

Hot Plates

Hot plates are used to heat many different types of materials. To be used safely, they must be used correctly. The following are some important tips for safe use.

Intrinsically safe: It is important to understand that the vast majority of hotplates are not intrinsically safe. This means that if flammable liquids are used with the plate in such a way that flammable vapors are generated around the plate (i.e., recrystallizations), the hotplate can serve as a source of ignition and fires can result. Explosion-proof hot plates, with hermetically sealed housing, can prevent fires by isolating the source of ignition from evolved vapors. Use of explosion proof hotplates is not required at UMass, however, it is strongly encouraged. Open heating of solvents on a hotplate must always be performed in a chemical fume hood that has adequate room to provide appropriate airflow around the hotplate to ensure that flammable vapor concentrations do not reach the lower explosive limit. Only have in the fume hood what you need for the work you are actively performing to ensure optimal airflow.

Tips for Working Safely with Hot Plates:

- If you are using hot plates for oil baths, please check the oil bath fact sheet for more information: <https://ehs.umass.edu/institutional-standard-operating-procedures-and-guidelines-work-particular-hazardous-materials-and>
- Do not store flammable or combustible materials near a hot plate.
- Do not use old hot plates manufactured prior to 1984. Consider using explosion-proof (i.e., intrinsically safe) hot plates or those with additional safety controls.
- Consider periodically testing the function of the “OFF” switch on hot plates.
- Do not leave the hot plates on and/or plugged in when not in use. Always switch to the “OFF” position and unplug the hot plates when not in use.
- Use thermal gloves or tongs when removing items from hot plates. Do not touch heated objects or the hot plate with bare hands or non-thermal gloves. Let items cool before handling them when possible. Alert all lab occupants about unattended hot objects.
- Do not heat a metal pan or foil on a hot plate to an excess of 200°C. Doing so can damage the hot plate.
- Household hot plates are not permitted to be used in a lab. All hot plates must be UL rated.
- Always check for cracks before heating on a hot plate. Do not heat cracked glassware on hot plates.
- Never heat materials on a hotplate beyond the manufacturer specified safe temperature use range.

- Do not use damaged, malfunctioning or unreliable hot plates in labs, such as units that have worn plugs or cords that are frayed or damaged. Please fill out a surplus equipment disposal request (<https://www.umass.edu/wastemanagement/surplus-property-disposal>) to dispose of these items or ensure these are repaired according to manufacturer's recommendations.
- Do not allow electrical cords and temperature sensor probe wires to contact the hot plate surface when it is hot.
- When using hot plates with external temperature sensor probes, clamp the temperature probe securely in the item being heated. If the temperature probe is reading ambient temperature instead of the temperature of the item that is being heated, the hot plate will continue to heat beyond the set-point.
- Make sure the hot plate surface is larger than the item being heated to prevent overtaxing of the heating element and to ensure even heating.
- Plug hot plates directly into GFCI (Ground Fault Current Interrupter) outlets whenever possible and try not to use a power strip or extension cord to plug in a hot plate.
- Stir bars, boiling stones, or constant agitation should be used for mixing/providing a nucleation site when possible to prevent superheating and splattering
- Do not use a hot plate in a cluttered fume hood. Fume hoods that contain many items can create dead-zones of air movement where explosive levels of flammable vapors can accumulate. Hot plates also need to have enough clearance to allow for heat dissipation.
- Arrange the equipment in your lab to provide a clear workspace. Do not reach over the hot plate to access other equipment. Plan your procedure and arrange items in order of use.
- Never heat hazardous items (including flammable, corrosive, and toxic materials) on hot plates outside of a chemical fume hood.
- Never vigorously boil volatile solvents, such as ether, in open containers on a hot plate. Consider using intrinsically safe hot plates for any processes that require heating of flammable liquids in open containers (e.g., recrystallizations).
- Read manufacturer's instructions before using the hot plates.
- Do not modify hot plates yourself and always place them on a clear horizontal surface.
- Pay close attention to any recall notices for the hot plates and take appropriate action.