.1. Control parameters****Occupational Exposure Limits**

: Carbon dioxide: TLV-TWA(Belgium) (ppm) : 5000
:TWA BE 8h (mg/m3) : 9131
:TLV-STEL (Belgium) (ppm) : 30000
:STEL BE 15 mins (mg/m3) : 54784

DNEL: Derived no effect level (Workers)

: No data available.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 8. Exposure controls/personal protection (continued)****DMEL: Derived minimum effect level (Workers)**

: No data available.

PNEC: Predicted no effect concentration

: No data available.

8.2. Exposure controls**8.2.1. Appropriate engineering controls**

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

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.

• **Skin protection**- **Hand protection**

: Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk.

- **Other**

: Wear safety shoes while handling containers. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• **Respiratory protection**

: Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

• **Thermal hazards**

: None necessary.

8.2.3. Environmental exposure controls

: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

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

: Mixture contains one or more component(s) which have the following colour(s): Colourless.

Odour

: There may be no odour warning properties, odour is subjective and inadequate to warn of overexposure. Mixture contains one or more component(s) which have the following odour(s): Odourless.

Odour threshold

: Odour threshold is subjective and inadequate to warn for overexposure.

pH value

: Not applicable for gas-mixtures.

Molar mass [g/mol]

: Not applicable for gas-mixtures.

Melting point [°C]

: Not applicable for gas-mixtures.

Boiling point [°C]

: Not applicable for gas-mixtures.

Flash point [°C]

: Not applicable for gas-mixtures.

Evaporation rate (ether=1)

: Not applicable for gas-mixtures.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 9. Physical and chemical properties (continued)**

| | |
|---|--|
| Flammability range [vol% in air] | : Flammability range not available. |
| Vapour pressure [20°C] | : Not applicable. |
| Relative density, gas (air=1) | : No reliable data available. |
| Solubility in water [mg/l] | : Solubility in water of component(s) of the mixture : • Argon : 61 • Carbon dioxide : 2000 |
| Partition coefficient n-octanol/water [log Kow] | : Not applicable for gas-mixtures. |
| Viscosity at 20°C [mPa.s] | : Not applicable. |
| Explosive Properties | : Not applicable. |
| Oxidising Properties | : None. |

9.2. Other information

| | |
|------------|--|
| 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.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: None.

10.4. Conditions to avoid

: None under recommended storage and handling conditions (see section 7).

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**

| | |
|---------------------------------------|--|
| Acute toxicity | : In high concentrations cause rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness. |
| Rat inhalation LC50 [ppm/4h] | : No data available. |
| Skin corrosion/irritation | : No known effects from this product. |
| Serious eye damage/irritation | : No known effects from this product. |
| Respiratory or skin sensitisation | : No known effects from this product. |
| Carcinogenicity | : No known effects from this product. |
| Germ cell mutagenicity | : No known effects from this product. |
| Toxic for reproduction : Fertility | : No known effects from this product. |
| Toxic for reproduction : unborn child | : No known effects from this product. |

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 11. Toxicological information (continued)**

STOT-single exposure : No known effects from this product.
STOT-repeated exposure : No known effects from this product.
Aspiration hazard : Not applicable for gases and gas-mixtures.

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

: Classification criteria are not met.
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

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

Effect on ozone layer : None.
Effect on the global warming : Contains greenhouse gas(es) not covered by 842/2006/EC.

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

: Ensure that the emission levels from local regulations or operating permits are not exceeded.

Do not discharge into any place where its accumulation could be dangerous.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Contact supplier if guidance is required.

List of hazardous wastes : 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.

13.2. Additional information

: None.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 14. Transport information**

UN number : 1956
Labelling ADR, IMDG, IATA



: 2.2 : Non-flammable, non-toxic gases

Land transport (ADR/RID)

H.I. nr : 20
UN proper shipping name : COMPRESSED GAS, N.O.S. (Argon, Carbon dioxide)
Transport hazard class(es) : 2
Classification code : 1 A
Packing Instruction(s) : P200
Tunnel Restriction : E : Passage forbidden through tunnels of category E.
Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : COMPRESSED GAS, N.O.S. (Argon, Carbon dioxide)
Class : 2.2
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-V
Packing instruction : P200
IMDG-Marine pollutant : No

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : COMPRESSED GAS, N.O.S. (Argon, Carbon dioxide)
Class : 2.2
Passenger and Cargo Aircraft : Allowed.
Packing instruction - Passenger and Cargo Aircraft : 200
Cargo Aircraft only : Allowed.
Packing instruction - Cargo Aircraft only : 200

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 there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder 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.

ARCAL™ Force, ARCAL™ 5**2015251****SECTION 15. Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**EU legislation

Seveso directive 96/82/EC : Not covered.

National legislation

National legislation : Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16. Other information**Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.**Training advice** : Receptacle under pressure.
Users of breathing apparatus must be trained.
The hazard of asphyxiation is often overlooked and must be stressed during operator training.**List of full text of H-statements in section 3.** : H280 - Contains gas under pressure; may explode if heated.**Further information** : Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.
This Safety Data Sheet has been established in accordance with the applicable European Union legislation.**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.**End of document**