



Material Safety Data Sheet

1. Product and Company Identification

Product name : **Deuterium**

Chemical formula : D2

Synonyms : None

Company : Specialty Gases of America, Inc
6055 Brent Dr.
Toledo, OH 43611

Telephone : 419-729-7732

Emergency : 800-424-9300

2. Composition/Information on Ingredients

Components	CAS Number	% Volume
Deuterium	7782-39-0	> 99.7%
Maximum Impurities		< 0.3%

3. Hazards Identification

Emergency Overview

Serious fire hazard when accidentally released.
Rapidly expanding gas can cause frostbite to any contaminated tissue.
May cause asphyxiation by displacement of oxygen.

Potential Health Effects

Inhalation : High concentrations of this gas can cause an oxygen-deficient environment. May experience symptoms such as headaches, ringing in the ears, dizziness, drowsiness, unconsciousness, nausea, vomiting and depression of all the senses. Under some circumstances of overexposure, death may occur.

Eye contact : None.

Skin contact : Contact with rapidly expanding gas may cause frostbite.

Ingestion : Ingestion is not normal route of exposure for gases.

Chronic Health Hazard : None.

4. First Aid Measures

General advice : None.

Eye contact : In case of emergency, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin contact : If case of frostbite, place the frostbitten part in warm water. **DO NOT USE HOT WATER.** If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently

- exercise the affected area while being warmed. Seek medical attention immediately.
- Ingestion : None.
- Inhalation : Remove victim to fresh air immediately. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

5. Fire-Fighting Measures

- Suitable extinguishing media : Use water spray to cool fire-exposed structures and equipment.
- Specific hazards : Deuterium is a flammable gas. An extreme hazard of cylinder rupture exists in areas in which the gas has been released, but the material has not yet ignited. Deuterium burns with an almost invisible blue flame.
- Special protective equipment for fire-fighters : Structural fire fighters must wear self-contained breathing apparatus and full protective equipment. The best fire-fighting technique may be simply to let the burning gas escape from the pipeline or other container. Stop the leak before extinguishing fire. If the fire is extinguished before the leak is sealed, the leaking gas could re-ignite without warning and cause extensive damage, injury or fatality. In this case, increase ventilation to prevent flammable mixture formation. For large releases, consider evacuation. Refer to North American Emergency Response Guidebook (Guide # 115) for additional information.

6. Accidental Release Measures

- Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
- Environmental precautions : Not available.
- Methods for cleaning up : Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of release, clear the affected area, protect people, and respond with trained personnel. Adequate fire protection must be provided. Minimum Personal Protective Equipment should be Level B: fire-retardant protective clothing, mechanically-resistant gloves and self-contained breathing apparatus. Use only non-sparking tools and equipment. Locate and seal the source of leaking gas. Protect personnel attempting the shut-off with water spray. Allow the gas, which is lighter than air, to dissipate. Monitor the surrounding area for combustible gas and oxygen levels. Combustible gas concentration must be below 10% of the LEL (LEL = 4.9%) prior to entry. The atmosphere must have at least 19.5% oxygen before personnel can be allowed in the area without self-contained breathing apparatus. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.
- Additional advice : None.

7. Handling and Storage

Handling

Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire, minimize ignition sources. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not puncture or incinerate container. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage

Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 C (125 F). Isolate from oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Post "No Smoking or Open Flame" signs in storage and use areas.

8. Exposure Controls / Personal Protection

Engineering measures

Use only with adequate ventilation. Local exhaust ventilation is preferred, because it prevents Deuterium dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the presence of potentially flammable air-gas mixtures and the level of oxygen. Monitoring devices should be installed near the ceiling.

Personal protective equipment

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|--------------------------|---|--|
| Respiratory protection | : | Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection during emergency response to a release of Deuterium if oxygen levels are below 19.5%. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards. |
| Hand protection | : | Wear mechanical resistant gloves when handling cylinders. |
| Eye protection | : | Splash goggles or safety glasses, for protection from rapidly expanding gases. |
| Skin and body protection | : | Use body protection appropriate for task. |

9. Physical and Chemical Properties

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|------------------|---|----------------------------------|
| Form | : | Gas. |
| Color | : | Colorless. |
| Odor | : | Odorless. |
| Vapor pressure | : | Gas, ambient. |
| Vapor density | : | 0.18 kg/m ³ (air = 1) |
| Boiling point | : | -249.5 C (-417.1 F) |
| Water solubility | : | Very slightly soluble. |
| Specific gravity | : | 0.139 @ 70 F (air = 1) |

10. Stability and Reactivity

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| Stability | : | Stable under normal conditions. |
| Conditions to avoid | : | Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. |
| Materials to avoid | : | Strong oxidizers (e.g. chlorine, bromine, pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). |
| Hazardous decomposition products | : | When ignited in the presence of oxygen, heavy water (Deuterium) will be produced. |

11. Toxicological Information

Acute Health Hazard

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|------------|---|----------------|
| Ingestion | : | Not available. |
| Inhalation | : | Not available. |
| Skin | : | Not available. |

12. Ecological Information

Any adverse effect on animals would be related to oxygen-deficient environments. Deuterium stunts the growth of mammals when drunk regularly as heavy water. No adverse effect is anticipated to occur to plant life, except for frost produced in the presence of rapidly expanding gases.

13. Disposal Considerations

Waste from residues / unused products : Dispose of non-refillable cylinders in accordance with federal, state and local regulations. If the cylinders are refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

Contaminated packaging : Return cylinder to supplier.

14. Transport Information

DOT (US only)

Proper shipping name : Deuterium, Compressed

Class : 2.1

UN/ID No. : UN1957

Labeling : Flammable Gas

Further information

Cylinders should be transported in a secure upright position in a well ventilated truck.

15. Regulatory Information

TCSA

Material is listed in TSCA inventory.

SARA Threshold Planning Quantity

Not applicable.

SARA Section 302/304

Deuterium is not subject to the reporting requirements.

16. Other Information

Prepared by : Specialty Gases of America, Inc.

For additional information, please visit our website at www.americangasgroup.com.