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# JOINT RESEARCH SUPPORT OFFICE

# STANDARD OPERATING PROCEDURES

## Research Space SOP 5008

## v1.1 March 2018

# Standard operating procedure for the safe use, handling and storage of dry ice within Research Space, LRI

**PGC Registration: C19/2018**


OFFICE BASE

Research Space

Level 0, Balmoral Building

Leicester Royal Infirmary

Infirmary Close

Leicester LE1 5WW

## 1. Background

Dry Ice:

- is Carbon Dioxide ($CO^2$) in its solid state
- sublimes from a solid to a gas without passing through a liquid phase
- has a temperature of -78°C

$CO^2$ is a non-flammable colourless gas. It has a slight pungent odour which is only detectable in high concentrations. $CO^2$ gas is always escaping into the atmosphere when dry ice is present, even when stored securely. Hazards include:

- asphyxiation through a toxic atmosphere
- cold burns
- frostbite

Due to the hazards associated with the use of dry ice, it is imperative that all staff members who need to use, store or handle dry ice as part of their role are appropriately trained to ensure their own safety and the safety of all staff working within Research Space.

## 2. Purpose

The purpose of this Policy is to describe the methods for safely using, storing, and handling dry ice when shipping and transferring samples for research purposes.

## 3. Scope

This policy applies to all staff that may come into contact with dry ice within Research Space.

## 4. Responsibilities

The Research Space Senior Management Team (SMT) are responsible for:

- ensuring this procedure is implemented
- ensuring evidence of training is documented in Research Space records

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Staff members who need to use, store or handle dry ice are responsible for:

- the safe handling and management of dry ice in accordance with national health and safety policies & guidelines, and study protocols
- undertaking formal dry ice training or in-house cascade training as per the Department of Transportation (DOT) and/or International Air Transportation Association (IATA) shipping requirements. Training must be undertaken prior to use or handling of dry ice
- use of personal protective equipment (PPE) as per the Policy Statement below.

## 5. Policy Statement

### 5.1. Storage of dry ice

The following steps should be performed to ensure safety:

- Only experienced and trained people should use, store and handle dry ice
- Dry ice properties should be known and understood
- Dry ice should be stored in a well-ventilated room away from direct sunlight or heat sources. It should be placed in a Styrofoam chest, insulated cooler, or a special cooler designed for the storage of dry ice
- DO NOT use or store dry ice in confined areas, walk-in refrigerators, freezers, or rooms without ventilation

### 5.2. Packaging of dry ice

- Ensure that samples are appropriately labelled and packaged prior to placing on dry ice
- Pack the dry ice in an area with good ventilation
- Ensure dry ice is packaged in containers that allow the release of $CO^2$ gas
- DO NOT place dry ice into a tightly sealed container, as this can produce sufficient gas build up to cause an explosion
- Take care when lifting, opening and closing packages containing dry ice
- Ensure that packaging provided is strong and well designed

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- Ensure that packaging has appropriate safety makings on the side for the dry ice e.g.:
    - Carbon Dioxide Solid
    - Class 9 label
    - UN number (UN1845)
    - Delivery address
    - Sender
    - Orientation label (for example  ) to demonstrate which way up the box should be handled
    - Net weight
- Do not remove or deface packaging or labels

### 5.3. Personal Protective Equipment

- Personal protective equipment (PPE) to European standard EN511 should be worn at all times when coming into contact with dry ice. This includes:
    - Dry cryogenic gloves (NEVER use bare hands or wet gloves as this can result in burns/frostbite to the skin in a short period of time)
    - Safety goggles
    - Enclosed shoes
    - Lab coats / aprons, if available
- Arms and legs should be covered

### 5.4. Transportation of Dry Ice

- Dry ice is classified as a 'dangerous good'. Where possible, official couriers who have had dry ice awareness training should be used to ship and transfer samples
- In extreme circumstances it may be necessary to transport samples without a courier. If this is the case, please discuss this with your Line Manager or a member of the SMT prior to doing so.
- In transport is authorised, the following precautions should be taken in **addition** to the above:
    - Use the minimal amount of dry ice necessary for sample stability

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- Carry a spillage kit incorporating: goggles, gloves and a plastic container to collect spilt dry ice

### 5.5. First Aid for Dry Ice Burns

- Move the dry ice victim to a well-ventilated room away from the dry ice, if possible
- Cover affected area with a dry sterile dressing or cling film
- Avoid potential impact to affected areas
- Ensure that clothing is loosened to provide unrestricted circulation
- Do not remove clothing from site of cold burns
- Seek medical assistance
- Observe for shock
- DO NOT administer food or drink until reviewed by a medical team

### 5.6. Disposal of Uneeded Dry Ice

- Leave the unused portion of dry ice to sublimate in a well-ventilated area. This may take several days. Adequate ventilation is necessary to allow gas liberation.
- NEVER dispose of dry ice in a sink, toilet or other drain
- NEVER dispose of dry ice in a rubbish bin
- NEVER leave surplus dry ice in corridors, offices or other enclosed spaces

## 6. Related documents & References

- IATA Dangerous Goods Regulations

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## 7. Approval and sign off

| DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT | | | |
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| **Author:** | Helen Bray | **Job Title:** | Research Nurse |
| **Reviewed by:** | Research and Innovation Management Group | | |
| **Approved by:** | Prof. Nigel Brunskill | **Signature** | **Date Approved** |

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