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| **Duke OESO Guidelines for Safe Use of**  **Osmium Tetroxide (OsO4)**  ***Lab-specific Safety Information on page 2 MUST BE APPROVED in advance by OESO and the PI.*** | | | | | | | | |
| **Hazards** | **Potential Hazards** | * **Solid is fatal if inhaled (category 1) or if swallowed or in contact with skin (category 2).** * **2% and 4% solutions are fatal if inhaled (category 1), category 3 oral and category 4 dermal. Solutions are also repiratory sensitizers (category 1), serious eye damage (category 1) and skin irritation (category 2). High risk.** * Causes **severe skin burns** and **eye damage**; **lachrymator**. Has an unpleasant chlorine-like odor and also has poor warning properties (odor detectable only above exposure limit). * May cause allergy or asthma symptoms or breathing difficulties if inhaled. * Symptoms may be delayed. * Exposure limit (OSHA): 0.002mg/m3 (0.0002 ppm) – 8 hr TWA; Short term (NIOSH, ACGIH):0.0006 ppm.Chronic exposure causes damage to the liver and kidney. * Sublimes readily at room temp and significantly when refrigerated. * **Consult the Safety Data Sheet (SDS)** and the [Laboratory Chemical Safety Summary](https://pubchem.ncbi.nlm.nih.gov/compound/osmium_tetroxide#datasheet=lcss&section=Top). | | | | | | |
| **Hazard Controls**  **Hazard Controls** | **Selection & Purchase** | * Use a less dangerous product if possible. * Purchase in solution or in pre-weighed ampule. | * Purchase corn oil for decontamination and spill clean-up. | | | | | |
| **Storage & Transportation** | * Solid andolutions: store and transport in sealed, glass (OsO4 penetrates plastic), shatter-resistant containers within secondary containment. Use Teflon tape to reseal any solutions. * Store in a dry and well-ventilated place; keep storage area secure. * Container must be kept away from strong reducing agents, organic materials, powdered metals, and hydrochloric acid. | | | | | | |
| **Engineering Controls** | * **Eyewash** (preferably with   **drench hose**)is required.   * A **safety shower**   is highly recommended**.** | | * All work must be done in a chemical fume hood. NO BSCs! * Open only inside hood. | | | |  |
| **Work Practice Controls** | * **Designate a specific area** for osmium tetroxide use and **label it**. * Keep containers closed and tightly sealed as much as possible. * If possible, **purchase as solution** OR **make the entire ampule into a solution** and then aliquot the solution for use. * If weighing is necessary**, place balance in hood** OR use **Tare Method** 🡪 🡪 🡪 | | | | Osmium Tetroxide Work Area  Danger! Toxic! Corrosive!   * + **Tare** (pre-weigh) empty **glass** container with lid.   + Go to **hood**, add **solid**, **close lid**.   + Go to balance to weigh.   + **Return to hood.** | | |
| * **Decontaminate** containers, equipment, & surfaces with **corn oil**. If OsO4 is still present, the oil will turn black. Use this as an indicator to ensure decon is complete. | | |  | | | |
| **Personal Protective Equipment** | goggles**Minimum PPE:**   * **Safety goggles** and **face shield** (8” length min.) * **If using the solid, use 2 pairs nitrile gloves** (inspect for defects before use) * **If using solutions, 1 pair of nitrile gloves will be sufficient.** * *Avoid glove contact & change gloves at least every 30 minutes.* * Fully buttoned **lab coat** with sleeves extending to the wrists. | | | | | 3XE79_AS01?$zmmain$lab coat2  **x2** | |
| blue neoprene latex gloves**Risk of splash** (or for spill clean-up):   * **Chemical-resistant sleeves and apron** over lab coat | | | | | 8400131-24 | |
| *Check the manufacturer’s glove guide for glove effectiveness if using a solvent other than water.* | | | | | | |

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| **Other** | **Medical Emergencies** | * See Emergency Response [webpage](https://www.safety.duke.edu/emergency) or flip chart and/or lab specific chemical hygiene plan * Exposed persons: **seek immediate medical attention** at the nearest Emergency Room. |
| **Spills** | * **Spill >1 g or outside hood:** Call 911 from a campus phone or 919-684-2444 from any phone. * **Spills < 1 g in hood:** Cover spill with corn oil-soaked inert absorbent. Scoop, double bag & seal. * **AFTER** the spill is absorbed, wipe area with corn oil, then soap and water. |
| **Waste** | OsO4 is **P-listed waste**. Accumulate separately. Submit empty containers (including syringes) as waste if OsO4 was the only active ingredient in the container. **NO DRAIN DISPOSAL.**  See lab-specific chemical hygiene plan and [Lab Chemical Waste Management Practice](https://www.safety.duke.edu/environmental-programs/hazardous-waste/chemical-waste) for more information. |
| **Training** | Sign lab-specific Chemical Hygiene Plan to indicate review. |
| **Questions** | Contact OESO Lab Safety at 919-684-8822 or [labsafety@dm.duke.edu](mailto:labsafety@dm.duke.edu). |

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|  | | **Lab-Specific Safety Information for**  **Osmium Tetroxide**  ***Supplements the Guidelines for Safe Use of Osmium Tetroxide***  ***Must be approved by OESO and PI below.*** | | |  | |
| **Lab Info** | **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. | | |
| **Lab-Specific Hazard Controls** | **Purchase**  **Details** | Maximum container size | Enter maximum container size purchased | | | |
| Maximum concentration | Enter maximum concentration purchased | | | |
| Container type | Enter the container material | | | |
| Specific product info. | Enter supplier name/product number or purity/grade to purchase | | | |
| **Storage** | Specific location | Enter rooms and areas designated for storage | | | |
| **Use Information** | Designated work area (specific room(s) and area(s)) | Enter rooms and areas designated for use | | | **Label work area!** |
| Type of container to use | Type of container in which OsO4 is used or stored in the lab | | | **NO PLASTIC!** |
| Maximum quantity | Enter maximum quantity to be used at a time | | | |
| Location of supplies for decontamination  (or spill clean-up) | Corn Oil: List Location  Inert Absorbent: List Location | | | |
| **Waste Information** | Details about waste - location, type of container | Enter waste collection details – location, type of glass container  Empty containers are submitted as waste | | | **Accumulate Separately!**  **No plastic!** |
| **Details of Process** | 1. Enter steps used in lab process(es) or experiment(s) | | | | |