

**Estates and Facilities Directorate.**

**Safe Isolation of Equipment for Electrical / Mechanical Services**

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29/04/2022	Jon Hudson	No changes made.
04/2021	Jon Hudson	No changes made.
15/06/2020	Noel Mc Sweeney	Updated the reference to L22 - Safe use of work equipment, to latest version
08/05/2019	Jon Hudson	No changes made.
26/04/2018	Jon Hudson	Minor changes to the layout.
22/03/2016	Jon Hudson	No changes made.

**Legal Obligations**

The Electricity at Work Regulations 1989 require precautions to be taken against the risk of death or personal injury from electricity during work activities. To comply with these Regulations the normal working method of carrying out work on electrical equipment or circuits should be with the system powered down and isolated. Live working should only be carried out where it is unreasonable to work with the system dead, such as fault finding and testing where the risks are acceptable and suitable precautions can be taken against injury. In these cases, a Risk Assessment must be completed and a Permit to Work issued.

The Provision of Work Equipment Regulations 1998 (PUWER) also require that every employer shall take appropriate measures to ensure that re-connection of any energy source to work equipment does not expose any person using the work equipment to any risk to his health or safety. The employer is responsible for ensuring that the risk is to any employee using or maintaining work equipment is removed or minimised. This is of particular relevance whilst carrying out maintenance on work equipment, where the likelihood of staff being exposed to mechanical or electrical hazards can be significantly greater than usual.

All personnel involved in the isolation of plant and equipment should be trained and competent to carry out their responsibilities and understand the purpose, principles and practices of safe isolation procedures and associated safety rules.

A permit to work must be obtained from the relevant Campus Facilities Management Office before any isolations are undertaken.

**What is Isolation?**

Isolation means disconnecting the energy supply in a secure manner, thus ensuring that inadvertent reconnection is not possible i.e. the equipment or circuit is 'dead'. When isolating equipment with multiple energy sources, which may include electricity, heat or pressure (e.g. hydraulic, pneumatic or

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steam), then all sources should be taken into account. Where appropriate, a safe method of dissipating stored energy e.g. earthing rods or venting valves should also be considered as part of the isolation procedure.

A key principle of isolation is that the point of isolation should be under the control of the person who is carrying out the work on the isolated equipment.

### Electrical isolation

For low voltage systems (up to 1000 v ac) the means of isolation could be an adjacent local isolation device such as a plug and socket, circuit breaker or fuse, as appropriate, which is under the direct control of the competent person carrying out the work. These methods can be used without further precautions provided there is no foreseeable risk that the supply could be reinstated by others.

When there is no local means of isolation, or the point of isolation is not under the direct control of the competent person carrying out the work, or where there is a risk of inadvertent reinstatement of the supply by other workers, the circuit or equipment to be worked on should be securely isolated and a permit to work issued.

Securing the point of isolation should be by a combination of the following methods:

- An appropriate locking off device and/or padlock with unique key or combination attached to the circuit breaker. Where more than one person will be working on equipment, the use of a multi-lock hasp can be used to prevent access to a main isolator until such time that all persons working on a system have completed their work and removed their individual padlocks from the hasp.
- a locked switch-room door and/or locked distribution panel
- removal of the relevant circuit fuse (may be used with a lockable fuse insert and padlock)
- The above padlocks keys or combinations and removed fuses should be retained by the competent person carrying out the work.

An appropriate notice should be placed at the point of isolation e.g. *“Caution, Do Not Switch On, System Undergoing Maintenance”*. It is also helpful to include the person’s name and contact details (on a write-on section).

**Note:** The practice of putting insulating tape over a switch or circuit breaker to prevent accidental switch on, is **NOT** a safe isolation procedure.

### Proving the isolated equipment or circuit is dead

Following isolation of equipment or electrical circuits and prior to starting work, appropriate tests must be carried out to prove that the parts to be worked on are isolated. It must never be assumed that equipment is isolated because a particular isolation device has been placed in the off position. The test instrument must be proved to be working on a known live source or proprietary proving unit before and after use. All phases of an electrical supply and the neutral should be tested and proved dead.

Care must always be taken to ensure all electrical supplies to the equipment are isolated, some equipment may have additional supplies under certain conditions, e.g. time switches and photo electric sensors which will only switch during the hours of darkness, therefore if the proving dead check was carried out during the day; equipment may become live in the evening.

### Live Working

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Live working should only be carried out where it is unreasonable to work with the system dead, such as fault finding and testing where the risks are acceptable and suitable precautions can be taken against injury. In these cases, a Risk Assessment must be completed and a Permit to Work issued.

### Mechanical and other Isolation Procedures

Where a machine or device is connected to a pressurised piping system e.g. hydraulic (water or oil), pneumatic, steam, or where piping may introduce hazardous products during the servicing or repair process, the piping shall be isolated by closing the local isolating valve or, for higher pressure systems, closing two valves. Where this is not possible then the piping should be disconnected and blanked off or disabled using a suitable device such as inserting a blanking plate between the pipe flanges. In all cases the supply valve must be closed and locked out prior to work commencing. Valves should be locked with a padlock (and chain if required). If the valve cannot be locked off, then the valve handle may be removed and retained by the person carrying out the maintenance. A suitable warning notice such as *"Caution, Do Not Open Valve, System Undergoing Maintenance"* shall be displayed at the isolation point. It is also helpful to include the person's name and contact details (on a write-on section).

Blocking and/or restraints such as chocks or locking pins should be put into place to prevent any parts from moving during repairs. Residual or stored energy must be relieved or restrained prior to repair work commencing, this may include relaxing any springs and relieving any pressure or vacuum. Local gauges should be observed to ensure that the pressure has fallen to zero and/or venting valves used to prove this.

The final step should be to attempt to re-start or re-energize the equipment or machinery to verify the isolated condition. If the equipment does not re-start, then work can proceed.

**Note:** NEVER rely on an interlock device to adequately isolate equipment.

### Further Guidance

L22 (4th Edition) Safe use of work equipment - ISBN 978 0 7176 6619 5

HSG 85 3<sup>rd</sup> Edition. (2013) Electricity at work – Safe Working Practices - ISBN 978 0 7176 6581 5

University of Greenwich Code of Practice - Safety, Health and Environmental Requirements for Contractors.