



# MCRCD/HREC Safety

---

## Personal Protective Equipment (PPE)

The following PPE will be worn at all times while working on or near the system:

No loose fitting clothes. Avoid flammable clothes (synthetics)

Sturdy work boots

Safety glasses that meet ANSI Z87.1

Personnel must have the following PPE in their possession at all times, and wear when appropriate:

Hearing protection

Work gloves

The following PPE will be stored in a readily accessible location nearby to be used as required in the SOPs for specific tasks:

Hearing Protection

P100 Respirators

Specialty gloves such as nitrile or high temperature rated

Carbon monoxide monitor

## Worksite Cleanliness

- Avoid any accumulation of wood chips or other debris around the feed system, within the container, or general operating area
- Tripping hazards should be promptly cleaned up or marked with orange cones.
- Keep tools organized

# Warning: Maintenance Hazards

The gas circuit is under vacuum pressure and at high temperatures during operation; doing any of the above while the machine is hot will introduce air into the gas circuit where it can mix with hot combustible gases, cause internal fires and explosions, and/or release enough carbon monoxide to seriously harm the user.

While the gasifier is hot (whether in operation or stopped), **do not:**

- remove the ash collection vessel
- open the ash inspection view port
- open the reactor access door
- remove the cyclone ash can

These operations must not be done until the exposed parts of the gas circuit, such as the cyclone, are cooled to the point of being safe to the touch. Cooling may take half an hour or more, depending on ambient temperatures.

## 1.1 Carbon Monoxide

The gas left in the gas circuit after the machine has cooled down will still be rich in carbon monoxide, which is a poisonous gas as well as a fire hazard. Carbon monoxide exposure is also a risk when refilling the hopper. Always have adequate ventilation and do not do Power Pallet maintenance in the presence of open flames and sparks. When opening the reactor or any portion of the gas circuit, be sure to have the blowers turned on to a low setting to draw the gases away from the work area. Be sure to have the carbon monoxide detector near by when maintaining the machine to alert you to dangerous concentrations of carbon monoxide.

Wear a NIOSH approved respirator when opening these systems

Operations that may involve a Carbon Monoxide hazard will be indicated with the following sign:



## 1.2 Re-establishing air-tight seals

Everything that can be unsealed and opened by the Power Pallet operator in the course of maintenance must be re-sealed with an air-tight seal because air leaks are hazardous to the machine. Examples of such seals include

- the hopper lid,
- the cyclone ash can,
- the gas filter lid
- the hose connections to the filter and its lid

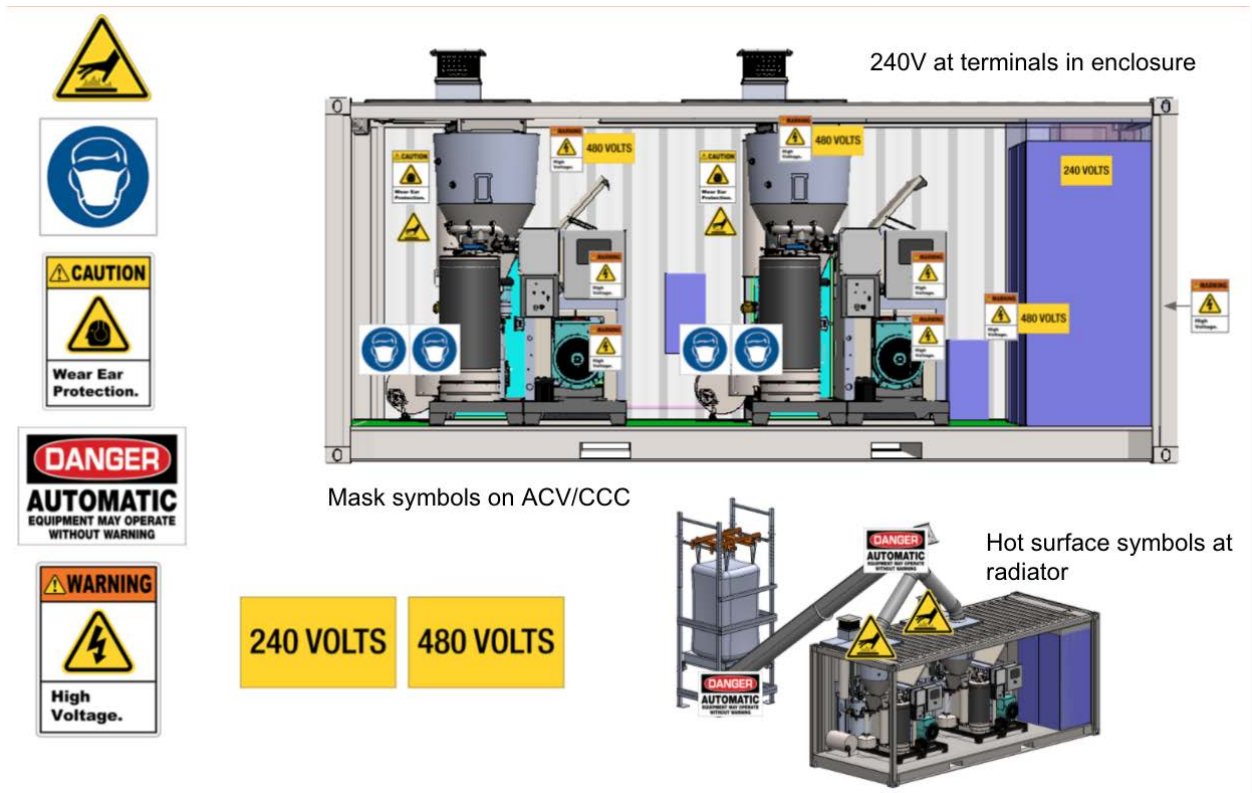
- the reactor access door
- the ash collection vessel connection and ash removal port
- the gasifier viewport

Air leaks can cause internal fires that cause irreversible damage to the machine.

## Fire

A charged 5 lb CO2 fire extinguisher should be located at the corner of the container. Two 2.5 gallon water extinguishers are placed by the power pallets

## Labelling



Safety labels should be installed at the following locations.

Sign/Label	Size	Source	
Hot Surface Label			
Mask Label			

CAUTION: Wear Ear Protection Label			
DANGER: Automatic Equipment May Operate Without Warning Label			
WARNING: High Voltage Label			
240 VOLTS Label			
480 VOLTS Label			