

Dr Hal @ ASE 2013

Use of liquid nitrogen

Risk Assessment

Please note that this risk assessment was written to cover the demonstration of this experiment at the ASE Conference in January 2013. For any other use, this risk assessment should be reviewed to see whether there is a need to modify or adapt it in any way to suit the particular conditions under which the experiment will be carried out.

Risk Assessment: Dr M H Sosabowski

Written By: Dr M H
Sosabowski/D.Campbell

Location: Reading University

Date Of Assessment: 30th October 2012

ACTIVITY

RISK CATEGORY	DESCRIPTION OF ACTIVITY TO BE ASSESSED
Low	Bigger Bang Reading 6 th Jan 2013 – Use of liquid nitrogen

HAZARDS

List hazards here. List only hazards which could reasonably be expected to result in significant harm under the conditions in your workplace.

Description: Liquid nitrogen will be used to demonstrate its properties and effects on different materials.

Hazards:

1. Contact with liquid N₂ may cause cold burns or frostbite - liquid nitrogen has a temperature of -196°C, and will cause tissue damage if in prolonged contact with tissue;
2. Glass fragments from Dewar flasks -they can on occasions implode, with consequent risk of eye damage or other flying glass trauma;
3. Risk of flying debris (brittle rubber/banana) caused when demonstrating properties of liq. N₂.
4. In high concentrations may cause asphyxiation

WHO MAY BE HARMED

List here groups of people who are especially at risk from the hazards that you have identified. You may list individuals but think of groups of people doing similar work

1. Audience, Dave C, other on-staff on stage.

IS THE RISK ADEQUATELY CONTROLLED

List existing precautions & controls here or note where information can be found

General:

- (i) Dave/Dr Hal Sosabowski has carried out demonstration many times and will oversee and direct all liq. N₂ demonstrations;
- (ii) Dave C to wear safety glasses and laboratory coats at all times during demonstration, all other on-stage staff to wear safety glasses.
- (iii) Audience to be seated at suitable distance from stage.
- (iv) Safety Data Sheets available at all times.
- (v) Liq. N₂ contained in secure dewars, under control of Sosabowski/Campbell at all times.

1. Liquid nitrogen tissue damage:

- (i) Hal is the only operator to have direct contact with liquid nitrogen by design. He has carried out this demonstration countless times and is familiar with handling cryogenic materials. He is aware how long skin can remain unharmed when in contact with liquid N₂. Cryogenic gloves to be used.
- (ii) All present to wear labcoats in case of nitrogen splash. Hands and faces excepted, there should be no unprotected skin on those directly involved with the experiment.

2. Dewar flask failure:

- (i) The flasks to be used are relatively new and have been tested several times to -196°C. All persons directly involved to wear eye protection and labcoats. Dewars that fail tend to implode rather than explode, so risk of injury from flying glass low. Cling film to be wrapped around glass dewars to maintain structural integrity of glass.
- (ii) In the event of a Dewar failure the liquid N₂ will spill out. There is a very low risk of frostburn since it will evaporate immediately on hitting the table and is unlikely to penetrate clothes. Also due to evaporation & low conc., v. low asphyxiation risk. (see 4)

3. Flying debris:

- (i) Laboratory glasses to be worn by all directly involved with experiment. All on stage to wear safety glasses.
- (ii) Safety screens to be used, to prevent debris from hitting audience.

4. Asphyxiation: Very low risk due to low volume of N₂ being used, and demo being carried out in large well ventilated venue.

WHAT FURTHER ACTION IS NECESSARY

List all risks that are not adequately controlled and the action that you will take, where it is practicable, to do more

None

Have all necessary precautions and procedures been included in the assessment?

Yes

RESULT - T=Trivial Risk /A=Adequately controlled

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