

## Safe Use of Heating Apparatuses in Labs

### In General:

- Prior to each use, inspect any cords for damage including the grounding pin.
- Do not have any flammable chemicals near the setup when heating.
- Do not leave a heating apparatus unattended (if necessary, follow the Overnight Heated Reactions Protocol from Elliott Safety Rules).
- Use only heat-resistant appropriate glassware for heating, and always inspect the glassware for cracks before use.
- Make sure heating devices are turned OFF and unplugged when not in use.
- Always turn off/unplug and clean up spills immediately to prolong the life of the heating apparatus.
- Always heat flammable liquids in a fume hood.

### Heating Mantles:

- Inspect heating mantle for any visible damage to the fiberglass insulation, casing, and electrical cords. They are generally not repairable, if there are any visible defects or exposed wires, discard the mantle.
- Never plug a heating mantle directly into a 110V or any other electrical outlet. Always use a separate grounded variable voltage device to regulate the current.
- Be careful not to exceed the recommended input voltage by the mantle manufacturer.

### Hot Plates:

- Inspect the hotplate for defects/corrosion
- Ensure the hotplate surface is larger than the glassware being heated
- Occasionally test the hotplate knobs to ensure the "OFF" position is correct and fully cools the apparatus
- Make sure the cords etc are safely away from the hotplate surface to prevent melting/spark.
- Do not place metal foil on the hotplate, damage or spark could result.
- Do not use a high setting to heat low-boiling liquids.
- A cold hotplate looks the same as a hot one! Be careful of burns. Hotplates take a while to cool back down.

### Oil Baths:

- Oil baths are the most hazardous heating method and are not recommended unless necessary. They pose an increased fire hazard and burn hazard compared to a heating mantle or hotplate. The oil also makes the glassware harder to handle and increases the risk of spills/breakage.
- Never heat an oil bath beyond the flash point of the oil. The temperature of the oil bath must always be monitored. If the oil bath smokes, that indicates it is being heated too far and is unsafe and should be discarded once cool.
- Ensure the risk of water getting into the oil bath is minimized as that can result in splattering.
- Avoid overfilling the bath with oil, the vessel should only be 2/3 full when the glassware is immersed in the oil.
- Store the oil away from heat sources and make sure to label it properly, including the flash point.
- Inspect the oil prior to each use, if it appears dark/cloudy, do not use.