Autoclaves for Biological Waste Sterilisation

Background

This notice applies to all UQ personnel who use or provide maintenance of autoclaves used to sterilise biologicals waste.

Recently an audit was conducted throughout UQ of autoclaves used to process biological waste, in order to determine if they meet legislative requirements. Biological waste requiring legislative compliance includes:

- Infectious material of risk group 2 or higher
- Genetically modified organisms or microorganisms
- Quarantine material

If the biological material does not fall into any of the categories above, then it does not require autoclaving, but rather must be disposed of directly into the clinical waste stream, where it will be treated by the approved UQ contractor using high temperature incineration.

The legislative requirements differ for each type of waste, however in all cases, the autoclaves must meet containment and OHS requirements.

Implications and Recommended Practices

In many cases autoclaves remove air from the sterilisation chamber prior to the sterilisation cycle, and this air is unfiltered. Whilst the risk is relatively low, the following practices should be adopted across the University when autoclaving biological waste to ensure aerosols are not produced prior to sterilisation:

- Autoclave bags are to be sealed prior to autoclaving, and
- These bags are not to be slashed or left open, and
- Any loads of ‘dry’ material should have a small amount of moisture added to the bag/load before sealing the autoclave bag to ensure adequate steam for sterilisation within the bag/container (no more than 100-200mL added to either animal cages with bedding or loads with absorbent material).
- Ensure adequate air space in the bag (ullage) is allowed for before sealing the autoclave bag/container.

Note: 1 part of liquid water expands to 1700 times the volume as steam when boiled

This method has been tested with spore tests and the sterilisation is effective providing there is adequate moisture within the autoclave bag prior to sealing.

The minimum compliance requirements for autoclaving biological waste are:

- **Infectious and/or GMO/GMMO waste:**
  - The densest part of the load must be exposed to 121°C and 103kPa for a minimum of 15 minutes.
  - Each load must be marked with an indicator (e.g. indicator tape that changes colour when the correct temperature has been reached) to distinguish between sterilised and non-sterilised loads, or chemical indicators (progressively changes colour with the time exposed at specified temperatures)
  - The autoclave must be tested for effectiveness monthly using a biological indicator or bacterial enzyme indicator
  - The autoclave must be serviced and calibrated annually, and a copy of the calibration record including test-run to be retained locally or by P&F (whoever is the owner of the autoclave)

- **Quarantine waste:**
  - Quarantine waste that is also infectious or GMO or GMMO must be treated as per Quarantine waste
  - All quarantine waste must be double bagged within Quarantine Waste bins and for ‘dry’ loads the water/ice must be added into the primary bag before sealing
Future Compliance

OHS-Biosafety is meeting with industry experts to determine if the current autoclaves can be retro-fitted in order to meet full compliance requirements. In the meantime, the practices outlined in the section above, should be strictly adhered to, to ensure continued safety of personnel.

If your School or organisational unit is considering purchasing a new autoclave for the processing of waste, please contact FBS-procurement or OHS-Biosafety for advice on autoclave requirements prior to purchase. We can refer you to the relevant Australian Standards and Legislative requirements.

Contact for Additional Information

For further information, contact your local Work Health and Safety Manager/Coordinator, or the UQ OHS Division:

Phone: 336 52365, Email: ohs@uq.edu.au or OHS-Biosafety at biosafety@uq.edu.au.