

## Electrical Safety in Classrooms and School Offices

*The classroom of the 21st century is loaded with tools that create a tremendous need for electrical power. Computers, projection equipment, video, audio, telecommunications, FM broadcast and transformers require an abundance of power throughout the classroom and school office environments. In addition, heating, ventilation, and air conditioning add to the load. These power demands were not considered in many schools that are in use today so it is important that clearly defined ground rules for the proper use of electricity in the classroom be established.*

Not only can electrical devices bring an increase in employee injuries (i.e., shock and burns) they are also a common source of school related fires.

Some basic precautions may help keep staff and students safe. It is important to establish standards and present clear instructions to staff repeatedly so that behaviors are changed. Make it clear that electrical appliances are to be used correctly or not at all. Common situations that may lead to employee and student electrical injuries include:

### **Temporary Wiring**

Older school buildings were likely built with power outlets that are not adequate to accommodate the equipment used in modern school settings. School staff may sometimes improvise to put power where they want it rather than using what they have.

- Extension cords are for temporary use only<sup>1</sup>. They are not intended to replace permanent wiring. Cords on the floor are a trip and fall hazard and can often be found around teachers' desks or computer labs.
- Power strips are commonly used to connect computers and multiple pieces of electrical equipment to a single outlet. Quality devices often include surge and over-ampage protection features. Plug each power strip directly into an outlet, and do not use as an extension cord or connect them to another power strip<sup>2</sup>.

#### **Rules for Extension Cords and Power Taps**

- *Unplug and put away when not in use*
- *Keep cords out of walking paths*
- *Never under carpet or through doorways*
- *Never above ceiling tiles, or through walls*
- *Power taps plug directly to outlets*
- *Never daisy chain taps together*
- *If a cord is hot, it's overloaded*

### **Heat Sources**

Portable equipment with electric elements intended to get hot are commonly used for heating, cooking and illumination. Keep heat sources in good working condition, away from combustible materials and turned off and put away when not attended.

- Electric space heaters are typically used to warm work areas that are not considered adequately heated by school staff. They are often placed under desks. School fires have been started by space heaters and their use is not recommended. Ideally, the maintenance staff will be able to operate the heating and ventilation system so that all work areas are provided with adequate heating and cooling.

If space heaters are allowed, set requirements for them to be approved by Underwriters Laboratories. Some safety design features include being equipped with an automatic shut-off timer switch, automatic shut off upon tipping over and a high temperature shut off. Require that all heaters be unplugged when unattended and kept clear of all combustible materials. Check that the power cord is heavy duty and not damaged<sup>3</sup>. Consider allowing only district-provided heaters, no space heaters at all or allowing only approved heaters if needed. If choosing the last option, recognize that it takes staff time to monitor and approve heaters.

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- Cooking devices including hot plates, toaster ovens, coffee pots, electric skillets, microwave ovens, popcorn makers and other similar appliances are generally kept in specialty rooms equipped as kitchens, such as teacher lounges. Discourage personal classroom coffee pots. Hot ovens and coffee pots have caused staff burn injuries and have started fires. Coffee pots with automatic timer shut offs are recommended.

- Lamps including pole lamps or other home décor lamps are sometimes brought into the classroom as an alternative to the illumination provided by overhead florescent lamps. These lamps could tip over, their cords can be tripped over and they can put hot bulbs within reach of students and staff.

It is recommended that no lamps be brought in unless they can be secured and protected. If heat lamps are needed to warm animals or reptiles make sure the fixture is installed and maintained according to the manufacturer's guidelines and is also securely installed with adequate separation from combustible materials or skin.

- Overhead projectors are giving way to video projection but are still in use in some schools. The bulbs of these projectors might get hot and burn users or ignite papers stacked next to the projector. Unplug them when not in use or unattended.

### **Damaged Equipment**

Report and/or repair missing or damaged electrical components, such as:

- Grounded power cord without its ground prong
- Separated electrical conduit with exposed wiring
- Electrical conduit without end caps
- Broken or cracked electrical outlets
- Loose outlets, not securely installed
- Three-wire power cord plugged into an adapter
- Extension cord end plug is damaged
- Broken light switch
- Missing outlet or switch cover plates

### **Electric Service Equipment**

The distribution system including the main service, transformers, circuit panels and sub-panels provides power for lighting fixtures, equipment and outlets.

The system is normally under the control of the school staff. These simple rules may help reduce the potential for staff injuries:

- Outlets & Switches that have missing cover plates, cracked components or loose installation that can increase the potential for shock or burn injuries are recommended to be repaired immediately.

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- Panels with open slots, missing cabinet doors or damaged breakers can expose staff to live electrical components. Do not routinely use breakers as switches and correctly label the breaker service areas<sup>4</sup>. Keep the area in front of the panel clear for 36" to provide access<sup>4</sup>.
- Transformers, though not typically accessible, are sometimes installed in closets or service areas. Since these cabinets produce heat it is recommended that the area around them be kept clear of combustibles and that the units are not used as steps to access high shelves.

### Summary

The safe use of electricity in classrooms and offices may help provide educators with the tools they need for teaching and learning. Help reduce the potential for employee and student injuries by establishing and enforcing simple electrical device safety rules. Post the rules so everyone knows what is acceptable and what is not. Be on the lookout for new technologies introduced to the school or new employees unfamiliar with the existing rules. It is all part of the today's high-energy safe school environment.

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### References

1. Consumer Product Safety Commission, Extension Cords Fact Sheet <http://www.cpsc.gov/cpscpub/pubs/16.html>
2. Guide Information for Electrical Equipment, The White Book 2011, UL Product Categories Correlated to the 2008 and 2011 National Electrical Code® Page 428 – Relocatable Power Taps
3. NFPA 70 E Standard for Electrical Safety in the Workplace 400.3 (B), and Table 400.15 (A) (1) Working Spaces
4. OSHA 209 CFR 1910.303 Subpart S, Electrical, General Requirements