

## Risk Assessment Form

|                  |   |
|------------------|---|
| <b>Procedure</b> | Use of Laboratory Autoclave (Astell 153L MNS153C) |
|------------------|---|

|  |   |                  |           |
|--|---|------------------|-----------|
| <b>Name(s) of person performing the work</b> | Users (Lab manager & Lab Technician & Tenants & Licensee's) |                  |           |
| <b>Name &amp; position of assessor</b>       | Khwaja Islam & Laboratory Manager                           | <b>Signature</b> |           |
| <b>Date of assessment</b>                    | 01/10/2018  | <b>RA Number</b> | BioE 0004 |

### Outline of procedure / activity:

The laboratory autoclaves (Astell, MNS153C) are used to steam sterilization of liquid (media or other fluids in unsealed containers), dry (instruments, dry glassware) and waste discard (Biological & GMO waste to make safe) for the tenants on ground and first floor of the BioEscalator of the Innovation Building. The laboratory autoclaves are used every day for the sterilization of laboratory equipment, glassware, liquid, GMO waste and is situated in the services laboratory (696.10.23) on the ground floor.

Astell sterilizer are functional front loading autoclaves/sterilizers designed with ease of use in mind. They use a rapid-action "new swift lock" closure system to give easy and rapid opening of the chamber, together with a 10 program touch screen operated control system, to facilitate a variety of uses.

For safety it's good to remember at all times that autoclave store considerable potential energy, and should be treated with respect and care. Never force the locking mechanism, or operate the autoclave with any leaks, incorrectly operating parts, report any faults to the laboratory manager.

Operator must be trained in operating and loading the autoclave to guarantee safe daily use. Untrained Personnel are not be allowed to operate the autoclave.

There are 4 pre-programmed cycles installed on autoclave 1 and autoclave 2:

- Cycle 1: Media – 121°C for 15 min.
- Cycle 2 Plastics – 121°C for 15 min.
- Cycle 3 Glassware – 121°C for 15 min.
- GMO Discard – 134°C for 15 min.

Operation procedure:

1. Ensure all items to be autoclaved have autoclavable indicator tape on them.
  - a. Biological waste discard including GMO waste the autoclave bag should be left open with the top of the bag rolled outwards, exposing the load to the steam inside the pressure vessel. The waste discard i.e. autoclave bag must fit in the stainless steel waste discard container (290 x 330 x 927mm) provided in the services lab and **never** autoclave waste bags fully sealed

without the discard container as any **spillage could block pipes and valves and will not be covered by the warranty**. Care should be taken when loading the baskets or containers not to pack them too tightly with material. Ample room must be allowed for steam to penetrate the load properly or full sterilisation will not be achieved. When using autoclave bags these should be left open with the top of the bag rolled outwards (i.e. opened up completely so that the maximum area of the load is exposed to the steam without the top of bag getting in the way, exposing the load to the steam inside the pressure vessel. The waste discard container holding the plastic bag has large holes in the sides to allow steam to enter the container sides and the plastic bag must be slashed or cut with a knife through the holes so that steam can get into the bag

2. The autoclave bag open so penetration steam is accessible.
3. Load the autoclave with the either the glassware, liquid or waste to be sterilised
  - a. In the case of liquid, check that the bottle lids are not tightly shut to prevent pressure build up with the bottle. Fill up an empty bottle at is the same volume of the largest bottle in the autoclave. Place the thermometer probe in the newly filled bottle.
  - b. In the case of glassware, ensure the probe is left loose and that any bottle lids are not tightly sealed.
  - c. In the case of waste, place the bags of waste into the discard container to prevent leakages in the autoclave.
4. Close the door of the autoclave.
5. Once the door has bolted, choose the appropriate cycle and pressed start.
6. Once the cycle is completed the panel will display “**CYCLE COMPLETE PASSED**”, press the **DOOR** button to unlock the door open the door.
7. Use the heat resistance gloves to unload the autoclave.
  - a. In the case of liquid, reseal the bottle lids while wearing heat resistant gloves.
  - b. In the case of waste, once the container have cooled while wearing laboratory gloves remove the autoclavable bag and place in the hazard waste bin. Agar plates may have leaked in the container.

#### CYCLE COMPLETE -- - FAILED:

1. If the cycle has failed for some reason the final stage is “cycle complete-failed”. No door button.
2. Press the alarm button (alarm button flashes red) – bottom RHS of screen) – go to alarms page so you can investigate, then correct and reset the alarm.
3. You will need the supervisor level password or higher (**222222 or 333333**).
4. Load may not be sterile. You will need to sort out the reason for the cycle failure.
5. You will then be able to press the “DOOR” button to open the door.
6. If the sterile stage has been set to “sterilize retry” then you cannot open the door but you can restart the cycle.
7. Is the load safe? – After a failed cycle, for waste discard you must restart the cycle again until it has undergone sterilisation processing for the load to be safe (i.e. “CYCLE COMPLETED PASSED”).
8. Some loads such as media preparation will normally be safe after a failed cycle and might even be useable, depending on what went wrong.

#### ALARMS:

1. If any of the functions monitored for faults are triggered then the system will ensure that a safe condition is generated. This may stop the cycle early and then go to cycle complete failed. The alarm button flashes red.

2. Press the alarm button for the alarm list.
3. Login with operator password see above.
4. When the source of the fault is removed and you can press the **ack** button, the button changes from flashing to continuously grey.
5. If the button will not change to grey you have not cleared the cause of the alarm.

**Note:** Care should be taken the contents of autoclave bag and containers are not allowed to spill over into the body of the autoclave vessel.

### Potential hazards

| Substance or item handled | Associated Hazard (s)                                   | Existing Control Measures   | Risk (L/M/H) | Further Action required  | Risk (L/M/H) |
|---------------------------|---|---|--------------|--|--------------|
| Autoclave door            | Hand or arm trapped in door handle.                     | Ensure hands are out the way of the door. Use the handle to close the door carefully. Only trained personal to use the equipment.   | L            | No further action required if the existing control measures are adhere to. | L            |
| Contact with hot surfaces | Burn / Scalds from contact with hot surfaces/glass ware | Wear appropriate PPE.<br>Lab coat and safety glasses and gloves must be worn when operating the autoclave.<br>Allow autoclave to cool down before attempting to open door or unload contents. Heat resistance gloves worn when unloading. Take care when unloading the unit.<br>Lab gloves should also be worn when loading the autoclave.<br>Heat resistant gloves should be worn when unloading material. | M            | No further action required if the existing control measures are adhere to. | M            |

|  |   |  |   |  |   |
|--|---|--|---|--|---|
| Biological waste discard                       | Bio-Hazard  | Wear appropriate PPE.<br>Lab coat, safety glasses, gloves must be worn. Manual handling operation training provided.   | L | No further action required if the existing control measures are adhere to. | L |
| Broken glass                                   | Cuts  | Wear appropriate PPE<br>The contents of the autoclave should be stacked carefully and boxes should not be over loaded.<br>Put in and remove content carefully from the autoclave.  | L | No further action required if the existing control measures are adhere to. | L |
| Autoclave                                      | Electrical fire risk  | Safety valve prevents excessive pressure build up in the chamber.<br>3 monthly safety valve test is carried by the lab manager.<br>The equipment is protected from overheating by an electrical thermal cut-out sensing excessive chamber temperature. | M | No further action required if the existing control measures are adhere to. | M |
| Loading and unloading waste discard containers | Personal injury from lifting autoclave waste discard containers | Wear appropriate PPE (Lab coat, safety glasses, and Lab gloves).<br>Users are trained in manual handling operation.  | L | No further action required if the existing control measures are adhere to. | L |

**Persons potentially at risk:**

Only the user or others near by

**Action in event of an accident or emergency:**

1. **First Aid Measure:**  
**Burns** – immersing the burn in cool water immediately, removing clothing from the burn area, and keeping the injured area cool for at least five minutes (preferably longer). Any burns to the face or eye or any burns that blister should be seen by a physician.
2. **Fire:** raise the fire alarm and evacuate the area. Use correct fire extinguisher if you have been trained and it is safe to do so.

**Arrangements for monitoring effectiveness of control:**

Daily inspection of equipment by lab technician.

Annual preventative maintenance carried by external contractor (Astell).

Instruction and training given to all operators which is reviewed annually.

Existing operators receive annual refresher training.

Annual insurance inspection by Zurich engineer to comply with pressure systems safety regulations.

**Arrangements for monitoring effectiveness of control:****Review of the Risk Assessment:**

|                     |  |                  |  |
|---------------------|--|------------------|--|
| Date of review      |  | Name of reviewer |  |
| Date of next review |  | Signature        |  |

Have the control measures been effective in controlling the risk?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

Have there been any changes in the procedure or in the information available which affect the estimated level of risk from the listed substances

|     |    |
|-----|----|
| Yes | No |
|-----|----|

What changes to the control measures are required?

|  |
|--|
|  |
|--|





