

ES&H Guideline

Protecting workers in the workplace
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Heater tape and other flexible heating devices



What is the purpose of this guide?

This guideline reminds qualified personnel of safety issues related to installing and operating heater tape, heater blankets, and similar flexible heating devices. These devices are typically used for baking out vacuum systems, controlling the temperature of gas cylinders, deicing applications, etc. For the purposes of this guideline, heater tape includes all similar flexible heating devices, including blankets. This guideline is for personnel who have completed electrical safety training and work with heater tape and other flexible heating devices.

What safety dangers exist with Heater Tape?

Heater tapes can pose several hazards. By design, these devices can become hot enough to cause burns or possibly ignite combustibles (such as clothing and fabric). The electrical elements in heater tape can pose a potential shock hazard to personnel if not used properly. With prolonged use, these elements can fray to the point where strands of heating wire protrude through the protective insulation. In addition, the insulating material used in these devices pose a hazard—fiberglass and aluminosilicate fiber insulation can cause irritation to the skin or respiratory tract. Other potential hazards can arise from the device design or installation methods.

How to safely install and operate heater tape

Conduct a hazard analysis before each installation to identify unique hazards. All installations must follow these minimum precautions:

Before Installation:

- All systems composed of electrically conductive elements must be properly grounded before applying heater tape. Department/area safety personnel or the SLAC Electrical Safety Officer (x2039) can provide guidance on proper equipment grounding.
- De-energize and follow lock-out/tag-out procedures for the heater tape's energy source prior to installation or removal.

- Use proper Personnel Protective Equipment (PPE) as required to mitigate hazards posed by the insulating materials. Department safety personnel or the SLAC Industrial Hygienist (x4105) can provide guidance on the proper handling of these materials.
- Use one of the following personnel protection methods to prevent or mitigate electrical shock hazards:
 - Use of a ground-fault circuit interrupter (GFCI) on all heater tape installations. If the heater tape is used with a Variac, the **GFCI must be placed upstream** of the autotransformer to operate properly (See Figure 1). Note that custom devices meeting UL943 can be used as a GFCI after review by SLAC Electrical Safety Committee and approval of the SLAC Electrical Safety Officer.
 - Cover the installation with a grounded conductive shield. Only personnel who have completed electrical safety training can then work on the system.



Figure 1:
GFCI/Variac Combo

During Installation:

- Follow the manufacturer's installation and operating instructions carefully.
- Do not cut or alter the heater tape length. Altering the tape's length will change wattage, and can cause overheating.
- Do not cross or lap heater tape directly over itself or another tape. Excessive heating could occur and the heater tape would burn out.
- The installation must be clearly marked with safety signs to identify the hazards (for example, "Voltage Present – Do Not Touch," or "Danger – High Temperatures Present," etc).

Operating heater tape:

- Before each use, inspect the heater tape. Replace it if there are any signs of excessive wear, brittleness, or deterioration: discolored or burnt surfaces, especially at the plug; charring, cuts, breaks or unraveling in insulation; or exposed conductors.

Questions?

If you have any questions, please contact the Electrical Safety Officer at Ext. 2039. Principal ES&H Coordinators are listed in the ES&H Resource List on the web at:

<http://www.slac.stanford.edu/esh/resource.pdf>