AUTOCLAVE SAFETY
Why Autoclave Safety is Important

• Autoclaves become very familiar to lab workers. Over time, familiarity can make it easy to forget their potential hazards:

1. Burns from hot pressurized steam
2. Exposure to biological organisms
3. Injury due to equipment malfunctions
Know Your Autoclave

• Each autoclave has unique characteristics, so before using an autoclave for the first time it is important to read and thoroughly understand the owner’s manual.
Sterilization Confirmation

- To show that the autoclave is sterilizing its contents, autoclave tape can be used that changes color when the proper temperature has been attained.

Some companies (i.e. Fisher Scientific, Boreal Laboratories, etc.) sell sterilization indicator tapes that are impregnated with chemicals that only change colors after the temperature has been held at 121°C. Additionally, it is necessary for the pressure to be held at 15 psi for the duration of sterilization.
Sterilization Confirmation (Continued)

• The best way to ensure the autoclave is working properly is to perform routine maintenance as described by the manufacturer.

• This should include MONTHLY efficiency test with biological (i.e. *Bacillus stearothermophilis* spore testing) or chemical indicators (e.g. Sterigage) that verify proper temperatures and times have been reached in the autoclave to kill microorganisms.

• These indicators should be buried in the center of a load to validate adequate steam penetration.
What should be Autoclaved?

- All infectious or dangerous medical and biological waste should be autoclaved prior to disposal including:
  1. Blood or blood products
  2. Pathological waste (cell cultures, tissue samples, etc.)
  3. Cultures and stocks of infectious agents
  4. Biotechnological by-product effluents
  5. Contaminated animal bedding
Infectious or Physically Dangerous Medical and Biological Waste Picked Up by EH&S

- Contaminated animal carcasses/body parts
- Sharps

Call EH&S at 575-5448 for pick up.

Sharps containers are available from EH&S.
Do NOT Autoclave:

1. Corrosive materials (e.g., acids, bases, phenol)
2. Solvents or volatile materials (e.g., ethanol, methanol, chloroform)
3. Flammable materials
4. Radioactive materials
For Efficient Sterilization

• Bags should be partially open during autoclaving to allow steam to penetrate the bag and contact its contents.

• Fully close bag after autoclaving
Before Autoclaving:

1. Check the autoclave for items left by a previous user.
2. Load the autoclave as recommended by the manufacturer.
3. Make sure bottles are not overfilled to prevent boiling over.
4. Load items in a tray that will catch spills.
5. Loosen caps of bottles with liquids
Before Autoclaving (continued)

6. Always place items in a tray on a rack in the autoclave.

7. Make sure the door is fully closed and select the correct cycle.

8. Add water to trays of bottles for even heating.

9. Ensure plastics are autoclaveable.

10. NEVER attempt to open the door while the machine is operating!
After Autoclaving

1. Be sure steam pressure is down before opening the door.

2. Wear heat-resistant gloves. **DO NOT** use gloves that are wet or have holes.

3. Open the door slowly, keeping head, face, and hands away from the opening.

4. Wait at least 30 seconds before reaching or looking in.
After Autoclaving (Continued)

5. For non-liquid loads, let cool 15 minutes before touching without gloves.

6. For liquids loads, let stand 1 hour before touching without gloves. Let others around know a heat hazard is present.

7. Remove solutions slowly.

8. Clean up any spills immediately.
After Autoclaving (Continued)

9. If possible, set autoclaved materials inside a fume hood. This will prevent the breathing of vapors from the heated materials and reduce odors.
Disposal

For steam sterilized infectious waste:

• Liquids (if not agar) may be poured down the drain

• **DO NOT** pour liquid or solid agar down the drain!

• Semi-solid and solid materials sterilized in an autoclave bag must be placed in a plastic bag to be **disposed of as regular lab waste**.

• All “Biohazard” labeling must be removed or covered.

• Glass must be in separate puncture-proof, leak-proof containers and labeled as “Glass.” Call EH&S for pickup.
Disposal (Continued)

Biohazardous waste which has not been disinfected chemically or by steam must be incinerated.

Contact EH&S for pickup - 575-5448.
Record keeping

Records of maintenance, use logbooks, calibration results, and efficiency tests (*Bacillus stearothermophilus* load tests or chemical indicators) should be kept for a minimum of three years.

*Logbook example:*

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>User/Lab</th>
<th>Cycle</th>
<th>Material Autoclaved</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/13/06</td>
<td>3:27 p.m.</td>
<td>Carla S. / Dr. Fathepure</td>
<td>Liquid</td>
<td>Media</td>
</tr>
<tr>
<td>2/14/06</td>
<td>9:16 a.m.</td>
<td>Ron A. / Dr. Smith</td>
<td>Dry</td>
<td>Trash</td>
</tr>
</tbody>
</table>
Protect Yourself

DO NOT eat, drink, or apply cosmetics (i.e. lip balm) in work area to prevent ingestion of hazardous substances.

DO NOT handle contact lenses while in the work area to prevent absorption of chemicals into the eyes.
Routes of Entry

- Absorption through the skin
- Inhalation via the respiratory system
- Ingestion into the digestive system
- Contact with eyes, mucous membranes, or cuts
Injuries

• Severe Injury, burns to the face, third-degree burns, or burns over large areas of the body, call 911.
• For less severe burns or injury, seek First Aid from the lab supervisor, or seek treatment at the Pat Walker Health Clinic located on the NW corner of Garland Avenue and Maple Street. Phone: 575-4451
Questions about autoclaves or how to contact a manufacturer?

Contact the Office of Environmental Health & Safety:

575-5448 (phone) 575-6474 (fax)