

This Information Sheet provides guidance to Colleges and Professional Services on visual inspections of College / Service 'owned' 3-phase and hard wired (230v) electrical equipment. It also outlines the process that must be followed to ensure formal (by a qualified electrician/competent person) inspection and testing of 'own' 3-phase and hard-wired electrical equipment is carried out.

The Information Sheet forms part of a series of Information Sheets that supports the Safety of Electrical Equipment Policy.

Definitions

For the purpose of this Information Sheet, *3-Phase* and *Hard-Wired* are:

- **3-Phase:** Items of electrical equipment that have at least three conductors carrying voltage.
- **Hard-Wired:** Electrical equipment permanently wired into the mains supply (without a three-pin plug).

Responsibility

The responsibility for ensuring College or Service 'owned' 3-phase and hard-wired equipment is safe, maintained, inspected and operated safely, rests with the relevant College or Service. However, often the College or Service will not be able to undertake formal test and inspection of such equipment as they are not permitted to access the electrical supply. In such cases, the College/Service must appoint a competent person, normally engaged via Estates Infrastructure (EI), to maintain and test the equipment.

Examples of Equipment

This section provides examples of 3-phase and hard-wired equipment found at the University. It is often easy to identify equipment by how they are connected to the mains electrical supply.

3-phase electrical equipment is usually plugged into the following type of mains electrical socket:



Older 3-phase mains connections may look like this:



In the UK, a 5-pin plug will, in most cases be needed to connect to a 3-phase mains electrical socket:



Types of 3-phase equipment at the University include:



Light Soaking Unit



Laser Machines



Engraving Machine



Spot Welding Machine (*cylinders chained (not visible in picture)*)

Hard-wired electrical equipment is physically wired into the 'isolator' providing electrical mains supply without the use of a 'three-pin plug' fitting. The following are examples of fittings with the arrows showing the cable that connects the mains electrical supply to the equipment:



Examples of hard-wired electrical equipment found at the University are:



Milling Machine



Physical Vapour Deposition System



Ultra-Low Temperature Freezer



Floor Mounted Autoclave

1. COMMON QUESTIONS

Q. Frequency of a Formal Inspection and Test

- It is recommended equipment is formally inspected at least annually and tested at least every 5 years. However, frequencies may need to be increased dependent on the environment the equipment is used; for example, wet, dusty, humid conditions which could cause the equipment's condition to deteriorate more quickly, and/or if the unit is moved frequently.

Q. Who should carry out Visual Inspections and a Formal Inspection and Test?

- VISUAL INSPECTION: The person should preferably have some type of electrical or engineering qualification, although someone with experience of working with electrical equipment, for example, a Technician may be sufficient. Central Health and Safety (HS) and/or Estates Infrastructure (EI) can provide initial assistance on how to inspect and what to look for.
- FORMAL INSPECTION AND TEST: As it will be necessary to access electrical isolators, only competent persons (electrically qualified) are authorised to undertake formal inspections and test on such equipment. Normally coordinated by, or approved via, EI.

NOTE: A qualified electrician / competent person must perform all remedial electrical work, repairs etc.

Q. Are there other General Arrangements?

- List all College / Service 'owned' 3-phase and hard-wired electrical equipment.
- Notify EI of the equipment and request that they include the equipment on a (minimum) 5-yearly cycle of 'Test & Inspect' (**note:** a cost may be associated with this). Alternatively, operate an alternative 'Test & Inspect' arrangement, approved by EI/HS.
- Use the list as the basis for a Record Sheet, which also includes when future Formal Inspections and Tests are needed (see below).
- When the Formal Inspections completed, note details on the Record Sheet, with any problems noted and dealt with immediately.
- Fix labels to each item to show inspected or, if unsafe as 'do not use' (see below).

Q. How do I carry out a Visual Inspection?

These are simply checks that look critically at the electrical equipment to check for signs the equipment is not in sound condition, e.g:

- Damage (apart from light scuffing) to the cable sheath/conduit.
- Damaged plug (3-phase and high amp supplies), e.g. the casing is cracking, or the pins are bent or discoloured.
- There are non-standard joints to the cable, including taped joints.
- The outer sheath of the cable is insecure where it enters the plug or equipment. Obvious evidence would be if coloured insulation of the internal core cables were showing.
- Signs the equipment subjected to unsuitable conditions, e.g. it is in wet or excessively contaminated location.
- Signs of damage to the external casing of the equipment or there are some loose or missing parts, covers or screws.
- There is evidence of overheating e.g burn marks / discoloration, burning smell.

Q. What do I do if I find something wrong?

All faults should be reported and the equipment clearly labelled as 'faulty' and taken out of use (see below) to ensure it cannot be used by mistake. It is also important to let others know the item is no longer in use, especially if it could affect someone's work / study activity.

In addition, make a note of the fault and the action taken on the Record Sheet. Then remember to monitor until the matter has been resolved i.e. fixed or replaced.

2. EQUIPMENT USERS

Encourage users of such electrical equipment to carry out a simple, pre-use check to spot obvious problems i.e. burn marks, damaged cables, no evidence of formal inspections and test with concerns reported immediately.

3. FORMAL INSPECTION AND TEST (ELECTRICAL SAFETY TEST)

Normally, every five years EI arranges for a competent electrician to undertake a *Formal Inspection and Test (Electrical Safety Test)* of the hard-wired electrical system in all occupied University buildings. Colleges and Services may include their 3-phase/hard-wired equipment on this schedule.

To do so, you must notify EI of appropriate College / Service 'owned' 3-phase and hard-wired electrical equipment. A competent electrician will perform the Electrical Safety Test, with the relevant College / Service being responsible for the cost of the work.

Record details of the formal Electrical Safety Test (see 4. below).

Alternatively, Colleges and Services may appoint their own competent electrical engineer to undertake the formal Electrical Safety Test. However, only EI can approve such contractors, as they need to access the EI electrical supply and equipment.

4. LABELLING EQUIPMENT AND RECORDING INSPECTIONS AND TEST

Recording inspections and tests will prove electrical equipment has been maintained in the event of an accident / incident involving it. Affix suitable labels to the item following a *Visual Inspection* or *Electrical Safety Test* (see below). These labels also help both those responsible for inspections and testing and users to quickly identify if the item is 'in date' and ultimately safe to use.

Always record your findings. Visit the [central H&S Website](#) for a suggested Record Sheet.

