TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY
SAFETY UNIT

Intended for the Faculty of Medicine

WORK AND SAFETY GUIDELINES FOR OPERATING THE FACULTY'S AUTOCLAVE

An autoclave is used for the sterilization of contaminated waste or equipment. The autoclave works under a high-pressure steam at a temperature of 132ºc or 121ºc

Main risks: infection, burns and explosion.

Autoclave operation is permitted only for experienced employees who have been properly trained

Main safety guidelines for using an autoclave

1. Do not use an autoclave in the absence of a compliance label issued by an authorized inspector.
2. Do not use an autoclave in absence of proper training.
3. Do not use an autoclave without the permission of the head of administration.
4. Do not enter hazardous materials, such as flammable solvents, oxidants or plastic objects that are not heat resistant, into the autoclave.
5. Upon cycle completion - let autoclave cool, open the door carefully to prevent sudden steam or hot liquids release. It is mandatory to use suitable personal protection equipment.

1. Main risks

1.1. Burns due to steam,hot liquids release or to accumulation of steam and hot water caused by the obstruction of the drain strainer at the bottom of the autoclave chamber.

1.2. Injury due to the explosion of a glass object still maintaining steam pressure in it.

1.3. Exposure to hazardous materials as a result of the release of toxic gases placed in the autoclave, such as bleach, formalin, phenol, acrylamide, etc.

2. Safety during an autoclave operation

The temperature in the autoclave can reach 132ºc or 121ºc according to the sterilization program, therefore:

2.1. Do not place materials which boil below 100ºc.

2.2. Only plastic objects and bags that withstand an autoclave's temperature can be used to avoid melting or sticking to other items.

TECHNION CITY, HAIFA 32000, ISRAEL TEL: 04-8292146, 8292147,8294989 FAX: 04-8292148

2.3. When unloading the autoclave, use long heat resistant gloves, safety glasses and closed shoes. When handling bottles with hot liquids use a rubber apron as well.

2.4. Do not cut short the sterilization program. In the event of a stoppage - intentional or due to malfunctioning - restart.

3. Autoclave preparation for sterilization

3.1. Prior to loading the autoclave, ensure each bag contains a minimum 250 ml water and that the drain strainer is not blocked.

3.2. Spread the load evenly to ensure effective steam penetration.

3.3. Ensure the autoclave door is properly closed

3.4. Set parameters - temperature and time .

3.5. Start the autoclave.

3.6. On completion of the sterilization process, the pressure gauge should indicate "0".

Do not open the door before the pressure gauge shows "0"

3.7. Wait 5 – 10 minutes.

3.8. Release steam: stand beside the door and open it to a crack to slowly and safely release the steam and lower the temperature in the chamber. **Do not stand in front of the crack!**

3.9. Unload the autoclave by load type: contaminated waste, tools, samples, etc.

4. Routine maintenance of the autoclave

4.1. Before placing objects in the autoclave ensure the pressure gauge, the temperature meters, the power system, the door gasket, etc. are in good working order.

4.2. The pressure valves must be checked twice a month to ensure they are not blocked.

4.3. Clean the autoclave chamber and especially the drain strain. Strain blockage might cause accumulation of hot water and steam in the autoclave.

4.4. Once a week, or after spillage, rinse thoroughly. You can use a citric acid solution for cleaning the chamber walls (2 tablespoons citric acid powder in 1/2 L water)

4.5. In case a problem was detected, notify the persons authorized to perform the required repair immediately.

Annex

1. Containers and packaging for use in the autoclave

Commented [חע1]: Nhavu tjr vjk k,rמישהו אחר החל לתרגם
כאן. מישהו ש-actually יודע אנגלית

1.1. Stainless steel containers: containers with excellent heat conductivity

1.2. Polypropylene containers: containers that withstand the autoclave temperature but with poor heat conductivity. It is recommended to use wide and shallow polypropylene containers (or to extend the sterilization time)

1.3. Plastic biohazard bags

1.3.1. Biological waste should be discarded in polypropylene biohazard bags

1.3.2. In order to avoid material spillage should the bag tear or explode - place each bag containing items for sterilization into a suitable sized receptacle.

1.3.3. Close the bag with a rubber or adhesive band so as to allow steam penetration. Do not seal the bag.

1.3.4. To ensure efficient sterilization, there must be water inside the bag. If needed add 250 ml water to dry material. This must be done with care to avoid generation of aerosol in the air.

1.3.5. Do not overfill the bag. This can prevent efficient steam penetration and heat flow.

1.4. Glass bottles:

1.4.1. To avoid leakage of liquids, do not place in the autoclave bottles filled more than 2/3.

1.4.2. To avoid explosion, do not tighten bottle caps to enable free steam flow.

1.4.3. It is recommended to place liquid filled bottles inside a container filled with a 2 cm water layer for uniform heat distribution.

1.4.4. Before removing empty bottles from the autoclave, wait for 5 minutes after the pressure reaches 0 (to avoid their explosion after the door is opened).

1.4.5. Before removing bottles containing liquids from the autoclave, wait for about 10 minutes after the pressure reaches 0. It is recommended to wait for 15 additional minutes before shuttling them.

2. Sterilization verification

Sterilization can be verified by chemical of biological validation methods.

2.1. A chemical validation uses autoclave strips that change color upon reaching the required temperature.

2.2. A biological validation uses the biological markers Bacillus Stearothermophilus ATCC 12930 as instructed by the manufacturer. Its spores are heat-resistant and can survive at 121ºc for 5 minutes. The spores are killed at 121ºc after 13 minutes.

3. Troubleshooting

3.1. The material is not suitable for sterilization in an autoclave.

3.2. It is not clear that the material was sterilized according to temperature and time requirements.

3.3. For proper sterilization, microbiological load, load size and type and packing density of the autoclave must be taken into consideration.