

## Electrical Safety...

Electrocutions are few in this country, about 1,000 per year, but there are 30 times that many people injured through electrical shock. Portable, electrically-operated tools account for the second largest number of injuries, with the plug or cord at fault in two-thirds of the accidents.

It is important to realize when you issue or rent an item, you are liable for those defects of which you are aware, as well as those which would have been disclosed by reasonable investigation.

### Leakage Current

One of the most important checks to be sure a tool is safe, is for excessive leakage current. Leakage current flows from the internal wiring to metal portions of the equipment housing or enclosure.

The skin offers a barrier to the flow of leakage current. It is not until the voltage exceeds about 48 volts that a hazard exists. At a common supply voltage of 120 volts, current can easily pass through the skin. Once the current starts to flow, the skin's resistance decreases further, allowing an increasing flow of current to pass through the body.

### Perception Current

One milliamperes (1/1000 of an ampere) will be felt by most individuals as a slight tingling sensation. A defective hand drill or floor polisher might allow this amount of current to flow through a person standing on a dry wooden floor. Not bothered by it, he continues to use the equipment, until he happens to touch a water connection, heating register, metal window sash or other grounded metal object. He has now completed the circuit to ground and a much larger current will flow through his body.

### Shock Level

If only five milliamperes (1/43 of the current required to operate a 25 watt lamp) flows through his body, it will result in a violent muscle reaction, throwing him away from the equipment.

### Let-Go Current

If the current is much above 10 milliamperes, the person will lose his ability to release his grip on the electrical equipment. While the heart normally can continue to function, fatigue sets in, followed by death if no help is available.

### Electrocution

At about 100 milliamperes (less than half that used by a 25 watt lamp) ventricular fibrillation occurs, the muscle fibers lose control and the heart is no longer able to pump blood.

### Safety

The levels of current for perception, let-go and ventricular fibrillation vary widely from person to person. The above figures are based on the standard reactions of normal, healthy individuals. The effect of electrical shock on a child, elderly or sick person is much more severe. Even very small amounts of electric current can startle a person, causing him to spill hot liquid, fall from a ladder, or jump back into a greater hazard. For this reason, most manufacturers of electric tools, appliances and motors follow Underwriters Laboratories recommended maximum leakage current of 0.5 milliamps.

Any tool which is found to have leakage current in excess of 0.5 milliamperes should be immediately identified with a red tag as unsafe, and repaired by qualified personnel in accordance with the manufacturer's recommendations prior to returning to service.