

<b>Title of project/experiment/activity</b> Use of 3d printer FDM Cube X duo			
<b>Location of activity</b> Cambridge Graphene Centre : Ink Lab		<b>Start and end dates</b> 24/08/2015 - continuous	
<b>Brief description (or attach procedure/protocol)</b> The Cube X duo is a commercially made fused deposition modelling 3d printer and will be used in accordance with the manufacturer’s instructions after training. It is used to thermally extrude thermoplastic polymer filament feedstock and print 3d objects onto a moving platform.  The solid filament is fed inside the print head comprising a rotating gear and a small extruder known as a print jet.  The printer is enclosed to prevent accidental contact with moving parts.  The printed part is cooled while printing by fans located on the print head.			
Hazard	Effect	Control measures	Residual risk
Heat: the thermal extruder can be heated to 260°C while printing and cools slowly after printing.	If touched, the user may burn fingers	The printer must be used with the security lid closed and the user must not put his hands inside the printer case while printing. (Likelihood: 1, Severity: 2).	Low risk
Mechanical: The printer has moving parts leading to potential pinch points.	User may trap fingers. Mechanical damage to equipment	The printer must be used with the security lid closed and the user must not put his hands inside the printer case while printing. (Likelihood: 1, Severity: 2).	Low risk
Electric shock	Shock to user, damage to equipment	Do not get outer parts of the printer wet (Likelihood: 1, Severity: 1)	Low risk

<b>Personal Protective Equipment required [eye/face protection, respiratory protection, gloves, lab coat etc]</b>  Gloves (purple nitrile) and eye protection (safety specs) required in the lab at all times
<b>Emergency Instructions &amp; First Aid</b>  Spillage:

The process uses dry materials so there is no possibility for spillage

**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 in the corridor outside the laboratory.

**First aid:**

If swallowed: Consult a physician. Show this safety data sheet to the doctor in attendance.  
Dry process involving thermoplastics.

**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: the material waste can be disposed in the bin.

In the case of equipment malfunction/failure: shutdown instrument 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 be left running unattended and overnight, but will typically be used during normal hours. While printing unattended an „Attention running equipment / Keep away“ notice should be displayed. People working around the printer have to make sure they won't disconnect the USB stick from the printer or the main power.

*Requires overnight running permit from Head of Division.*

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.

<p><b>Name of Assessor</b> Panagiotis Karagiannidis Email: pk412@cam.ac.uk</p>	<p><b>Signature</b> </p>	<p><b>Date</b> 31/08/2016</p>
<p><b>Name of Supervisor</b> Prof A.C. Ferrari Email: acf26@cam.ac.uk</p>	<p><b>Signature</b> </p>	<p><b>Date</b> 2/9/16</p>

Department of Engineering – Risk Assessment

Ref No.

Local Safety Coordinator	Signature <i>David Harb</i>	Date 2/11/16.
Departmental Safety Office IAN SLACK	Signature <i>[Signature]</i>	Date 9 NOV 2016