# **Standard Operating Procedure (SOP) Title: Gas Chromatography**

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

## **Justifying the hazards:**

Gas chromatography (GC) is a common type of chromatography used in analytical chemistry for separating and analysing compounds that can be vaporized without decomposition. It is also known as vapour-phase chromatography (VPC), or gas–liquid partition chromatography (GLPC).

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| 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** use damaged equipment or glassware. Refer to SOP for Use of Glassware.
* **DON’T** start the procedure before familiarising with SOP for Compressed gasses.
* **DON’T** adjust gas cylinders, these are set up by technicians.

## **Procedure:**

# **Before the procedure:**

1. Switch on the GC instrument and the software.
2. Select the instrument settings and conditions for gas chromatography.
3. Prepare five or more calibration standards.
4. Prepare the sample.

# **During the process:**

1. Inject the standards and the sample in to the instrument using the autosampler.
2. Run the software.

# **After the procedure:**

1. Analyse sets of samples along with five or more calibration standards.

## **Disposal:**

If any chemical waste is produced, ensure it is disposed of via the appropriate chemical waste stream. All glassware must be cleaned, or disposed of, following SOP for Glassware. Small disposable vials can be disposed of in yellow sharps bin.

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

Lab coat, appropriate 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**

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| Hazard | Raw risks | Current control measures | Residual risk  (Low/Med/High) |
| Glassware and glass parts | Cuts and splinters from broken glass | Visually inspect glassware for cracks and other defects before and after use. If glassware damaged arrange for repair or dispose of. | Low |
| Electrical equipment and cables | Electrocution and electrical fire | Commercial equipment, do not modify.  Ensure regular portable appliance testing (PAT).  Visual inspection of equipment and cables prior to each use.  Immediate clean of any spills.  Ensure plugs, sockets, cables and equipment positioned so as not to be at risk of ingress from liquids.  Ensure a CO2 extinguisher is available.  Ensure easy access to the power supply. | Low |
| Hazardous materials | Exposure to hazardous reagents via inhalation or skin contact | No working with hazardous reagents outside of containment.  Always wear appropriate PPE.  Ensure the fume cupboard and sample preparation areas are cleaned after each use.  (Include hazards and controls of associated reagents in this or separate risk assessment) | Low |
| Heavy item | Crushing injury | Equipment securely located on suitable work surface.  No lifting or moving of equipment. | Low |

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| **Additional control measures to minimise residual risks** | **Implementation date** |
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| **Who may be harmed** | |
| Staff / students ☒ | Cleaners / Engineers ☒ |
| Supporting staff ☒ | Others (specify): |

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| **Emergency procedures** – describe the response(s) required by the user and lab members |
| In the event of an incident involving the **equipment itself,** turn off the power supply, unplug and place a sign on the equipment stating that it is not to be used. Arrange for repair.  **Electrical shock** - switch off power. Do not touch the affected individual until the power is definitely off. Seek immediate medical attention by calling 4444 (+44 20 7589 1000) and contacting nearby First Aid officer. Use non-conductive lever to remove them from electrical source (e.g. a dry wooden broom handle).  **Fire** – If ignition occurs but extinction is managed in a controlled manner, ensure a SALUS report is completed at the earliest opportunity. If the fire is not controllable, you must activate a fire alarm call point and evacuate. Inform Fire Safety Officers or Security of where the fire is and what it involves when they arrive at the building.  Clear up **broken glass** using dustpan and brush, tweezers or other suitable equipment to prevent exposure to the glass then place into the appropriate waste bin (clean or contaminated glassware).  If anyone is injured while using the equipment contact first aider.  If any **cuts or exposures** to hazardous substances, ensure affected area is held under running water for at least 15 mins and the wound is encouraged to bleed, ask for first aid assistance. If water is not available use alcohol free wipe from the First Aid Kit and dress the wound. Seek further medical attention if required.  If **crushing injury** occurs- contact a first aider immediately – use ice/cool pack (if on hand only) to reduce immediate swelling – seek medical attention if required.  **Chemical spills, risks specific to hazardous substances** - dependant on the nature of the chemical. Specific procedures will be outlined on an individual basis on the relevant COSHH form.  (Include emergency procedures associated with the use of hazardous substances if relevant) |

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| Recommended trainings and records: |
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| 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: |
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