

Advice for Newcomers

Electrical hazards

GeePs



Illustrations William Augel, Prévention Infos, décembre 2012, n°32



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- Electrical hazards (electric shock, electrocution, burns, fire and electrical arc blast)
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General informations about electricity

Electricity is a flow of electrons circulating in a conductive material thanks to a generator. It is characterized by:

- The voltage **V**

	Very Low Voltage	Low Voltage	High Voltage A	High Voltage B
Voltage Level	$U < 50$	$50 < U < 1000$	$1000 < U < 50\,000$	$U > 50\,000$

- The current **I**
- The resistance **R**
- Ohm's law: **$U = R \times I$**



Electrical hazards : electric shock and electrocution

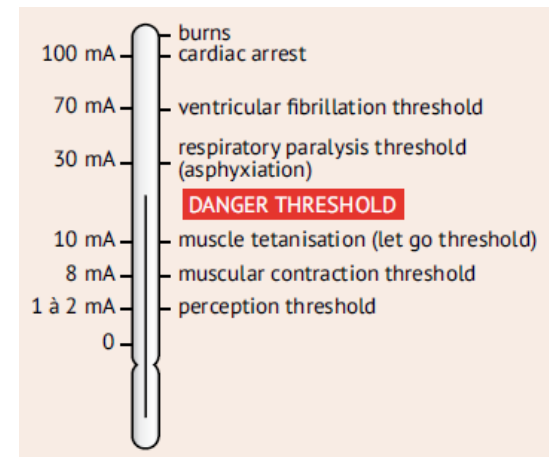
Accidental leakage of current through a person's body (electric shock). It depends of several things:

- The kind of current (DC or AC) and of its level → **current is killing**



- The resistivity of the body
- The path it takes through the body

Effect : muscular tetanisation (the victim can or cannot shout, it is reversible → **electrical shock**), ventricular fibrillation (heart tetany) → **electrocution**





Electrical hazards : electrical burns

Joule effect : heat produced by an electric current through the body

Electrical burns can come from electrical arcs, electrothermal burns, molten metal projection



Electrical hazards : fire and electrical arc blast

- Short-circuits
- Overheating of cables
 - Overloaded electrical circuits
 - Loose or rusted connections
 - Electrical circuits that are not properly insulated



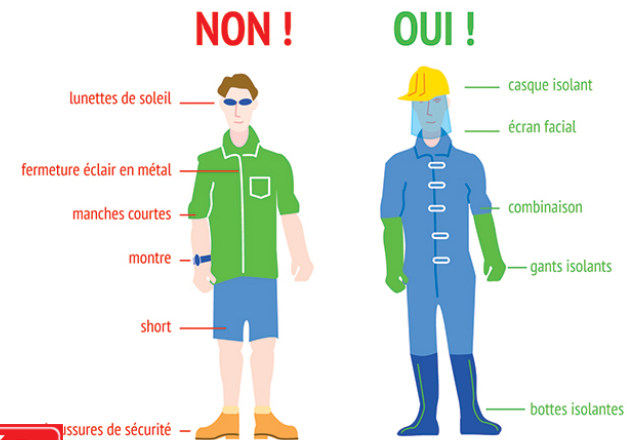
Preventive measures

How avoid accident?

- Collective Protective Equipment (CPE) : Insulation, Guarding, Grounding, Electrical protective devices (switch, circuit breaker, fuses, ground fault circuit interrupter)
- Personal Protection Equipment (PPE) : insulating gloves, glasses, protective clothing untreated natural fiber, safety shoes

Rescue resources

- Emergency stop
- Main breaker
- Follow-up the emergency procedures
- ► First-aid



SOINS AUX ÉLECTRISÉS

→ NE PERDEZ PAS UNE SECONDE ←

PROTÉGER

Soustraire la victime aux effets du courant par mise hors tension.
Si la mise hors tension n'est pas possible par le sauveteur, prévenir le distributeur.

TOUTE INTERVENTION IMPRUDENTE DU SAUVETEUR
RISQUE DE L'ACCIDENTER LUI-MÊME.

SECOURIR

ASSURER LA RESPIRATION

La victime est inanimée et ne répond pas. Thorax et abdomen sont immobiles



Basculer prudemment la tête en arrière et soulever le menton



Observer, écouter, apprécier le souffle



Observer, écouter, apprécier le souffle



Évacuation éventuelle de corps étrangers en position latérale de sécurité



Massage cardiaque si nécessaire par sauveteur formé et entraîné

ALERTE

Suivant consigne préalable

POLICE :	HOPITAL :	DISTRIBUTEUR :
GENDARMERIE :	MEDECIN :	
POMPIERS :	RESPONSABLE :	

Ne jamais abandonner les soins avant l'arrivée des secours spécialisés






Good Practices

How avoid accident?

- Prevention/behavior
 - Electrical installations must be checked
 - Do not overload sockets with multiple devices
 - Before doing any work ensure that the electrical installation is switched off
 - Only use equipment that is in good condition
 - Electrical certification (see for training courses)

- Different classes of protection

Class 0	The use of this type of equipment is prohibited in the workplace.	
Class I	Protection is provided by the equipment earthing.	
Class II	Protection is provided by double insulation.	
Class III	Protection is provided by a safety extra-low voltage power supply.	

- Lower the voltage to a secure level