TAKING CARE OF BUSINESS

Electricity

Introduction

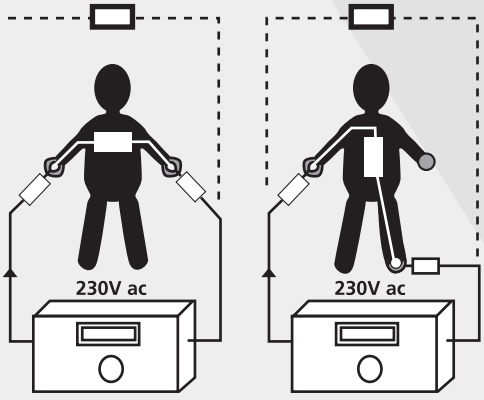
This information sheet will give employers practical advice on managing electricity in the workplace and what can be done to reduce the risk of electrocution (shock or burns) and electrical fires.

Electricity in workplaces is generally supplied at three distinct voltages: 110 volts, 220 volts and 380 volts. The higher the supply voltage the higher the level of risk. However electricity at all voltages, if not managed in a safe way, can present significant hazards to those working with electrical installations or using electrically powered equipment.

How can electricity kill or injure?

Electricity can kill or injure people in four different ways:

- Electric current passing through the body disrupts the operation of key organs such as the brain, heart, lungs and the nerve impulses that stimulate these organs. Even relatively low currents can scramble nerve cell signals so that the heart cannot beat properly, sending the heart into a condition known as fibrillation. A fibrillating heart flutters rather than beats, and is ineffective at pumping blood to vital organs in the body, which can cause serious injury or death.
- If higher voltages or longer exposure is involved, heat is generated within the body and tissues may be burnt. The effect is the same as damage caused by an open flame, except that electricity burns tissue beneath the skin, even burning internal organs causing irreparable damage or death.



Current passing through the body from one hand to the other or from hand to foot will pass through the chest area containing the heart and lungs.

- Muscles triggered by an external (shock) current will involuntarily contract, and there is nothing the person can do about it. If the person contacts a live conductor with his or her hands, the forearm muscles responsible for bending fingers will clench the fingers into a fist forcing the hand to grasp the wire firmly. The person will be completely unable to let go of the wire. This effect can only be stopped by cutting off the current.
- Finally, the heating effects of electricity can cause ignition of flammable or combustible materials leading to fire, which may cause death or serious injury.

Dangerous electrical plug giving rise to risk of electrocution.

Most of us have experienced some form of electric "shock", where electricity causes our body to experience pain. If we are lucky, that experience is limited to tingles or jolts of pain from static electricity build up discharging through our bodies. When we are working around electric circuits capable of delivering high power, electric shock becomes a much more serious issue, and pain is the least significant result of shock.

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How do electrical installations start fires?

Any electric current passing through an item can generate heat. Usually this temperature increase is intended and is used for electric heating, lighting, welding and drying. However if electrical connections are loose, electrical outlets are overloaded or damaged, or if there is a short circuit, heat can be generated to the point where ignition occurs and a fire may start.

Another risk in the case of electrical fires is that they can be particularly tricky to put out; using water to put out the fire can cause electrocution. Many fire extinguishers are not suitable for use on electrical fires. Until the power has been shut off, only extinguishers containing non-conducting extinguishing agents should be used.

Potential ignition source from electrical equipment.

Extinguishers which are suitable for use on electrical fires are:

- Carbon Dioxide
- Dry Powder
- Halon Replacement (Be careful not to select a halon extinguisher which is banned because of its toxic effect on the environment)

Select these extinguishers for buildings or rooms that mainly house electrical apparatus or plant.

How can I prevent danger from electricity?

Installations like these can lead to inadvertent contact and electrocution.

Putting in place a system for checking electrical appliances, leads and sockets on a regular basis and reporting any defects, e.g. scorch marks or frayed leads, will help in identifying any potential problems. Replace or repair any damaged or worn item immediately. Depending on the equipment or installation involved, repairs or extensions should be done by a competent electrician who should test and certify the works when they are complete. It is advisable to have the entire installation periodically checked and certified by a competent electrician and a record of this test should be maintained by the employer in control of the installation.

A means of cutting off power to electrical installations, e.g. fuses or trip switches, must be provided and employees should be made aware of their location.

What are residual current devices (RCDs)?

An RCD protects against serious electric shock if there is an electrical fault in your workplace.

An RCD must be fitted in the distribution / fuse board.

Circuits requiring RCD protection include:

- Socket outlets
- Immersion heaters and electrical shower circuits

RCDs detect 'leaking' electricity from a circuit (e.g. a damaged cable) and respond by disconnecting the electricity supply from that circuit.

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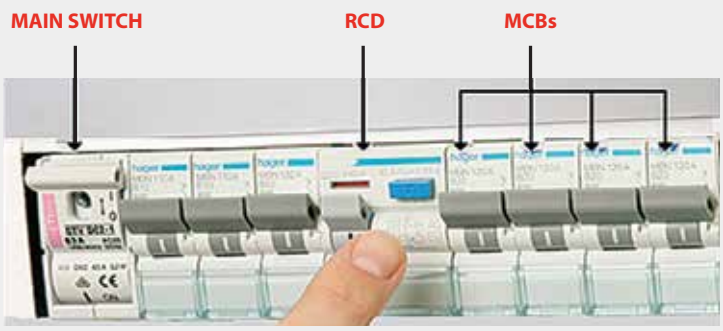

Typical distribution board - MCB (Miniature Circuit Breaker) type.

Check that your RCD is working correctly by pressing the test button marked 'T' or 'Test'. Remember this will cut the power to all socket outlets so make sure no essential work is being done at the time.

Different types of RCDs.

If it is working, power to the socket outlets will immediately switch off. If the RCD fails to trip, it should be replaced immediately by a registered electrical contractor.

What are the requirements for ongoing inspecting and testing?

Testing and certification should only be carried out by a competent person.

Every new installation and every major alteration or extension to an existing installation, after completion and before being made live, must be inspected and tested. However, certain types of test may only be done after an installation has been made live. All the appropriate information, including diagrams of connections, wiring diagrams, charts, tables, schedules and equipment ratings, must be available to the person(s) carrying out the work. Precautions must be taken to ensure the safety of persons and to avoid damage to the installation and equipment during inspection and testing.

Where the installation is an extension or alteration of an existing installation, it must be verified that the extension or alteration does not impair the safety of the existing installation.