

Deuterium (Compressed)

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 05/19/2017

Version: 1.0

SECTION 1: Identification

1.1. Product identifier

Product form : Substance
 Substance name : Deuterium (Compressed)
 CAS-No. : 7782-39-0
 Product code : CA-1001-07419
 Formula : D₂

1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Test gas/Calibration gas
 Manufacture of substances

1.3. Supplier

Air Liquide Canada Inc.
 1250, René Lévesque West Blvd. Suite 1700
 H3B 5E6 Montreal, QC - Canada
 T 1-800-817-7697
www.airliquide.ca

1.4. Emergency telephone number

Emergency number : 514-878-1667

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification (GHS-CA)

Flammable gases, Category 1 H220
 Gases under pressure : Compressed gas H280
 Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms (GHS-CA) :



Signal word (GHS-CA) :

Danger

Hazard statements (GHS-CA) :

H280 - Contains gas under pressure; may explode if heated
 H220 - Extremely flammable gas
 OSHA-H01 - May displace oxygen and cause rapid suffocation
 CGA-HG04 - May form explosive mixtures with air
 CGA-HG08 - Burns with invisible flame

Precautionary statements (GHS-CA) :

P381 - In case of leakage, eliminate all ignition sources
 P377 - Leaking gas fire: Do not extinguish unless leak can be stopped safely
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.
 P403 - Store in a well-ventilated place
 P410+P403 - Protect from sunlight. Store in a well-ventilated place
 P202 - Do not handle until all safety precautions have been read and understood
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
 P308+P313 - IF exposed or concerned: Get medical advice/attention
 P280 - Wear protective gloves/protective clothing/eye protection/face protection
 P271 - Use only outdoors or in a well-ventilated area
 P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
 CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C/125 °F
 CGA-PG05 - Use a back flow preventive device in the piping
 CGA-PG06 - Close valve after each use and when empty
 CGA-PG10 - Use only with equipment rated for cylinder pressure

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CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Chemical name/Synonyms	Product identifier	%	Classification (GHS-CA)
Deuterium (Compressed) (Main constituent)	Deuterium, compressed	(CAS-No.) 7782-39-0	> 99	Flam. Gas 1, H220 Press. Gas (Comp.), H280

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product.

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

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May displace oxygen and cause rapid suffocation.

Symptoms/effects after skin contact : Adverse effects not expected from this product.

Symptoms/effects after eye contact : Adverse effects not expected from this product.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

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. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

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

5.3. Specific hazards arising from the hazardous product

Fire hazard : This product is flammable.

Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapour-air mixture.

Hazardous combustion products : None

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Exposure to fire may cause containers to rupture/explode.

Protection during firefighting : Standard protective clothing and equipment (e.g. Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Ensure adequate air ventilation.
- Personal Precautions, Protective Equipment and Emergency Procedures : EVACUATE ALL PERSONNEL FROM AFFECTED AREA. Use appropriate protective equipment. If leak is on user's equipment, be certain to purge piping before attempting repairs. If leak is on a container or container valve contact the closest Air Liquide Canada location.

6.2. Methods and materials for containment and cleaning up

- For containment : Try to stop release if without risk.
- Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.
- Methods and material for containment and cleaning up : Ventilate area.

6.3. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection"

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools.
- Hygiene measures : Do not eat, drink or smoke when using this product.
- Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapours are flammable. In use may form flammable vapour-air mixture.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.
- Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.
- Incompatible products : None known.
- Incompatible materials : Oxidizing materials. Air.
- 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. Segregate from oxidant gases and other oxidants in store. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

- Appropriate engineering controls : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities.
- Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Safety glasses. Protective clothing. Safety shoes.

Hand protection:

Wear working gloves when handling gas containers.

Eye protection:

Wear safety glasses with side shields.

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Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

None necessary during routine operations. See Sections 5 & 6



Thermal hazard protection:

None necessary during routine operations.

Other information:

Wear safety shoes while handling containers.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Clear, colorless gas.
Colour	: Colourless.
Odour	: Odourless
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: No data available
Molecular mass	: 4.032 g/mol
Melting point	: -254 °C
Freezing point	: -254 °C
Boiling point	: -248.65 °C
Flash point	: No data available
Critical temperature	: -233.75 °C
Auto-ignition temperature	: 560 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: See Section 2.1 and 2.2
Vapour pressure	: 6894 bar
Vapour pressure at 50 °C	: No data available
Critical pressure	: 1660 kPa
Relative vapour density at 20 °C	: 0.14
Relative density	: No data available
Relative gas density	: 0.14
Solubility	: Water: Insoluble
Log Pow	: No data available
Viscosity, kinematic	: No data available
Explosive properties	: Without adequate ventilation formation of explosive mixtures may be possible.
Oxidising properties	: None.
Explosive limits	: 6.7 - 79.6 vol %

9.2. Other information

Gas group	: Compressed gas
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SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: None known.
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Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: May react violently with oxidants. Can form explosive mixture with air.
Conditions to avoid	: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Incompatible materials	: Air, Oxidisers.
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 (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Inhalation:gas: Not classified.

Deuterium (Compressed) (1f)7782-39-0	
LC50 inhalation rat (ppm)	800000 ppm/4h
ATE CA (gases)	800000.00000000 ppmv/4h

Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified

Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: No data available.
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12.2. Persistence and degradability

Deuterium (Compressed) (7782-39-0)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Deuterium (Compressed) (7782-39-0)	
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Deuterium (Compressed) (7782-39-0)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on global warming	: No known effects from this product.
Effect on ozone layer	: None.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	: Contact supplier if guidance is required. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.
Product/Packaging disposal recommendations	: Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.
List of hazardous wastes	: 16 05 04 *: Gases in pressure containers (including halons) containing dangerous substances.

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SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

Transportation of Dangerous Goods

UN-No. (TDG) : UN1957
TDG Primary Hazard Classes : 2.1 - Class 2.1 - Flammable Gas.
Transport Document Description : UN1957 DEUTERIUM, COMPRESSED, 2.1
Proper Shipping Name : DEUTERIUM, COMPRESSED

Hazard labels (TDG) : 2.1 - Flammable gases



TDG Special Provisions : 38 - A person must not handle, offer for transport or transport these dangerous goods in a large means of containment if they are in direct contact with the large means of containment.
SOR/2014-306
ERAP Index : 3 000
Explosive Limit and Limited Quantity Index : 0.125 L
Passenger Carrying Ship Index : Forbidden
Excepted quantities (TDG) : E1
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

14.2. Transport information/DOT - USA

Department of Transport

DOT NA no. : UN1957
UN-No.(DOT) : 1957
Transport Document Description : UN1957 Deuterium, compressed, 2.1
Proper Shipping Name (DOT) : Deuterium, compressed
Contains Statement Field Selection (DOT) : DOT_TECHNICAL - Proper Shipping Name - Technical (DOT)

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
Division (DOT) : 2.1
Hazard labels (DOT) : 2.1 - Flammable gas



Dangerous for the environment : No

DOT Special Provisions (49 CFR 172.102) : N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized.
DOT Packaging Exceptions (49 CFR 173.xxx) : 306
DOT Packaging Non Bulk (49 CFR 173.xxx) : 302
DOT Packaging Bulk (49 CFR 173.xxx) : None
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

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DOT Vessel Stowage Location	: E - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	: 40 - Stow "clear of living quarters"
Emergency Response Guide (ERG) Number	: 115 (including Deuterium)
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 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.
Other information	: No supplementary information available.

14.3. Air and sea transport

IMDG

UN-No. (IMDG)	: 1957
Proper Shipping Name (IMDG)	: Deuterium, Compressed
Transport Document Description (IMDG)	: UN 1957 Deuterium, Compressed, 2
Class (IMDG)	: 2 - Gases
MFAG-No	: 115
Ship Safety Act	: Gases under pressure/Gases flammable under pressure(Dangerous Goods Notification Schedule first second and third Article Dangerous Goods Regulations)
Port Regulation Law	: Hazardous materials/High pressure gas (Article 21, Paragraph 2 of Law, Article 12 rule, notice attached table that defines the type of dangerous goods)

IATA

UN-No. (IATA)	: 1957
Proper Shipping Name (IATA)	: Deuterium, Compressed
Transport Document Description (IATA)	: UN 1957 Deuterium, Compressed, 2
Class (IATA)	: 2
Civil Aeronautics Law	: Gases under pressure/Gases flammable under pressure(Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)

SECTION 15: Regulatory information

15.1. National regulations

Deuterium (Compressed) (7782-39-0)

Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Deuterium (Compressed) (7782-39-0)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

Date of issue	: 05/19/2017
Other information	: This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of H-statements:

H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated

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SDS Canada (GHS)

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