

OCDEM, Churchill Hospital, Oxford OX3 7LE

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Head of Department: Prof Fredrik Karpe

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DSO: Sandy Humphreys

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Use of Electrophoresis Equipment

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Basic Safety Considerations

The combination of high voltages and conductive buffer solutions used during electrophoresis, (SDS-PAGE, sequencing, agarose, IEF, blotting, etc.) poses a major potential hazard in the laboratory if used incorrectly. Any contact with exposed live parts, with leaking buffer, or even moisture films could result in a serious shock (equipment operating at 100 volts and 25 milliamps is capable of delivering a lethal shock). Although the incidence of this potential being realized is extremely low, controls to prevent electric shock must be implemented and observed but users should not underestimate the potential seriousness of an accident involving electrophoresis.

All electrophoresis equipment **MUST** be used in accordance with the Manufacturer's instructions and only by trained personnel.

NB: Operators Manuals should be available in the labs for reference.

Equipment

- i) Power supplies should be clearly labelled with their **maximum output voltage**.
- ii) All power packs must incorporate a safety device that disables the high voltage supply when the cover of the tank is opened or removed.
- iii) Multi-outlet powerpacks may be used with multiple electrophoresis devices, providing a safe system of work is followed.
- iv) Gel equipment must be used with a cover in place such that neither electrodes nor buffer chambers are accessible and the equipment is not useable unless the cover is in place.
- v) All connecting leads between power packs and gel equipment must be fitted with shrouded connectors so that live parts are inaccessible. Both the leads and connectors must be correctly rated for the maximum voltage which the power pack in use can deliver. Equipment used above 1000 volts should use 2mm plugs and sockets, equipment used below should use 4mm plugs and sockets to prevent low voltage equipment being used with high voltage power packs.
- vi) Do not use adaptors to allow 4mm plugs to be used in high voltage power packs with 2mm sockets or adaptors that enable unshrouded plugs to be used with deeply recessed sockets.
- vii) Leads must be regularly inspected to ensure that there is no damage to insulation, and that all parts of the conductor are covered.
- viii) Any new power packs purchased should meet the above criteria. It is recommended that the departmental Electrical Safety Supervisors are consulted by users before purchases are made.

In Use

- ix)** Always maintain adequate clearance around the equipment. Do not place other apparatus or perform procedures in close proximity to electrophoresis equipment. Good housekeeping is essential. Set the power pack on a shelf above the gel equipment where possible.
- x)** Keep all electrophoresis equipment as far away from water and water sources as possible. Avoid conductors (sinks, metals plates, aluminium foil, jewellery, pipes or metal equipment), or ground (water taps, pipes, radiators) when working around or near a power supply. Do not touch ANY cooling apparatus connected to a gel; current can be conducted through the tubing.
- xi)** Check the physical integrity of the electrophoresis equipment before use. Power packs should be checked to ensure they are within PAT testing date and the electrophoresis equipment and leads should be in good order with no cracks visible.
- xii)** Follow all the equipment operating instructions and do not disable any safety devices.
- xiii)** Always ensure that your hands are dry before you touch any electrical equipment.
- xiv)** Connect all electrical leads first before turning on the mains supply to the power pack.
- xv)** Connect one lead at a time using one hand only.
- xvi)** Where possible ensure the voltage and current settings are set to zero before turning on the mains supply to the power pack then set power requirements and start electrophoresis.
- xvii)** Identify electrophoresis equipment running overnight with a contact name and telephone number and/or simple instructions for disabling the power supply safely.
- xviii)** Do not rely on safety interlocks to cut power. Never disconnect the leads from the gel equipment with the power supply turned on to interrupt or finish a run. Turn the power off, firstly to the electrophoresis equipment, and then to the power pack and always wait 15 seconds to allow any capacitors to discharge. Where possible confirm that any voltage and current indicators read zero before making any disconnection.
- xix)** If electrophoresis buffer is spilled or leaks from the gel equipment, stop the run by turning the power off, wait 15 seconds, and then clean up the spillage.

xx) Leads must never be left connected to power packs when the electrophoresis run is complete.

N.B. Turn power on last when starting. Turn power off first when stopping.

This policy is written in line with the University Policy Statement S11/07 - Electrophoresis Apparatus.

Review History

Version	Date	Reason for update	Updated/reviewed by:	Date review due
1	24 Jan 2007	New document	SMH	August 2010
2	06 June 2011	Updated university policy	Amy Barrett	June 2013
2.1	13 Mar 2014	Updated Header to RDM	SMH	Mar 2016
2.2	11 th April 2016	Updated HoD, ToC added, no other changes	AB/SMH	April 2018