



## LABORATORY SAFETY GUIDELINE

### Hot Plate Safety

Hot plates used in labs present many potential dangers, such as burns, fires, and electrical shock, which can cause injuries, significant disruption of lab operations, and loss of scientific data.

	<p><b>Burns</b></p> <ul style="list-style-type: none"> <li>The hot plate is a source of heat when on, and for some time after it has been turned off. The temperature of the heated plate can reach 500°C and can cause severe burns.</li> </ul>
	<p><b>Electric Shock</b></p> <ul style="list-style-type: none"> <li>Touching the hot plate with the power cords can melt through the insulation and cause electric shock.</li> </ul>
	<p><b>Fire Hazard</b></p> <ul style="list-style-type: none"> <li>Electrical spark hazard from either the on-off switch or the bimetallic thermostat used to regulate temperature, or both, are a design flaw issue in older hotplate models. If the equipment sparks near combustible or flammable materials, fire could result.</li> <li>Exercise caution when heating flammable materials.</li> <li>Hot/stirrer plates have an additional risk if an operator accidentally turns on the wrong feature.</li> <li>Hot plates are NOT explosion proof or intrinsically safe.</li> </ul>

#### Basic Precautions:

- Only use hot plates that have been approved by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriter's Laboratory (UL).
- Read the manufacturer's instructions before using and consider registering the device with the manufacturer so you will be notified of any warnings or recalls.
- Periodically inspect equipment prior to use:
  - Do not use if the plug or cord is worn, frayed, or damaged, if the grounding pin has been removed, or if a spark is observed.
  - Check for corrosion of the thermostat, which can cause a spark.
  - Test the function of the "off" switch on each hot plate to verify that it works and the device cools quickly when the switch is in the "off" position.
- Use only heat-resistant, borosilicate glassware, and check for cracks before using. Do not place thick-walled glassware, plastic containers, soft-glass bottles or jars on a hot plate.
- Ensure that the hotplate's electrical cords and, if using, the temperature sensor probe wires, do not come in contact with the hot plate surface.
- TURN OFF the hot plate when not in use. The surface of a hot plate stays hot for some time – and looks exactly the same as a "cold" plate. Hot plates that have been left on, or hotplates where the user has mistakenly turned off the stirrer function, but not the hotplate function, are the sources of most hot plate related injuries and incidents.

#### Tips for Working Safely with Hot Plates:

- Avoid unattended use of hot plates when possible. If unattended heating cannot be avoided, consider the use of an additional feedback system such as pre-set timers or automatic high temperature shut-off.
- The hot plate surface should be larger than the vessel being heated.
- When you are bringing liquids to a boil, adding boiling stones will help facilitate the process.
- Be careful when condensing the material in a vessel until it's completely dry. If there is too little moisture and the vessel remains exposed to heat, it will eventually crack.
- Use a medium to medium-high setting to heat most liquids, including water. Do not use the high setting to heat low-boiling liquids.
- Heating of flammable liquids should be performed using an exposure control device, or a certified fume hood. If it is necessary to boil a solvent, use a condenser rather than an open beaker or flask.
- Provide secondary containment for any flammable liquids being heated to prevent liquid from contacting the hot plate in the event of a leak or overflow.
- Do not heat strong oxidizing materials in oil baths. A reaction could occur in the event of a leak or overflow.
- Ensure that when only the stirrer function is being used that it is verified that the heating element is turned off.