

Attachment 2 – Electrical Hazards

Electrical Shock

Accidental contact with exposed electrical parts operating a voltage greater than 50 volts to ground and having a current greater than 5 milliamperes can cause serious injury or death. Fatal ventricular fibrillation of the heart can be triggered by a current flow of as little as several milliamperes. Severe injuries, such as deep internal burns, can occur even if the current does not pass through the vital organs or nerves.

Delayed Effects

Damage to the internal tissues may not be apparent immediately after contact with the current. Delayed internal tissue swelling and irritation are possible. Prompt medical attention can help minimize these effects and avoid death or long-term injury.

Arc Flash

When an electric current passes through the air between two conductors, the temperature can reach 35,000°F. Exposure to these extreme temperatures can result in life threatening burns. The majority of hospital admissions due to electrical accidents are from arc-flash burns, not electrical shocks. Arc-flashes can and do kill at distances in excess of 10 ft.

Arc Blast

The tremendous temperatures of the arc cause an explosive expansion of both metal and the surrounding air in the arc path. For example, copper expands by a factor of 67,000 times when changed from a solid into a vapor. The dangers of this explosion are of high blast pressure wave, high decibel levels of sound and high velocity shrapnel. The material and molten metal is expelled away from the arc at speeds exceeding 700 miles per hour. Arc blasts often cause severe injuries and death.

Other Burns

Other burns suffered in electrical accidents are of two basic types: electrical burns and thermal contact burns. In electrical burns, tissue damage (whether skin deep or deeper) occurs because the body is unable to dissipate the heat caused by the current flow. Typically, electrical burns are slow to heal. Thermal contact burns are those normally experienced from skin contact with the hot surfaces of overheated electric conductors.

Hazard Controls Used