

ELECTRICAL SAFETY

Accidents with electricity can have catastrophic consequences. In order to prevent accidents of this kind from occurring, you must be familiar with the tasks and responsibilities of everyone who is involved with work on electrical installations. You should also be aware of the risks and be able to recognise dangerous situations where electricity is involved.

Work on live electrical systems and equipment is strictly prohibited. When working on electrically driven equipment, this must be electrically locked and secured if necessary.

Work safely or don't work at all. There are strict procedures when working on installations and systems. After all, there's a risk for noxious substances to be released. Therefore read the Permit to Work carefully and check if the described control measures have been taken.

ELECTRICITY

- You can't see it
- You can't smell it
- You can't hear it
- If you feel it, it may already be too late

POTENTIAL RISKS

- Electrocution
- Serious burns
- Shock-induced falls
- Fire and or Explosion
- Damage to tools and materials

BEFORE YOU START WORK

- Read, check and discuss the Permit to Work
- Attend the Toolbox Meeting
- Inspect your workplace
- Familiarise yourself with escape routes and assembly points
- Together with the authorised person, check that the equipment you are going to be working on has been made safe in the correct manner
- Take your own measurements to check that the equipment you are going to be working on is electrically dead
- Carry out a last-minute risk assessment (LMRA)

DURING THE JOB

- Check regularly that the workplace is still safe
- Report any changes in the situation to the site manager or supervisor
- If anything in the Permit to Work is unclear, or there are any deviations from it, stop work immediately
- Never improvise!
- Report any defects or damage immediately. This includes defective or loose earth connections
- Always use the correct equipment and tools (NB. zones, ATEX)
- Reassess the situation regularly. Remember that circumstances can change
- Weigh up any risks and dangers
- Respond appropriately
- If necessary, take additional precautions



Many fixed equipment are connected to the plant earth due to safety requirements. Examples include:

- Electric motors
- Cable trays and ladders

Temporary shall be connected to the plant earth as well.

Examples include:

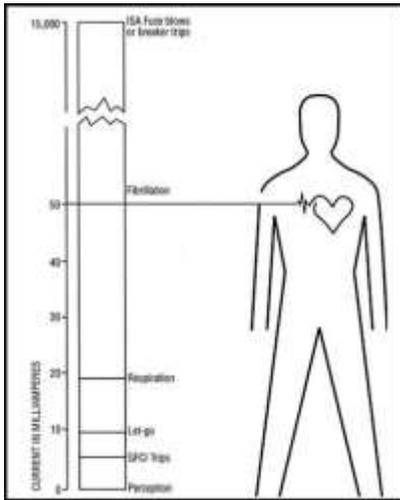
- Scaffolding
- Metal site offices

GENERAL SAFETY TIPS FOR WORKING WITH OR NEAR ELECTRICITY:

- Inspect portable cord-and-plug connected equipment, extension cords, power bars, and electrical fittings for damage or wear before each use. Repair or replace damaged equipment immediately
- Always tape extension cords to walls or floors when necessary. Nails and staples can damage extension cords causing fire and shock hazards.
- Use extension cords or equipment that is rated for the level of amperage or wattage that you are using.
- Always use the correct size fuse. Replacing a fuse with one of a larger size can cause excessive currents in the wiring and possibly start a fire.
- Be aware that unusually warm or hot outlets may be a sign that unsafe wiring conditions exist. Unplug any cords or extension cords to these outlets and do not use until a qualified electrician has checked the wiring.
- Always use ladders made with non-conductive side rails (e.g., fiberglass) when working with or near electricity or power lines.
- Place halogen lights away from combustible materials such as cloths or curtains. Halogen lamps can become very hot and may be a fire hazard.
- Risk of electric shock is greater in areas that are wet or damp. Install Ground Fault Circuit Interrupters (GFCIs) as they will interrupt the electrical circuit before a current sufficient to cause death or serious injury occurs.
- Use a portable in-line Ground Fault Circuit Interrupter (GFCI) if you are not certain that the receptacle you are plugging your extension cord into is GFCI protected.
- Make sure that exposed receptacle boxes are made of non-conductive materials.
- Know where the panel and circuit breakers are located in case of an emergency.
- Label all circuit breakers and fuse boxes clearly. Each switch should be positively identified as to which outlet or appliance it is for.
- Do not use outlets or cords that have exposed wiring.
- Do not use portable cord-and-plug connected power tools with the guards removed.
- Do not block access to panels and circuit breakers or fuse boxes.
- Do not touch a person or electrical apparatus in the event of an electrical accident. Always disconnect the power source first.

HOW MUCH SHOCK CAN WE TOLERATE?

Most people think that high voltage causes fatal shocks, which is not always the case. The amount of current flowing through the body determines the effect of a shock. A milli-ampere (1 mA) is 1/1000th of an amp; a current of 1 mA through the body is just barely perceptible. Up to 8 mA causes mild to strong surprise. Current from 8 to 15 mA are unpleasant, but usually the victim is able to free himself or to "let-go" of the object that is causing the shock.



Readings	Effects
1 mA or less	Causes no sensation - not felt.
Safe Current Values 1 mA to 8 mA	Sensation of shock, not painful; Individual can let go as will since muscular control is not lost.
Unsafe current values	8 mA to 15 mA Painful shock; individual can let go as will since muscular control is not lost.
	15 mA to 20 mA Painful shock; control of adjacent muscles lost; victim can not let go.
	50 mA to 100 mA Ventricular fibrillation - a heart condition that can result in death - is possible.
	100 mA to 200 mA Ventricular fibrillation occurs.
200 mA and over	Severe burns, severe muscular contractions - so severe that chest muscles clamp the heart and stop it for the duration of the shock. (This prevents ventricular fibrillation).

Currents over 15 mA are likely to lead to "muscular freeze" which prevents the victim from letting go and often leads to death. Currents over 75 mA are almost always fatal; much depends on the individual involved; how much muscle mass, body condition and condition of the heart. In the final analysis it doesn't take much current to kill you.

Awareness of electrical hazards is critical to preventing accidents and creating a safer work environment. Following basic safety principles can help to ensure your safety and the safety of those around you.