

Guidance for the Evaluation of Method Statements for Electrical Isolations (Low Voltage Systems)

What is an electrical isolation?

Regulation 14 of The Electricity at Work Regulations 1989 requires that no work is undertaken on or near to a live conductor unless it is unreasonable in all the circumstances for it to be dead.

Covenrty University is committed to this duty and it is a requirement that all electrical conductors on systems before and beyond final distribution boards are made and proven dead before being worked on. This duty is dispensed by isolation procedures and a permit to work system.

The Health and Safety Executive define the term isolated as:

“Equipment (or part of an electrical system) which is disconnected and separated by a safe distance (the isolating gap) from all sources of electrical energy in such a way that the disconnection is secure, i.e. it cannot be re-energised accidentally or inadvertently.”

Hazards in Electrical Work

Contact with Live Conductors – contact with live conductors can result in electric shock which can be fatal. Electric shock can cause muscle convulsions, Ventricular Fibrillation (no heart beat) and Tachycardic Fibrillation (irregular heart beat). Those personnel who receive an electric shock should seek medical attention to confirm that such effects do not pose a risk to their health.

Fire - Sparks from electrical arcing can be of sufficient temperature to ignite materials and flammable substances. If this is not detected it could propagate into a significant fire.

Burns to those working in proximity to live conductors - As electrical energy passes through conductors, the conductor will experience a heating effect due to the natural resistance of the conductor. If the conductor is human tissue this too will experience a heating effect and this will result in internal and external burns. Severe internal burns can lead to fatalities some days after the event.

Secondary injuries from contact with live electrical conductors – those personnel who are working at height or who are working near to a point of fall, may be caused to lose the footing as a result of an electric shock.

Precautions for Electrical Isolation Work

As a **minimum** the following precaution should be applied to all electrical work;

1. All work on electrical systems, prior to final electrical distribution boards, must be subject to the University's Permit to Work System; no other final arrangements or contractors systems should be accepted. The permit shall not be issued until a suitable and sufficient risk assessment and safe system of work has been supplied by the company or individuals undertaking the work. This should be reviewed by the University's Electrical Engineering Team.
2. The University does not permit contractors to undertake their own isolations of electrical systems, other than final circuits fed from final distribution boards and distribution boards with an integral isolator.
3. The University operate a 'No live working' policy therefore any work on the electrical system shall only be undertaken when proven dead. Exceptions to this requirement can only be authorised by the University's Senior electrical engineer.
4. Isolations of electrical systems supplying final distribution boards can only be made by competent persons in the University's Estates Department.
5. Isolations to circuits fed by final electrical distribution boards can be made by contractors without the need for permits to work providing they are undertaken following safe systems of work that meets the requirements of HSE Guidance HSG 85 and the 17th Edition of IEE Wiring Regulations. This shall be undertaken in consultation with the Electrical Engineering team and approval the Project Manager.
6. Caution should be observed when working with older distribution boards and circuit breakers which may contain asbestos containing woven cloth which were used as flash guards. These should not be removed or disturbed as this could release harmful asbestos fibres into the atmosphere
7. Before an isolation is made the appropriate voltage indicator should be proven and tested on a known source to confirm correct operation. GS38 Test Lamps must be proven as working using a voltage proving unit
8. An isolation of the circuit should be made that prevents accidental re-energisation of the circuit. The isolation should be locked off using safety lock and be suitably labelled and fitted with a caution notice. The safety lock and caution notice should be fitted to either Circuit Breakers or the Distribution Board
9. Once an isolation has been made it is essential that the circuit is tested and proved dead at the point of work using an appropriate voltage indicator, which conforms with HSE guidance GS38. It is also required that the appropriate voltage indicator is then proven using the known source (in 5. above) to confirm operation. Where the isolation is completed by the University the circuit will be proven dead.
10. Once the work has been complete the electrical system should be made safe and commissioned prior to the reconnection of the supply. The installation shall be tested and inspected to BS7671 before re-energising.
11. The whole activity should be supervised by a competent individual who has the responsibility to ensure that all of the necessary precautions are implemented and must have received training in relevant work precautions.

Further Guidance

12. Further guidance on the safety in Electrical Isolations can be gained from the University's Senior Electrical Engineer, Safety and Risk Management Team and authorised permit holders for electrical isolations in the Estates Department.
13. Additional guidance is available in HSE publication HSG85 – Electrical Work, Safe Working Practices which can be accessed at <http://www.hse.gov.uk/pubns/priced/hsg85.pdf>