Rev. Mar 2017 K. Mikkelsen

# Laboratory Ovens Standard Operating Procedures

## 1. Instrument Hazards and Best Practices: Ovens (including vacuum oven)

This document will cover the inherent hazards when utilizing this piece of equipment as well as the best practices and procedures to avoid danger. These hazards will not include basic things that may be included in the basic safety training document that each user has attested to have reviewed at fom.wwu.edu/documents

**Lab coats are to be provided by the user unless special hazards exist in which case they are located at the PPE station.**

**Hazards:**

- Elevated Temperatures (Up to 300 C)
- Vacuum (only on Thermo Lab-Line)

### 1. Required PPE

Appropriate laboratory attire is required at all times in the AMSEC laboratories. Whenever chemicals are being used, an additional requirement of a lab coat is required. Lab coats are to be provided by the user.

Whenever a user is in the AMSEC labs, the minimum requirement for eye protection is wrap around impact glasses. Anytime liquid chemicals are present in the same room as the user without a direct barrier, all users in the lab must wear chemical splash goggles. Splash goggles must be approved by State of Washington Administrative Code (WAC 296-155-215).

If chemicals being used are considered toxic, caustic, corrosive, flammable solvents, carcinogenic, mutagenic, or teratogenic, a minimum of disposable nitrile gloves is required. Avoid chemical transfer by taking off gloves when using anything other than the chemical(s).

### 2. Elevated Temperatures

The ovens operate from room temperature up to 300 C. Avoid touching the ovens while at temperatures above 50 C. Avoid touching anything inside the ovens when at temperatures above 50 C. If it is necessary to touch or move things in the oven at elevated temperatures, wear the appropriate heat resistant gloves. There are heat resistant gloves at the PPE station and there should be some near the ovens. Do not set anything hot directly on a lab bench. Always place on a metal tray. Whenever possible, use metal tongs to remove/move things from the oven unless this would create an unsafe situation where the item can be dropped.

Never leave the door open while the oven is in operation. Always make sure the door is latched securely. Keep anything flammable or combustible away from the ovens.

### 3. Vacuum

The Thermo Lab-Line oven has a vacuum pump hooked up. It is a chemically resistant, dry pump (no oil). To ensure no damage to persons or the pump, it must never be running at atmospheric pressure for very long, it should only pump on things. Never put samples under vacuum if the gas will be trapped inside and present a potential bursting hazard. Make sure all contents placed under vacuum can evacuate the gas inside safely without “bumping”. Bumping occurs when the gas is trapped and suddenly releases all at once, this can often happen with very viscous substances or if the liquid is exposed too rapidly to the vacuum. When placing a sample under vacuum, do it as gradually as possible.

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# Operating Procedures

1. Ensure that the oven is not in operation by another user.
2. If the oven is not on, but has samples in them, ensure that nobody has left a note stating their intentions and then empty the oven. Be sure to leave a note if you have any concerns and to let someone know when you will be done with the oven.

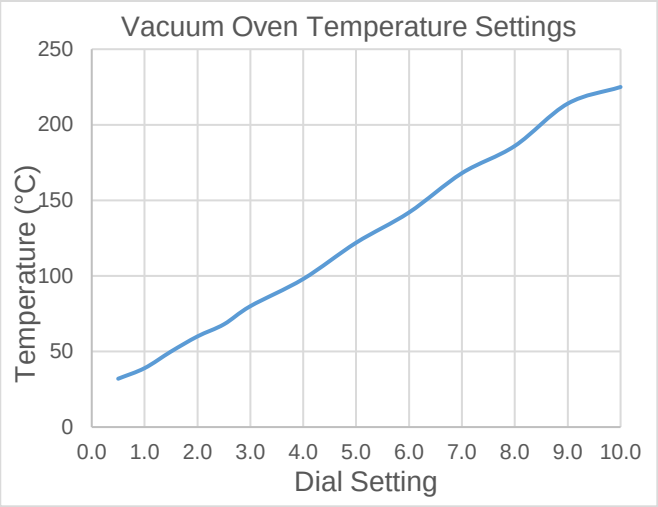
**Thermo Precision Oven**

3. Load samples into the oven. Close the door after.
4. Turn the power to the oven on.
5. Change the set point by holding the “set” button and using the up and down arrows to change the temperature.
6. Turn off oven and remove samples when done.

**Binder Oven**

3. Load samples into the oven. Close the door after.
4. Turn the power to the oven on.
5. Change the set point by holding the “X/W” button until SP displays, then release the button and use the up and down arrows to change the temperature. Press the “X/W” button again when the set point is correct.
6. Turn off oven and remove samples when done.

**Thermo Lab-Line**




3. Load samples into the oven. Close the door after.
4. Turn the power to the oven on.
5. If the oven is to be used without the vacuum, make sure the vacuum selector knob is set to “system closed”.
6. Turn the dial to the appropriate setting. The dial doesn’t inform you of what temperature it will go to.
7. To use the oven with vacuum, ensure that the vacuum exhaust line is fully submerged in the water in the flask behind the pump. If not, add water.
8. Turn the pump on with the selector knob at “system closed”. Ensuring the door has a tight seal, change the selector knob to “Evac.” You will need to press on the glass on the door for a few seconds to ensure the door seals properly. Do not do this while the oven is hot without a heat resistant glove.
9. Ensure that the chamber has sealed well by watching how vigorous the pumping is. The bubbles in the flask are a good indicator as well as how loud the pump is. If it doesn’t quiet down after ~5 minutes, the seal may not be good and you should try again.
10. **Never** grease the door seal. It will cause the seal to slide and ruin the sealing capability of the oven.
11. When finished, turn selector knob to “purge” and wait until the chamber is at atmospheric pressure. Knob should be left in “system closed” when not in use.
12. Turn off oven and pump and remove samples when done.