



# FS/NAAF GARRISON SAFETY OFFICE

## *Outsmart the Darkness: Your Weekly Safety Spotlight*



# Electrical Appliances

We use electrical appliances every day at work—from brewing coffee to printing documents. While convenient, these appliances can pose electrical hazards if not used properly.

## Math and Science Behind Electricity

### Electrical Terms Defined

- **Watts:** Measurement of amount of power an electric device consumes or what it takes to actually do something “Electricity at Work”
- **Volts:** Measurement of electric potential or “pressure” at which electricity flows through a system
  - In the United States, homes and workplaces are typically supplied with 120 volts and 240 volts
- **Amps:** Measurement of the “flow rate” of electrons moving through an electrical system
  - Typically, home and offices have 15, 20 or 30 amp breakers on circuits that control the flow of electricity to outlets and circuits
- **Ohms:** Measurement of the resistance of the flow of electrons
  - All conductors have some built in resistance.

### Ohm's Law

- All of the above are interconnected and are a function of each other.
  - Given a standard 120V Electrical System in the US, If an appliance requires more power (Watts) to operate, the flow rate (Amps) must be increased.
  - If the resistance inherent in the conductor is not reduced (for example a larger wire), then over time, heat builds up.

## Common Office Appliances and Electrical Requirements

### Lower Draw

- Desk Fan—20-75 Watts—.2-.6 Amps
- Desk Lamp—40-100 Watts—.3-.8 Amps
- Computer Work Station—15-300 Watts—.5-2.5 Amps
- Phone Charger—5-15 Watts—.04-.12 Amps

### Higher Draw (Should be on dedicated circuits/plugged directly to wall outlet)

- Printer—150-800 Watts—1.25-6.7 Amps (Draw will spike during printing)
- Copier/Multifunction—300-1500 Watts—2.5-12.5 Amps
- Microwave Oven—600-1200 Watts—5-10 Amps
- Coffee Maker—600-1200 Watts—5-10 Amps
- Small Space Heater—750-1500 Watts—6.25-12.5 Amps

## Using Office Electrical Appliances Safely

### Pay Attention to Wattage and Amperage

- Circuit Breaker Ratings: Common Office Circuit Breakers are either 15 or 20 Amps
  - Using Ohm's Law ( $P=VI$  where **P** is Power in Watts, **V** is Energy in Volts, and **I** is Current in Amps) you can calculate how many Watts you can safely put on a single circuit
    - $120V \times 15A = 1800W$  for a 15 Amp Circuit
    - $120V \times 20A = 2400W$  for a 20 Amp Circuit
  - This is why it is required that single high Wattage appliances (Microwaves, Space heaters, Refrigerators etc) are required to be on dedicated circuits, plugged directly into a wall outlet
- Just like Circuit Breakers, power strips, surge protectors and extension cables are rated for certain Amperages which should be followed in order to safely operate the appliance that is plugged into them