Essex Hall Autoclave Training Guide

University of Windsor

Chemical Control Centre Health and Safety

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

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.

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 MSDS

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 thermos 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

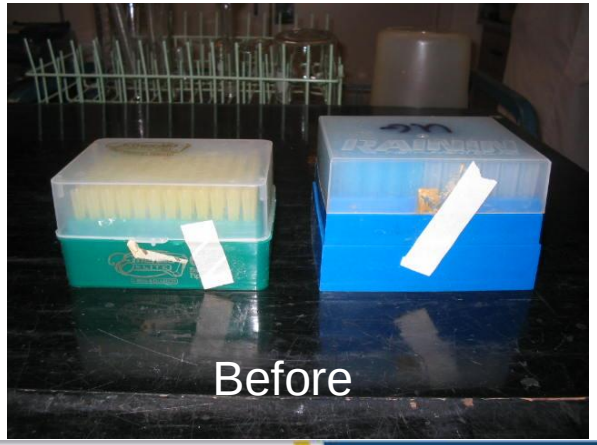
SECONDARY CONTAINERS

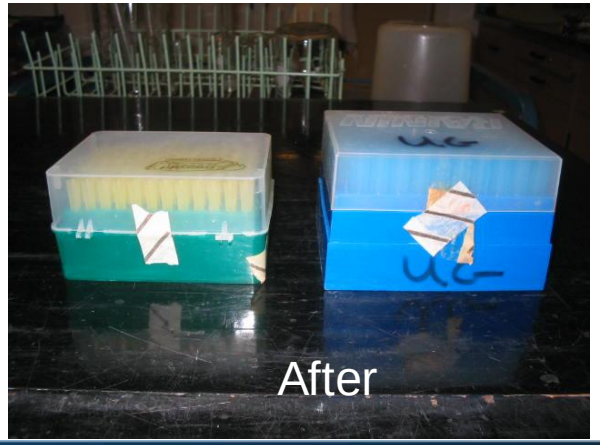
- Used to contain any spills
- The sides of the secondary container must be sufficiently high to contain any spill that may occur
- Tray MUST be autoclave safe

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

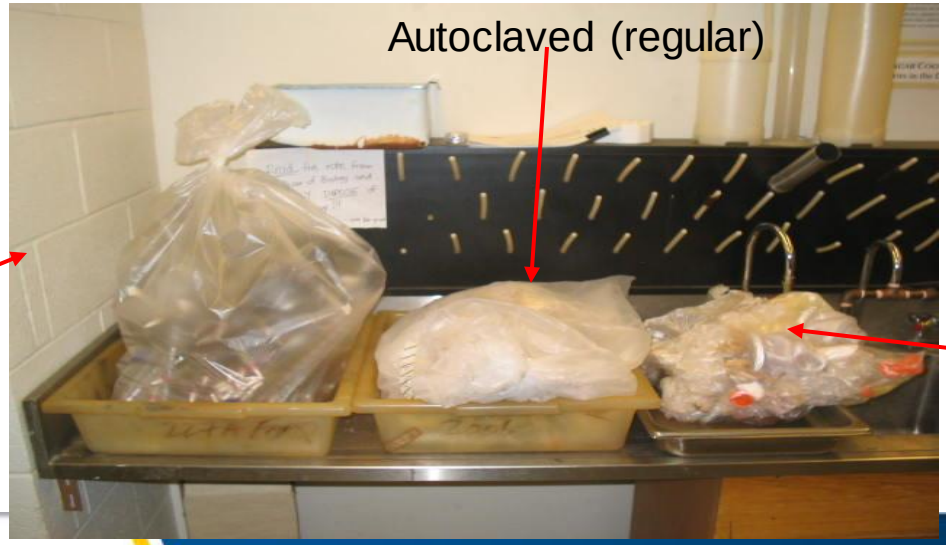
- Keeps track of autoclave use for maintenance records

Use personal protective equipment

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

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



Choosing a Cycle

The type of cycle depends on what is being autoclaved:

Liquid/Slow exhaust	* For autoclaving liquids * Prevents liquids from boiling over
Solid/Gravity	* 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 from opening and behind the door.

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	- Annual testing by certified technician - Pressure, Temperature, Cycle times, recorded on paper
Chemical	- Heat sensitive autoclave tape - Not an indicator of successful sterilization, useful to keep track of autoclaved and unautoclaved items
Biological	- Tests ability of autoclave to sterilize effectively - *Bacillus stearothermophilus* 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

Autoclave Issues/Concerns?

Contact:

- Your Supervisor

Chemical Control Centre:

- B-37 Essex Hall, x3523

Chemistry Coordinator:

- Beth Kickham, Chemistry Building, x3527

Biosafety Officer:

- Francis Arnaldo, B37C Essex Hall, x3524