

Electrical Safety

May 2010

Introduction

Improper use of extension cords and surge protectors can present a serious fire safety hazard in the workplace. According to the National Fire Protection Association (NFPA), electrical distribution equipment, such as extension cords were the second leading cause of fire deaths in the U.S. between 1994 and 1998. The most common cause of fires from extension cords is improper use and/or overloading, especially when the cord has multiple outlets.

The 2007 California Fire Code Chapter 6 Section 605 addresses the use of extension cords, power taps, surge suppressors and multi plug adaptors. By following the guidelines below the risk of fire due to overloaded or improperly used extension cords or surge protectors can be greatly reduced.

Extension Cords

Approved Extension Cords **Must:**

- a. Be Underwriter Laboratories (UL) listed.
- b. Be at least 12-14 gauge wire and not be less than the rated capacity of the appliance.
- c. Have a ground wire and cannot be bypassed or rendered inoperable.
- d. Be used only for temporary situations, such as laboratory experiments lasting no longer than 90 days, and not be used in place of permanent wiring.
- e. Connect to only one portable appliance. Portable means easily moved from one place to another during use.
- f. Connect directly into a wall receptacle.
- g. Be protected from exterior damage. Examples include environmental (weather) and physical (foot traffic).

Extension Cords **Must Not:**

- a. Be longer than 100 feet.
- b. Have more than one receptacle on each end.
- c. Be frayed, deteriorated, spliced or modified.
- d. Pass through walls, doors or windows.
- e. Be stapled or attached to a floor, wall, or ceiling.
- f. Be connected in series.
- g. Create a tripping or other safety hazard.
- h. Be unprotected where exposed to foot traffic, moving wheels, or falling debris to minimize tripping hazards and damage to the cords.
- i. Be in a cable tray that is not intended for power cables.

Power Taps

A Relocatable Power Tap (RPT) or power strip is a variation of an extension cord, where the cord terminates in a row or grouping of receptacles. Power strips are commonly used in offices to provide multiple receptacles to office equipment. In general, the policies pertaining to extension cords also apply to power strips.

Power Taps Must:

- a. Be of the polarized or grounded type, having over current protection.
- b. Be UL 1363 listed.
- c. Be connected directly to a permanently installed receptacle.
- d. Be protected from exterior damage. Examples include environmental (weather) and physical (foot traffic).

Power Taps Must Not:

- a. Be frayed, deteriorated, spliced or modified.
- b. Pass through walls, doors or windows.
- c. Be connected in series.

Surge Suppressors/Protectors

Surge suppressors are commonly found in areas where the consistency of the electrical current is vital. The surge suppressor monitors electrical equipment, such as computers, and protects them from fluctuations in the electrical current supplied by campus. It is important to recognize that not all surge suppressors are power taps. The important distinction is the presence of over current protection in the form of a circuit breaker. If the surge suppressor also contains this over current protection feature, and the surge suppressor is UL listed for that feature, it may be used as a power tap. Be sure the total wattage of all connected devices does not exceed the total wattage rating on the surge suppressor.

Surge Suppressors/Protectors Must:

- a. Be equipped with an automatic circuit breaker. Outlet strips with fuses or without over current protection are not acceptable.
- b. Have a cord no more than 15 feet long and must be directly plugged into a wall receptacle. Any cord over 15 feet must be approved by the UC Davis Fire Department.
- c. Be protected where exposed to foot or wheel traffic to minimize tripping hazards and damage to the cords.
- d. Be UL 1449 listed "Transient Voltage Surge Suppressor"

Surge Suppressors/Protectors Must Not:

- a. Have higher wattage appliances connected such as coffeepots, space heaters, microwave ovens, hot plates, refrigerators, or copy machines.
- b. Be connected in series.

When choosing a surge protector, look for the following:

1. **The UL 1449 Suppressed Voltage rating:** This number reflects the amount of voltage the surge suppressor will let through to your connected equipment after "clamping". The lower the rating, the higher the safety.

500V - Good

400V - Better

330V - Best

2. **Stages of Protection/Surge Current Rating:** UL 1449 does not tell you how much surge current (in amps) can be handled or how quickly the suppressor will clamp. With multiple stages of protection, different components are used to suppress a surge. The more stages, the more surge current can be handled. The surge current rating in amps lets you know the maximum amount of surge current that can be safely handled by the suppressor. The higher the number, the better the rating.

1 stage - Good

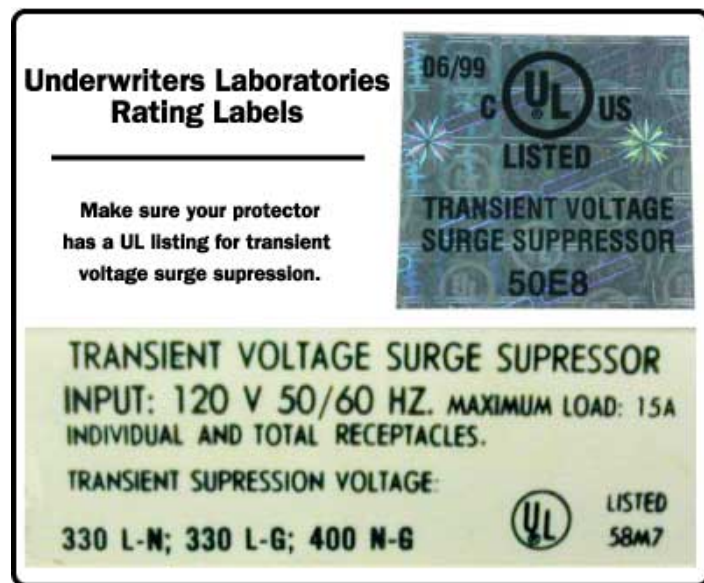
2 stages - Better

3 stages - Best

3. **Clamping Response Time:** How quickly does the suppressor respond.
Nanosecond (billionths of a second) – Better

Picosecond (trillionths of a second) – Best

Example of U/L Label



Multi Plug Adaptors

UC Davis Fire Department does **not** authorize the use of multi plug adaptors.

If you have any questions, please contact the UC Davis Fire Prevention Office on campus at (530) 752-2059 or at the Medical Center at (916) 734-3036.