

## STANDARD OPERATING PROCEDURES

## High-Temperature Muffle Furnace

**DO NOT use this machine unless you have received authorization from the Shop Coordinator**



Fire-resistant (cotton) lab coat or long sleeves must be worn at all times.



Heat-resistant gloves must be worn at all times.



Safety glasses must be worn at all times.



Sturdy closed-toe footwear

**Potential Hazards and Injuries**

- ⚠ Fire or explosion (trauma/burns)
- ⚠ Molten rock/hot surfaces (burn hazard; oven reaches 1000+ °C)
- ⚠ Fumes (respiratory hazard)
- ⚠ Electrical shock (high voltage)

**Pre-Operational Safety Checks**

- ✓ Locate and ensure you are familiar with the manual for operating the MSI K1700X furnace.
- ✓ Check that the work area is clean and clear of grease, oil and any flammable or combustible material.
- ✓ Check workspace to ensure no slip/trip hazards are present.
- ✓ Ensure that the sample delivery arm swings freely and without obstruction throughout its range of motion.
- ✓ Check that the alumina cooling block is in good condition without full-thickness cracks.
- ✓ Inspect all graphite crucibles for adequate integrity before using them to melt samples.
- ✓ Ensure that heat-protective PPE is in good condition (e.g., no cuts, tears, burns, melts, cracks, or kinks)

**Safe Practices During Operation**

- ✓ Always wear appropriate heat-resistant PPE when manipulating the furnace or samples.
- ✓ Materials between 200 – 1600 °C will not always glow or appear hot but will cause severe tissue damage with improper handling.
- ✓ Always use furnace tongs to move heated crucibles.
- ✓ Always keep furnace door closed, except when adding or removing samples.

**Ending Operations and Cleaning Up**

- ✓ The furnace will automatically ramp down in temperature after being on for 17 hours. DO NOT turn the furnace off manually, as rapid cooling can damage internal elements.
- ✓ Ensure that graphite crucibles are cleaned of sample matter.

**DON'T**

- ⊗ Place any materials that may off-gas or combust into furnace chamber.
- ⊗ Do not set heated materials onto the workbench surfaces. Leave heated crucibles on the refractory brick while cooling.
- ⊗ Don't use faulty equipment; report it immediately.

***SOP must be used in conjunction with an effective training program***