

Oil Baths



Oil baths are commonly used in synthesis to provide a very even and steady source of heat that is important for thermodynamic and kinetic control of many reactions. However, oil baths can also pose a potential for serious fire and injury risk in research laboratories, particularly when used improperly or neglected. Whenever possible, please use other alternatives, such as aluminum blocks, sand baths, and metal beads instead of oil baths. If you must use oil baths, be aware of the hazards and what you need to do to mitigate these.

Hazards:

- Hot temperatures and fire.
- Skin burns can be caused by spilt or splashed hot oil.
- Serious splattering can be caused by accidental additions of water or solvents to hot oil.
- Flasks in the oil baths can be slippery.
- Oil spilt on the floor and not properly cleaned up can be a slipping hazard.

How to minimize the hazards?

- Always use oil baths in a properly functioning chemical fume hood.
- Use silicone oil only. Mineral oil and pump oil are not permitted. Silicone oil has higher flash point (600.8 °F/316 °C), which will not catch fire as easily as mineral oil or pump oil, which can have flash points as low as (212 °F/100 °C).
- Make sure thermal gloves are readily available and in use when using oil baths.
- Avoid handling hot oil baths to prevent burns.
- Wear safety glasses, lab coats, closed-toe shoes, and long pants.
- Do not overheat the oil bath. Only use at recommended temperature with monitoring (i.e., a thermometer or thermistor). Do not leave oil baths heating unattended on a unit unless it is equipped with a temperature feedback loop.
- Change the oil if it becomes contaminated or shows signs of discoloration or turbidity. Dispose of used oil as hazardous waste.
- Do not overfill the oil bath. Depth should be no more than two-thirds of the container height.
- Clamp the reaction flasks with an adjustable clamp. Avoid using small open reaction vessels to avoid spilling and contamination of the bath.
- Never use water to put out an oil bath fire. Smother oil bath fires with a cover if possible, or close the sash to the fume hood and let these burn out.
- Store the oil bath away from heat sources and covered to prevent breakdown of the oil and contamination.

- Ensure water does not leak into oil baths from reflux condensers or other sources. Use spill guards (i.e., a lid constructed of metal or other appropriate material on the oil bath that has an opening to place the container that is being heated through) if possible to minimize spills and contamination of baths.
- Clean up all spills. Use paper towels to absorb the majority of the oil, and then wipe down the spill area with paper towels wetted with hexanes to remove oil residue. Wait until oil and affected surfaces cool before cleaning.

Examples

GOOD



BAD

