**Standard Operating Procedure**

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| **Chemical name/class:** | **Diborane Gas** | **CAS #: 19287-45-7** |
| **PI:** |  | **Date:** |
| **Building:** |  | **Room #:** |

1. **Circumstances of Use:**

***This SOP must be customized for each lab using Diborane. Use this section to describe the circumstances of use, including concentration and quantity as well as identification of a designated work area.***

2. **Potential Hazards:**

 Diborane is extremely flammable and catches fire spontaneously if exposed to air.

 Diborane can cause severe health effects, and is extremely toxic at very low levels. The lethal concentration in

 mouse studies was 50 ppm over 4 hours.

 Acute effects due to diborane exposure include severe burns and blisters as well as severe health effects to any

 portion of the body containing moisture due to boric acid formation (eyes, mucus membranes, lungs).

 Diborane may have delayed health effects well after exposure.

 Diborane may also have other acute effects such as CNS Depression and damage to the liver and kidneys.

 The OSHA Permissible Exposure Limit for Diborane is 0.1 ppm over an 8 hour day.

 For more information, refer to *Prudent Practices in the Laboratory* (National Academies Press)

[http://www.nap.edu/openbook.php?record\_id=4911&page=338](http://www.nap.edu/openbook.php?record_id=4911&page=292)

3. **Engineering Controls:**

 Forced ventilation systems for the general work area should be provided. It is recommended that cylinders in use be secured within a ventilated enclosure such as a gas cabinet or glove box.

 **Employee exposure must be monitored and reduced to the lowest practical levels using ventilation or**

 **other appropriate engineering controls.**

 As a best practice, areas where this gas or mixtures are used should be monitored with sensitive gas detection instruments which will alarm if leakage is detected.

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| 4. | **W** | **ork Practice Controls:** |
|  |  | ***Laboratory-specific written procedures are required for work with Diborane, including a designated work area****.* |
|  |  | ***It is expected that only competent persons with specific training and experience will be handling diborane gas or its mixtures.***  |
|  |  | Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. |
|  |  | Cylinders should be prevented being placed in any situation where damage to the cylinder may occur. Regular inspections of cylinders should be conducted to search for leaks, corrosion, or other damage. |

5. **Personal protective equipment (PPE):**

 PPE: Safety goggles with a face shield, nitrile gloves, and full length lab coats are recommended when handing cylinders of diborane gas mixtures. Respiratory protection is generally not practical in most situations, with reliance on engineering controls most acceptable.

* If a respirator is required, a full face respirator with multi-purpose cartridges must be used, at a minimum.

6. **Transportation and Storage:**

 **Ensure that the container is tightly closed at all times, and secure cylinders upright. Group I Flammable.**

 Avoid oxidizers, hydrocarbons, amines, aluminum, lithium, rubber, air, water, holaogens, and nitric acid.

 Keep container in a cool, dry, and well ventilated area.

 Contents under pressure.

 Avoid storing near oxygen gas cylinders.

7. **Waste Disposal:**

Handle and store empty diborane cylinders following the guidelines above while accumulating wastes and awaiting chemical waste pickup. Chemical waste must be disposed of following UNC Charlotte’s Laboratory Chemical Waste Management practices: <https://safety.uncc.edu/services/laboratory-research-safety>

8. **Exposures/Unintended contact:**

 Skin: **Immediately** remove all contaminated clothing. **Immediately** move under an emergency shower or other water source and flush the affected area for fifteen minutes with large amounts of water. Immediately washing off the area is critical.

 Eye: Remove contact lenses. Immediately flush eyes for fifteen minutes. Take victim to a physician as soon as possible.

 Inhalation: Immediately move to fresh air. Seek immediate medical attention. Avoid mouth to mouth contact

 with victims of diborane gas exposure.

 Ingestion: Ingestion is not considered an important route of exposure.

 **Medical attention:** In the event of minimal skin contact, contact Brocker Health Center at 7-7400. For all other exposures, immediately call 911.

The work-related injury or illness report found at:

<https://safety.uncc.edu/services/workers-compensation>

9. **Spill Procedure:**

If an active diborane gas leak occurs, avoid breathing vapors, gas, or mist. Allow the cylinder to empty if it is in an enclosed within a forced ventilation system. If the diborane cylinder is actively leaking outside of a forced ventilation system, do not attempt to close the valve, and immediately leave the room, close the door, and pull the fire alarm to signal evacuation.

In addition, contact the the Campus Police by calling 911 from a campus phone or 704-687-2200 from any phone.

10.  **Training of personnel:**

All personnel are required to complete the UNC Charlotte EHS Laboratory Environment Training Checklist. This checklist includes an introduction to general chemical safety as well as review of the laboratory specific safety plan. Furthermore, all personnel shall read and fully adhere to this SOP when handling the chemical.

**“I have read and understand this SOP. I agree to fully adhere to its requirements.”**

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