

U.S. Fire Administration / National Fire Academy

*Coffee Break Training***Topic: Electrical Safety**

Learning objective: The student shall be able to compute electrical loads on branch circuits.

One fire safety concern is the potential for electrical equipment to overload a circuit resulting in overheating and fire. Although circuits often are well protected by overcurrent protection devices (“circuit breakers” or fuses), the potential still exists for accidents.

Electrical branch circuits usually are rated to handle loads of 15 or 20 amperes maximum capacity before the overcurrent protection device operates. Fire inspectors can perform a quick check of the potential hazard on a circuit by looking at the appliances connected to it, and using a simple mathematical formula:

$$W/V = A$$

Where,

W = Watts

V = Volts

A = Amperes



Wattage ratings usually can be obtained from the electrical nameplate on an appliance. In the United States and Canada, branch circuit voltage nominally is 120 or 240 volts. Dividing watts by volts will give you a relative idea if the branch circuit is “overloaded,” that is, if it has too much current draw for the overcurrent protection.

Here’s an example: During an inspection, you find a microwave oven, coffeemaker, table lamp, and a television plugged into one 120-volt outlet protected by a 15-ampere fuse. Is this too much load for the circuit if all the devices are operating simultaneously? You examine the connected appliances and find the following information:

Appliance	Rated Wattage
Microwave oven	720
Coffeemaker	850
Table lamp	75
Television	70
Total wattage	1715

Divide 1715 watts by 120 volts,

$$1715/120 = 14.29 \text{ amps}$$

Therefore, this load would be permitted for this circuit. You should always consult a competent electrical inspector or engineer if you have questions. For additional information, refer to NFPA 70, *National Electrical Code*™.