# **Standard Operating Procedure (SOP) Title: Dry Ice**

|  |  |  |  |
| --- | --- | --- | --- |
| Assessor:  | Joshua Linfoot | Location of work:  | MSRH 502 |
| Principal Investigator:  | Prof Alan Spivey |
| Date of approval:  | 13/09/2021 | Date for review: | 13/09/2022 |

## **Justifying the hazards:**

Dry ice is solid carbon dioxide (CO2). At room temperature and atmospheric pressure, dry ice changes directly from the solid to carbon dioxide gas, without going through the liquid phase (sublimes). The sublimation temperature of dry ice is -78.5°C. Contact of dry ice with the skin may result in frostbite or cold burns. A concentration of CO2 > 1.5% can cause headache, nausea and vomiting and may lead to unconsciousness.

|  |
| --- |
| Identify hazards with specific risk assessments and a College or a departmental approval process  |
| [Ionising radiation sources](https://www.imperial.ac.uk/safety/safety-by-topic/laboratory-safety/) | [ ]  | [Biological sources](https://www.imperial.ac.uk/safety/safety-by-topic/laboratory-safety/) (microorganisms, human/animal tissues, plants) | [ ]  |
| [Class 3R, 3B or 4 Lasers](https://imperiallondon.sharepoint.com/sites/fons/faculty/safety/lasers/SitePages/laserhome.aspx)  | [ ]  | [Offsite work](http://www.imperial.ac.uk/safety/safety-by-topic/off-site-working/) | [ ]  |
| Confirm if [Lone working](https://www.imperial.ac.uk/safety/safety-by-topic/lone-working/) is permitted with this SOP? [ ]  If it is permitted, describe the control measures for lone workers:  |

## **Preparing for the SOP:**

* **DON’T** start work without wearing a suitable PPE.
* **DON’T** store dry ice in a tightly closed containers.
* **DON’T** travel in a lift with dry ice.

## **Procedure:**

# **Before the procedure:**

1. Wear appropriate PPE before starting work with dry ice.
2. Prepare an appropriate insulated storage container, such as a foam cooler box, and plastic tongs/scoop for discharging of the dry ice.

# **Procedure:**

1. Use plastic scoops/tongs to discharge dry ice from its stock container into an appropriate container for future use.

# **After the procedure:**

1. Ensure you leave used labware clean.

## **Disposal:**

Let the unused dry ice sublime (recommended for well‐ventilated areas and fume cupboards). Never dispose of dry ice in a sink, toilet or other drain, or with other trash or garbage.

## **Personal Protective Equipment (PPE):**

Lab coat, non-absorbent cryo-protective gloves, safety glasses.

## **Risk Analysis of SOP and emergency procedures:**

### (In addition to [Safe Lab Practice](https://imperiallondon.sharepoint.com/sites/fons/faculty/safety/SitePages/Basic%20Laboratory%20Rules%20for%20All%20Laboratories%20in%20FoNS.aspx))

### **Always remember to include fire associated risks and control measures where appropriate**

|  |  |  |  |
| --- | --- | --- | --- |
| Hazard | Raw risks | Current control measures | Residual risk(Low/Med/High) |
| Dry ice | Burns | Wear appropriate PPE (cyro-protective gloves, lab coat, safety glasses or face shield, enclosed footwear) and use an appropriate equipment (scoop for dry ice) to prevent exposure during transfer or use of cryogens. | Low |
| Oxygen deficient atmosphere – e.g. use of Dry Ice/ Liquid N2/ asphyxiant gas etc. | Asphyxiation | Ensure any low oxygen monitoring alarm system is serviced and operational.NEVER travel in an elevator with asphyxiant gas. One person should send the elevator to the location and another person receive the elevator. | Low |

|  |  |
| --- | --- |
| **Additional control measures to minimise residual risks** | **Implementation date** |
| If **contact with Dry Ice** (**Dry Ice burns**) has occurred, the aim should be to slowly raise the temperature of the affected area back to normal. The affected area should be doused with copious quantities of tepid water for at least 15 minutes. If the burn is serious, a clean lint-free sterile burn dressing should be applied to protect the injury until the person can be taken to receive hospital treatment.  |  |

|  |
| --- |
| **Who may be harmed** |
| Staff / students [x]  | Cleaners / Engineers [x]  |
| Supporting staff [x]  | Others (specify):  |

|  |
| --- |
| **Emergency procedures** – describe the response(s) required by the user and lab members |
|  |

|  |
| --- |
| Recommended trainings and records: |
|  |

|  |  |
| --- | --- |
| List of individuals competent to demonstrate safe work practice and train others (level 1 trainers): | Names of those that have been trained and can work unsupervised (level 2) and date training completed: |
|  |  |
|  |  |