# Department of Engineering – Risk Assessment

**Ref No.** B876

| **Title of project/experiment/activity**<br>**Use of inkjet printer** | |
|---|---|
| **Location of activity**<br>Cambridge Graphene Centre : Ink Lab | **Start and end dates**<br>24/08/2015 - continuous |

**Brief description (or attach procedure/protocol)**

The Fujifilm Dimatix DMP-2831 is a commercially made inkjet printer and will be used in accordance with the manufacturer's instructions after training. It is used to deposit inks on to a range of substrates including paper, glass, plastics and silicon. The cartridges will be filled and sealed in the Chemistry Lab and properly placed in the inkjet printer located in the ink Lab.

Cartridges are filled and sealed under a fumehood to prevent exposure to solvent vapours, and gloves and goggles are worn to prevent skin and eye damage.

The printer is enclosed, and includes an interlock to prevent accidental contact with moving parts or exposure to solvent vapours. During printing, only small volumes of ink are dispensed (< 1 mL/hour), and extraction is used to prevent solvent vapours escaping the printer enclosure. Completed samples removed from the printer are dry.

| Hazard | Effect | Control measures | Residual risk |
|---|---|---|---|
| General hazards in lab | Inhalation of solvents<br>Exposure to chemicals harmful to health | The cartridges contain small volumes (<3ml) of water or solvent based ink which is then dispensed onto the substrate and the solvent is evaporated. The printer is connected to an extractor. (Likelihood: 1, Severity: 1)<br><br>The use of various chemicals will be covered in separated risks assessments dealing with the preparation of nanomaterials inks and COSSH forms.<br><br>Gloves, eye protection and lab coat must be worn whilst in the laboratory. The Ink Lab rules will be respected. | Low risk |
| Mechanical: The printer has moving parts leading to potential pinch points. | User may trap fingers.<br>Mechanical damage to equipment | The printer must be used with the security lid closed. (Likelihood: 1, Severity: 1). | Low risk |
| Electric shock | Shock to user, damage to equipment | Do not get outer parts of the printer wet<br>Always wipe any potential leakage inside or around the printer.<br>(Likelihood: 1, Severity: 1) | Low risk |

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**Personal Protective Equipment required** [*eye/face protection, respiratory protection, gloves, lab coat etc*]

Lab coat, gloves (purple nitrile) and eye protection (safety specs) required in the lab at all times

**Emergency Instructions & First Aid**

**Spillage:**
Cartridges are filled and sealed in the Chemistry Lab. Spillage here can be dealt with using a standard spill kit or clean room wipes. A sealed cartridge contains <3mL of dispersion, and any leakage is contained within the printer enclosure.

**Fire:**
In case of fire, the fire alarm should be sounded and fire service called. If safe to do so, the fire may be extinguished using an extinguisher containing carbon dioxide, located outside the laboratory in the corridor.

**First aid:**
General advice: Consult a physician. Show this safety data sheet to the doctor in attendance.
If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.
In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**Any special monitoring required** [*e.g. hearing test, vibration monitoring, health surveillance*]

No

**Further control measures required? If yes, list with actions.**

Waste Disposal Procedures: Cartridges are opened and emptied into suitable chlorinated (DCB), or non-chlorinated (all others) waste containers prior to disposal. Cartridge emptying is performed under the fume hood in the Chemistry Lab.

In the case of equipment malfunction/failure: shutdown instrument from main switch or directly from plug socket.

**Biological/Laser/Radiation Approval** [*requires relevant Specialist Safety Officer signature and date*]
N/A

**Out of hours/Lone working**
The system can can left working alone for several hours overnight. A label mentionning „running equipment / keep away" must be displayed when the equipment is running unattended. Requires Head of Division permit.

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Signature to confirm that this is a suitable and sufficient assessment of risk and that stated control measures are in place. This risk assessment should be reviewed if additional risks not covered in this assessment are identified or if there is any reason to indicate that the control measures are insufficient.

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| **Name of Assessor**<br>Panagiotis Karagiannidis<br>Email: pk412@cam.ac.uk | **Signature** | **Date**<br>31/8/2016 |
| **Name of Supervisor**<br>Prof A.C. Ferrari<br>Email: acf26@cam.ac.uk | **Signature** | **Date**<br>2/11/16 |

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| **Local Safety Coordinator** | **Signature**<br>David Hanke | **Date**<br>2/11/16 |
| **Departmental Safety Office**<br>IAN SLACK | **Signature** | **Date**<br>9 NOV 2016 |