

ECORe

Autoclave Training Guide

University of Windsor
Chemical Control Centre

B37 Essex Hall.
Telephone : 519-253-3000 ext 3523

www.uwindsor.ca



Training Outline

- Autoclave Overview
- Hazards
- What you CAN & CAN'T Autoclave
- How to Autoclave
- Performance Indicators
- Quiz

You must attend training to receive access to the CORE autoclave room.



Autoclave Overview

- Pressurized device that uses heat, steam and pressure to achieve sterilization or decontamination



Autoclave Overview

- Typically operated at 121° C (250° F), 15psi, for 15-45 minutes.
- Allows the heating of liquids above boiling point.
- Uses moist heat (steam) to increase efficiency of sterilization.
- Heat is used to kill microorganisms by coagulation of essential proteins.

Autoclaves are expensive instruments! Proper training ensures that they continue to be operational and used properly with minimal issues.



Hazards



Hazards

- Tremendous pressure from steam in chamber provides explosive potential.
- High temperatures creates potential for burns and scalding.
- Potential exposure to hazardous fumes.
- Inadequate decontamination allows for the potential of biological hazards to contaminate personnel and the environment.



What you CAN Autoclave

Biological waste that can be autoclaved:

- Microbial stocks and cultures
- Items contaminated with such waste: petri dishes, pipette tips, pipettes, gloves, paper towel

Autoclaving is also used for:

- Sterilization of items such as; glassware, media, buffers, etc.



What you **CAN'T** Autoclave

BIOMEDICAL WASTE

- Human and animal anatomical or blood waste
- cytotoxic waste
- Sharps waste

RADIOACTIVE WASTE

HAZARDOUS CHEMICAL WASTE

- This includes anything contaminated with a toxic, volatile, corrosive, or mutagenic chemical
- materials containing solvents, volatile, chlorinated compounds (HCl, bleach)
- chemicals (such as: phenol, trichloroacetic acid, ether, chloroform, ethidium bromide, glutaraldehyde.)
- Check SDS



What you **CAN'T** Autoclave

SOME PLASTICS

Poor Choices:

- ☹ polystyrene (PS), polyethylene (PE) and high density polyethylene (HDPE) do not resist heat well.

Good Choices:

- ✓ borosilicate glass (Pyrex) has very low thermal expansion property and therefore resistant to breaking due to heating
- ✓ polypropylene (PP) and polycarbonate (PC) are heat resistant plastics
- ✓ stainless steel is a good heat conductor and thus facilitates sterilization



Preparing your items

PRIMARY CONTAINERS

- This is the container that comes into direct contact with the contaminated or non-sterilized material or fluid
- Do not fill more than 75% of holding capacity
- Must NOT be a tightly sealed container – must permit heat (steam) penetration
- Do not use polystyrene (PS), polyethylene (PE) and high density polyethylene (HDPE) (do not resist heat well).



Preparing your items

PRIMARY CONTAINERS (cont'd)

- Loosen screw caps or use self venting caps
- Cap open containers with aluminum foil or muslin
- If using plastic waste bags, leave a small opening



Preparing your items

SECONDARY CONTAINERS

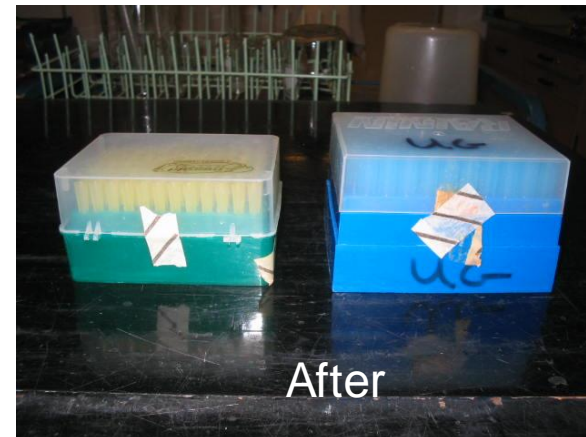
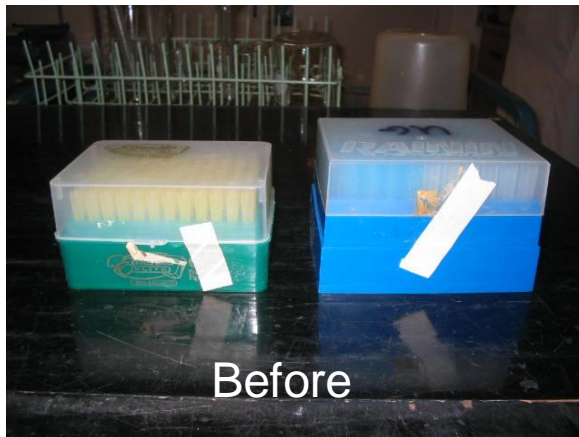
- Used to contain any spills
- The sides of the secondary container must be sufficiently high to contain any spill that may occur
- Tray **MUST** be autoclave safe



Preparing your items

TEMPERATURE SENSITIVE TAPE

- Indicates that high temperature has been achieved
- Does not prove that decontamination or sterilization was successful
- Assists in tracking autoclaved items



Preparing your items

Sign into log book

- Keeps track of autoclave use for maintenance records

Use personal protective equipment

- Eye protection
- Heat resistant gloves
- Lab coat
- Close-toed shoes



Before Loading

- First user of the day must check and clean the strainer:
 - Remove drain strainer from drain in chamber bottom.
 - Remove any obvious debris from strainer. If necessary, clear screen in strainer using the brush.
 - Once strainer has been cleared of obvious debris, rinse strainer under running water.
 - Replace strainer in chamber drain.

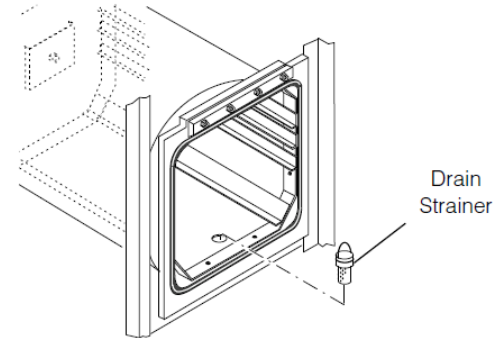
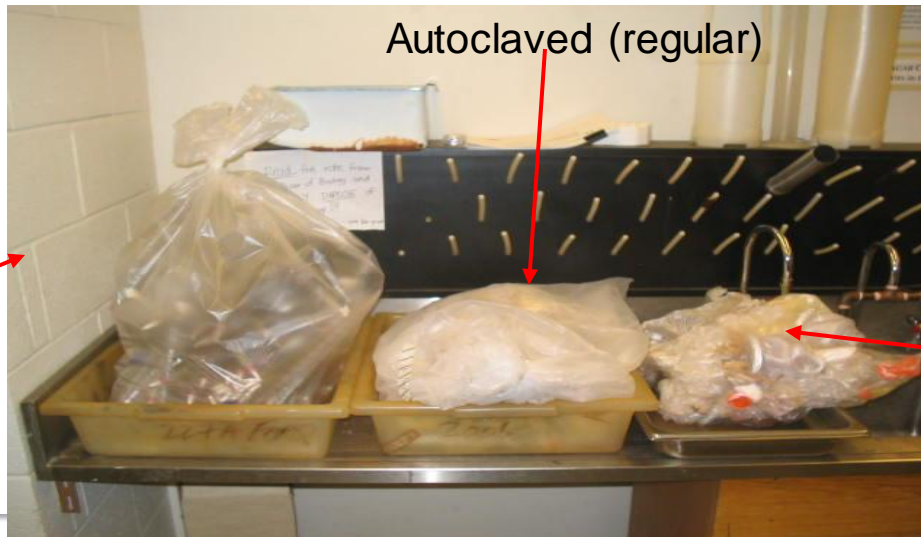


Figure 6-1. Check Chamber Drain Strainer



Loading

- Autoclave biohazardous waste separately
- Do not overload primary or secondary containers
 - Allow for sufficient steam penetration
 - Do not fill more than 75% to allow expansion without overflow



Unautoclaved

Autoclaved (regular)

Autoclaved (due to being compressed & sealed)



Autoclave Cycle

- Username and password are lab specific.
 - Do not use the username and password of another lab.
 - Do not give out the username and password to non-trained personnel.
- Charging autoclave takes 10 minutes – be patient.
- Avoid aborting the cycle – it will take 10 minutes to go through all the cycle steps.
 - If you forget to place an item in the load: just add the item to the next load to avoid tying up the autoclave.



Choosing a Cycle

The type of cycle depends on what is being autoclaved:

Liquid/Slow exhaust	<ul style="list-style-type: none">* For autoclaving liquids* Prevents liquids from boiling over
Solid/Gravity	<ul style="list-style-type: none">* Best for unwrapped solid items (i.e. glassware and waste)



Cycle Times

- For Liquids:
 - 20 mins / Litre of liquid, 5 mins per additional litre
- For Solids:
 - Glassware (empty): 15 mins
 - Instruments (utensils): 30 mins
 - Biohazardous Garbage: **at least** 30 mins per full bag



Unloading

- Use PPE. Always use heat protective gloves.
- Wait for autoclave to state **END CYCLE** before opening door.
- When opening the door, stand away to avoid any residual heat and steam.



Unloading

- Unmark biohazard signs from waste bags/boxes.
- Dispose of waste in proper bin or location.
- Please put back heat resistant gloves for other users.
- Keep autoclave doors shut, but not locked, when not in use.



Autoclave Performance Indicators

How to know if autoclave is functioning correctly:

Physical	<ul style="list-style-type: none">- Annual testing by certified technician- Pressure, Temperature, Cycle times, recorded on paper
Chemical	<ul style="list-style-type: none">- Heat sensitive autoclave tape- Not an indicator of successful sterilization, useful to keep track of autoclaved and unautoclaved items
Biological	<ul style="list-style-type: none">- Tests ability of autoclave to sterilize effectively- <i>Bacillus stearothermophilus</i> spore strips often used because they are resistant to steam sterilization.- EZ Test (SGM Biotech) (Fisher Sci #29801 074)- 3M Attest Rapid Readout Biological Indicators- Steris Verify Integrator Laminated and EO Integrators



Emergency Response Plan

- In case of emergency:
 - If possible, push the emergency stop button to stop autoclave.
 - Exit room immediately: if possible, ensure doors are closed.
 - Follow the CORE shared emergency response plan protocols.
 - In case of spill, follow the biological spill procedure. Spill kit is located inside room 219.
 - Do not re-enter the room or use autoclaves unless it is cleared to do so.



Autoclave Issues/Concerns?

Contact:

- Your Supervisor

Chemical Control Centre:

- B-37 Essex Hall, x3523

Biology Facilities Technician:

- Bob Hodge, 325 Biology Building, x3527

Acting Biosafety Officer:

- Francis Arnaldo, B-37 Essex Hall, x3524

