Electrical Shocks

Generally everyone fears receiving an electrical shock, quite simply because the instance can be distressing, physically harming and in some cases fatal.

An electric shock in humans comes about when the human body or parts thereof become/act as an electrical conductor. Fundamentally, the human body comprises mostly a saline solution, i.e. salty water, and since salty water is a fairly good conductor of electricity, so is the human body.

The key parameter when evaluating the severity of an electrical shock is 'electrical current' since electrical current constitutes a flow of electric charge, i.e. the movement of subatomic particles.

A further key parameter to consider is electrical voltage, since akin to the flow of water through a pipe (electrical current flowing through a conductor), electrical voltage can be considered akin to water pressure that stimulates water flow.

So given that the conductivity of the human body remains constant, electrical current flow will increase as electrical voltage increases.

The kinetics of physical movement of muscles within the human body comes about due to small electrical impulses (electrical current) conveyed and injected into muscles. So when the human body is inadvertently injected with 'stray' electrical current as during the course of an electrical shock, muscles react in a way to oppose or override those electrical impulses conveyed by the human brain. In other, more simple terms muscle movement becomes spasmodic.

IEC 60479.1 sets out the magnitude and format of electrical current that, when injected into a human body, those physiological effects an electrical current will bring about over a period of time.

To simplify, an electrical current of 50 milli-amperes, i.e. 50 thousands of one (1) Ampere, will over a period of one (1) second provoke pathophysiological effects such as cardiac arrest, breathing arrest, burns or other cellular damage.

Given analysis of the diagram and table below we can also comprehend other pathophysiological effects relative to injected electrical current and time.

In conclusion, no one wants to be the receiver/victim of an electrical shock, so I hope the latter may explain be helpful and indicate how dangerous electricity is.

With my kindest regards

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Robert is an accomplished professional Expert Witness having prepared and presented many court compliant reports and presented oral evidence within the High Court, Crown Courts and County Courts.

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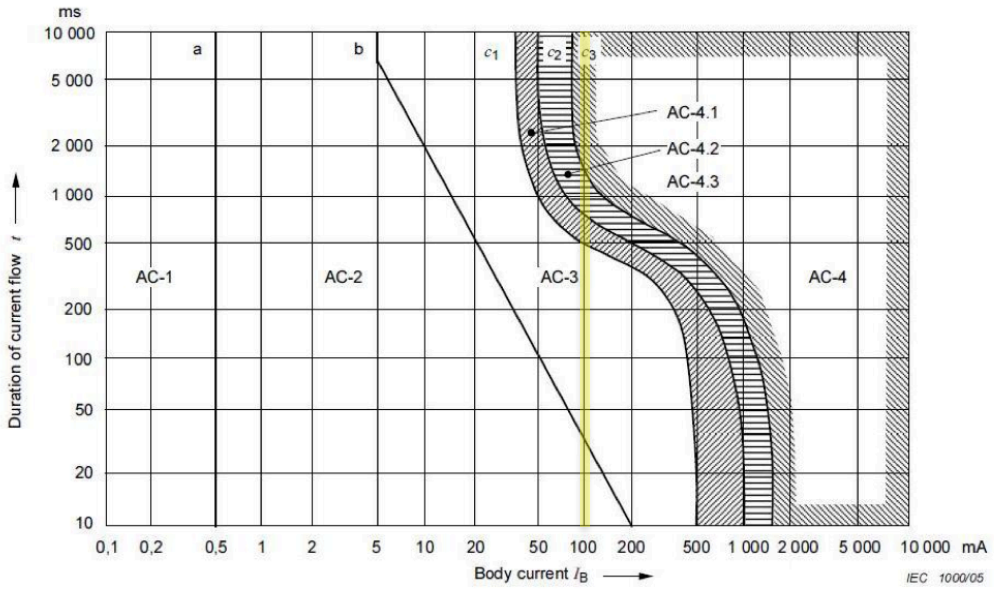
Data indicating the pathophysiological effect relative to electrical current



IEC TS 60479.1:2010 Conventional time/current zones of effects of a.c. currents (15 Hz to 100 Hz) on persons for a current path corresponding to left hand to feet

Zones	Boundaries	Physiological effects
AC-1	Up to 0,5 mA curve a	Perception possible but usually no 'startled' reaction
AC-2	0,5 mA up to curve b	Perception and involuntary muscular contractions likely but usually no harmful electrical physiological effects
AC-3	Curve b and above	Strong involuntary muscular contractions. Difficulty in breathing. Reversible disturbances of heart function. Immobilization may occur. Effects increasing with current magnitude. Usually no organic damage to be expected
AC-4 [1)]	Above curve c_1	Patho-physiological effects may occur such as cardiac arrest, breathing arrest, and burns or other cellular damage. Probability of ventricular fibrillation increasing with current magnitude and time
	c_1-c_2	AC-4.1 Probability of ventricular fibrillation increasing up to about 5 %
	c_2-c_3	AC-4.2 Probability of ventricular fibrillation up to about 50 %
	Beyond curve c_3	AC-4.3 Probability of ventricular fibrillation above 50 %
1) For durations of current flow below 200 ms, ventricular fibrillation is only initiated within the vulnerable period if the relevant thresholds are surpassed. As regards ventricular fibrillation, this figure relates to the effects of current which flows in the path left hand to feet. For other current paths, the heart current factor has to be considered.		

Summary of zones in the ***graph "Conventional time/current zones of effects of a.c. currents (15 Hz to 100 Hz) on persons for a current path corresponding to left hand to feet"***