|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A picture containing text, clipart  Description automatically generatedA picture containing text, clipart  Description automatically generatedDuke OESO Guidelines for Safe Use of**  Icon  Description automatically generatedIcon  Description automatically generated**DichloroMethane**  **DCM, Methylene chloride | CAS #: 75-09-2**  ***Lab-specific Safety Information on pages 3 and 4 MUST BE APPROVED***  ***in advance by OESO and the PI.*** | | | | |
| **Hazards** | **Potential Hazards** | * **Exposure** through the **skin,** **inhalation** of vapors or aerosols, or by ingestion or injection can cause **central nervous system, liver, and cardiovascular effects**. It is a suspected **carcinogen**. * The 2024 EPA Existing Chemical Exposure Limit (ECEL) is **2 ppm (8 hr average), 16 ppm (15 min average). There is a 1 ppm action limit (8 hr average).** * The OSHA Permissible Exposure Limit in air **is 25 ppm (**8 hr average**)** or **125 ppm (**15 min**)**. * DCM is a very volatile liquid that **penetrates readily through standard nitrile gloves and skin**. **A needle-stick containing DCM could quickly lead to necrosis** [see [incident report](https://pubs.acs.org/doi/full/10.1021/acscentsci.0c00100)]. * Consult SDS and [Lab Chemical Safety Summary for DCM](https://pubchem.ncbi.nlm.nih.gov/compound/Dichloromethane#datasheet=LCSS) for additional info on hazards. | | |
| **Hazard Controls** | **Selection & Purchase** | * Purchase the **smallest containers** at the **lowest concentration** practical. * Purchase in **shatter-resistant containers** if available (such as PVC-coated glass). * Purchase gloves not quickly penetrated by the liquid for cleaning up small spills (see PPE). | | |
| **Storage & Transport** | * **Transport DCM in secondary containment**, preferably in a compatible **bottle carrier**. * Keep container in cool, well-ventilated area. Store **below eye level** but **not on the floor**. * **03-439, 03-439AAvoid accidental heating**. Keep container tightly closed and sealed until ready for use. * **Store** away from strong oxidizers, strong caustics, plastics, rubber, nitric acid,  and chemically active metals, such as aluminum or magnesium powder, sodium, potassium, and lithium. * **Keep away from azides - reactions can form explosive compounds** [see [report](https://pubchem.ncbi.nlm.nih.gov/compound/Dichloromethane#section=CSL-Reaction-Information)]**.** | | |
| **Engineering Controls** | * **Work with open containers of DCM only in a chemical fume hood**. **This includes waste transfer.** Keep containers closed when possible. * Work on a chemically-resistant lab benchtop **inside fume hood (no bench pads)**. * An **eyewash** and **drench hose** are required. Safety shower for ≥ 4 L containers. | Chemical Fume Hood Flow Diagram | |
| **Work Practice Controls** | * OESO **MUST** perform initial exposure monitoring and approve all usage/handling of DCM. * Contact OESO if DCM volume increases or procedures change for monitoring assessment. * **Designate an area** for working with dichloromethane, and label it as such. * **Avoid using needles or sharps** when working with DCM when possible. * **Once work is complete, wipe down work area with ethanol, then with soap and water.** * Plan work to **avoid contact with gloves**. *Change gloves immediately if contaminated.* * **Change gloves at least every 2 hours** and **wash hands** at time of glove change.   **x2**  **Use Silver Shield gloves for risk of splash or contact. contact is expected.** | | |
| **Personal Protective Equipment (PPE)** | * lab coat2North Silver Shield® Gloves, Silver, 29" Long, Size 8Wear **closed-toed shoes** and **clothing covering your legs.** * **Minimum PPE** (see **NOTE**): * Buttoned lab coat, safety glasses * **For pipetting**, **2 pair** of ≥ 4 mil nitrile gloves * **For pouring or handling with risk of splash**, **1 pair of** [Silver Shield gloves](https://sps.honeywell.com/us/en/products/safety/hand-protection/gloves/silvershield-ssg29) (8 hr protection*\**) **under 1 pair of nitrile gloves**. *Do NOT use solely nitrile gloves due to quick breakthrough.* | | |
| * **NOTE - dichloromethane readily penetrates nitrile gloves in < 1 minute***\****!** Change gloves immediately if splashed! **Wash hands** at time of glove change! * **Risk of splash/working with ≥ 300 mL:** add splash goggles, face shield,  [Silver Shield chemically resistant apron](https://www.northernsafety.com/Product/16752/Honeywell-North-Silver-Shield-36-x-45-Chemical-Resistant-Apron) & [sleeves](https://www.northernsafety.com/Product/16751/Honeywell-North-Silver-Shield-20-Chemical-Resistant-Sleeves-Pair).   *\*Check manufacturer’s glove guide or SDS for glove breakthrough time.* | |  |
| **Other** | **Emergencies** | * See [Emergency Response webpage](https://www.safety.duke.edu/emergency), Flip Chart, and/or lab-specific chemical hygiene plan. * **Injection or laceration with DCM-contaminated sharps requires immediate medical help.** Color change at the site can indicate necrosis. **Do not assume that you can take care of the injury alone; the support of co-workers could be vital**. (Also report to EOHW – see below.) * **For eye/skin exposure**, flush with water for at least 15 min, then seek medical attention. * Contact Employee Occupational Health and Wellness (EOHW) at **919-684-8115** to report an exposure and obtain medical advice. For medical advice without exposure, call **919-684-3136**. * **For large spills (>1L) inside a fume hood and ALL spills outside of a fume hood**, evacuate the lab and activate a spill response by calling **911** from a campus phone or **Duke Police at 919-684-2444** from any phone to request assistance. * **For clean-up of small spills (≤ 1L) inside the fume hood, use splash-risk PPE noted on p. 1.**  Do NOT use nitrile/lab gloves on their own due to quick breakthrough. * **Avoid inhaling vapors during spill clean-up.** DCM evaporates quickly. Spills inside of a chemical fume hood can often be cleaned up with dry absorbents (such as spill pads or vermiculite) if the lab feels comfortable and prepared to do so. * After spill clean-up is complete, any surfaces contaminated with DCM should be wiped down with 70% ethanol and then wiped down with soap and water. * For **solid or** **spill waste**, collect any absorbent materials in tied-off double plastic bags, and keep in secondary containment in a fume hood until it is collected by OESO. | | |
| **Waste** | * DCM can dissolve some plastics; use a proper waste container for halogenated solvents. Halogenated waste containers can be obtained through the [Waste Pickup Request System](https://lsw.duhs.duke.edu/LabSafetyManagement), though use of these containers for DCM waste is discouraged due to their large size and difficulty to store and transfer waste inside the fume hood. Use of 4L glass bottles for waste storage is encouraged. * Waste dichloromethane must be disposed of following your **laboratory-specific chemical hygiene plan** and meet the requirements of Duke University’s [Chemical Waste Policy](https://www.safety.duke.edu/files/Q-Chemwastemgt.pdf) and Laboratory Chemical Waste Management Practices (link [here](https://www.safety.duke.edu/environmental-programs/hazardous-waste/chemical-waste)). * For **solid or** **spill waste**, collect any absorbent materials in tied-off double plastic bags, and keep in secondary containment in a fume hood until it is collected by OESO. | | |
| **Training** | Sign signature page in lab-specific chemical hygiene plan to indicate review. | | |
| **Questions** | Contact OESO Laboratory Safety at 919-684-8822 or [labsafety@duke.edu](mailto:labsafety@duke.edu). | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A picture containing text, clipart  Description automatically generatedIcon  Description automatically generated | | **A picture containing text, clipart  Description automatically generatedLab-Specific Safety Information for**  **DichloroMethane**  ***Supplements the Guidelines for Safe Use of DCM***  ***Must be approved by OESO and PI below.***  ***Attach relevant exposure monitoring results.*** | | | | **Icon  Description automatically generated** | |
| **Lab** | **PI Name** | Click or tap here to enter PI Name | | PI Approval (signature):  Date: Click or tap to enter a date. | | | |
| **Location** | Enter building(s) and room(s) where lab is located | | | | | |
| **OESO Approval** | Click or tap here to enter OESO Reviewer | | Signature:  Date: Click or tap to enter a date. | | | |
| **Controls Lab-Specific Hazard Controls** | **Purchase**  **Details** | Maximum container size | Enter maximum container sized purchased | | | | |
| Maximum concentration | Enter maximum concentration purchased | | | | |
| Container type | Enter the container material | | | | |
| Specific product information | Enter supplier name/product number or purity/grade to purchase | | | | |
| **Storage** | Specific location | Enter specific storage location | | **Not in a cold room!** | | |
| **Use Information** | Designated work area  (specific room(s) and area(s))  **LABEL WORK AREA** | Enter rooms and areas designated for use | | | | **WORK IN FUME HOOD** |
| Maximum quantity | Enter maximum quantity to be used at a time | | | | |
| Typical concentration used | Enter typical concentration used | | | | |
| Required PPE | **For pipetting and other tasks with low risk of skin contact or splash:**  Standard Lab Coat  Chemical Safety Glasses  2 pair of ≥4 mil Nitrile gloves (double gloved)  **For risk of skin contact to hands:**  [Silver Shield gloves](https://sps.honeywell.com/us/en/products/safety/hand-protection/gloves/silvershield-ssg29) (inner glove)   1 pair of ≥4 mil Nitrile gloves (outer glove)  **For working with amounts ≥ 300 mL:**  Chemical Splash Goggles  Face shield  [Silver Shield chemically-resistant sleeves](https://www.northernsafety.com/Product/16751/Honeywell-North-Silver-Shield-20-Chemical-Resistant-Sleeves-Pair)  [Silver Shield chemically impervious apron](https://www.northernsafety.com/Product/16752/Honeywell-North-Silver-Shield-36-x-45-Chemical-Resistant-Apron) | | | | |
| PPE Storage Locations for spill clean-up or work area decontamination | [Silver Shield gloves](https://sps.honeywell.com/us/en/products/safety/hand-protection/gloves/silvershield-ssg29) (inner glove): Location of Silver Shield gloves  1 pair of ≥4 mil Nitrile gloves (outer glove): Location of gloves  Chemical Splash Goggles: Location of splash goggles  Face shield: Location of face shield  [Silver Shield chemically-resistant sleeves](https://www.northernsafety.com/Product/16751/Honeywell-North-Silver-Shield-20-Chemical-Resistant-Sleeves-Pair): Location of sleeves  [Silver Shield chemically impervious apron](https://www.northernsafety.com/Product/16752/Honeywell-North-Silver-Shield-36-x-45-Chemical-Resistant-Apron): Location of apron | | | | |
| Location of supplies for decontamination | 70% Ethanol: Enter location of ethanol  Soap: Enter location of soap  Paper Towels: Enter location of paper towels | | | | |
| Location of supplies for small spill clean-up  (in addition to PPE above) | Location & Type of inert absorbent: Location of vermiculite, dry sand, or absorbent pads | | | | |
| **Waste Disposal** | | Chemical Waste Information | Enter location of waste container, type of container used. | | | | |
| **Details of Process(es)** | | **PROCESS 1**   1. Enter steps used in lab process(es) or experiment(s) | | | | | |
| **PROCESS 2**   1. Enter steps used in lab process(es) or experiment(s) | | | | | |
| **PROCESS 3**   1. Enter steps used in lab process(es) or experiment(s) | | | | | |
| **Monitoring Records**  (Ideally, save monitoring reports with this SOP) | | Highest Likely Full Shift Exposure Monitoring – Notes Indicate process monitored, time monitored, amt of DCM used, controls, other notes  Date of Monitoring: Click or tap to enter a date.  Monitoring result: Indicate result in ppm during time monitored and 8-hr TWA  Follow-up Monitoring Date: Click or tap to enter a date. | | Highest Likely 15-minute Exposure Monitoring – Notes Indicate process monitored, time monitored, amt of DCM used, controls, other notes  Date of Monitoring: Click or tap to enter a date.  Monitoring result: Indicate result in ppm during time monitored and 15-minute STEL  Follow-up Monitoring Date: Click or tap to enter a date. | | | |
| Additional Full Shift Exposure Monitoring – Notes Indicate process monitored, time monitored, amt of DCM used, controls, other notes  Date of Monitoring: Click or tap to enter a date.  Monitoring result: Indicate result in ppm during time monitored and 8-hr TWA  Follow-up Monitoring Date: Click or tap to enter a date. | | Additional 15-minute Exposure Monitoring – Notes Indicate process monitored, time monitored, amt of DCM used, controls, other notes  Date of Monitoring: Click or tap to enter a date.  Monitoring result: Indicate result in ppm during time monitored and 15-minute STEL  Follow-up Monitoring Date: Click or tap to enter a date. | | | |