ENVIRONMENTAL
HEALTH & SAFETY

SAFETY GUIDELINE
Autoclaves

This document is intended to help you prevent the occurrence of injury or other incident during autoclave use.

Autoclaves use high heat and pressurized steam to destroy microorganisms.

Burn Hazards!

High Temperature:
- Steam
- Surfaces
- Items
- Liquids

Explosion Hazards!

Pressure and Heat plus:
- Air Tight Containers
- Improper Loading
- Door Malfunctions
- Oxidizers

Other Hazards!

Physical Hazards:
- Heavy Lifting
- Pinch, Impact, Cut

Inhalation or Contact:
- Chemicals
- Biologicals

Crucial Considerations

- *Training should be provided* before any new user is allowed to operate the autoclave on their own. Always document training events.
- *Strictly follow* the manufacturer's *manual/instructions* along with departmental, program, or laboratory *specific procedures* associated with the autoclave itself and the materials you wish to autoclave.

- *Always wear personal protective equipment* (PPE) appropriate for the hazards. Examples include: goggles or face shields, nitrile gloves, lab coats, *thermal mitts* (pictured here), and closed-toe shoes.
- *Report all error messages or malfunctions* to your supervisor and whomever oversees the autoclave. *Post an "Out-of-Service" sign* to prevent use until repairs are made.
- *Ensure materials to be autoclaved are compatible* with peak autoclave temperatures and pressures. Polyethylene is not compatible with autoclaving, as seen in this image of a melted five gallon carboy. The table below lists examples of non-compatible materials. Unsure if your material is compatible? Simply contact UNMC EHS at 402-559-6356 or unmcehs@unmc.edu for additional guidance.

Examples of Materials that are Non-Compatible with Autoclaving			
Organic Solvents	Flammables	Corrosives	Sulphates
Toxic, Radioactive or Volatile Materials		Non-Stainless Steel	Nylon
Polyurethane	Polyethylene *(pictured above)*	Hypochlorite (Bleach), Chlorides, Chlorine	
Polystyrene	Polyvinyl Chloride	Acrylic	Dry Combustibles
Carcinogens or Mutagens		Strong Acids or Bases	
Note: Some biohazard bags, laboratory bins, and other lab plastics are not autoclavable. Dry combustible goods (gloves, paper, etc.) may burn on dry autoclave cycles in the absence of liquids.			

Loading and Unloading Best Practices

Before Loading or Unloading

- Check status indicators and messages.
- Confirm chamber pressure is zero.

While Loading or Unloading

- Utilize PPE. *Stand away from the door and open it slowly.* Steam, heat, and potentially hazardous fumes may rush out.

Content of Autoclave Loads

- Use *secondary containment* to avoid compromising the autoclave interior due to leaks, spills, or melting.
- Liquid containers should not be filled beyond ≈ 50% of their total volume, otherwise they are at risk for boiling over (pictured on right).
- Use lead free autoclave indicator tape Hazardous Material Fact Sheet, Autoclave Tape PDF

- *Pressure build up within tightly sealed items can cause explosion or implosion* (pictured on left). Caps/lids or closures should be secure but also loose enough to allow air flow.
- *Avoid stacking and overloading/overpacking.* Always leave space between items and autoclave walls. Steam must be able to penetrate all areas of the autoclave load to properly sterilize it entirely.
- *Promptly unload your materials* at the end of the autoclave process to free up the equipment for others.
- *Avoid unloading autoclaves if the contents within are of unknown identity to you.* Unknowns pose a risk for potential injury and some materials may require special handling or additional processing immediately post autoclaving.

Questions? More Information? Contact: UNMC EHS at 402-559-6356 or unmcehs@unmc.edu