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PERFORM Operating Document
Signature Page

Use and Maintenance of Tuttnauer Table-Top Autoclave
PC-POD-CA-006-v02

Author
Marie-Eve Rivard
PERFORM, Supervisor,
Clinical Analysis Suite

_____ _____
Signature *Date*

Authorization
Axel Bergman, PERFORM,
Manager, Research
Development

_____ _____
Signature *Date*

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Revision History

Version	Reason for Revision	Date
01	New POD	13-Aug-13
02	POD Section 3.1.3 and 3.2 revised	03-Nov-15

Summary

The content of this PERFORM Operating Document (POD) provides guidelines for the use and maintenance of the autoclave.

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1. Definition of Terms and abbreviations

PERFORM operating document (POD)	Operating documents that are specific to an instrument or technique that require approval by area managers.
DI	De-ionized
EXH	Exhaust
Personal Protective Equipment (PPE)	Specialized clothing or equipment worn for protection against health and safety hazards. Lab coats, gloves, safety goggles, face shields, long pants, closed toe shoes etc.

2. Introduction

PERFORM Centre has a Tuttnauer electronic table-top autoclave. This table-top autoclave is designed for the sterilization of wrapped and unwrapped instruments.

Note: This autoclave is intended to use only for laboratory research experiments. The autoclave is not appropriate to sterilize any surgical instrument for surgery or biopsies etc.

2.1 Overview of autoclave

This autoclave is an electrically - heated sterilizer using steam as the sterilizing agent. It is a manually operated devise, with a control system based upon steam pressure. The operator can select a sterilization temperature from within a range of 212°F - 273°F (100°C - 134°C). This allows the sterilization of heat sensitive material at a low sterilization temperature, as well as providing for faster sterilization at higher temperatures for materials able to withstand the higher sterilization temperatures.

The safety features include a double locking door mechanism (door tightening bolt and locking bellows), a mechanical pressure relief valve, over temperature thermostats and a double pole circuit breaker. Pressure Door Lock System (Door Bellow).The Door Bellows is a safety device that prevents the door from opening when the chamber is pressurized. The system utilizes the buildup of pressure in the chamber to expand a flexible Silicon-rubber bellows. The bellows then pushes a metal pin into a grove on the tightening bolt of the Door Closing Device. This prevents the operator from opening the door when there is pressure in the chamber. When the steam is released, this bellow returns to its original position, drawing the pin with it and releasing the tightening bolt.

2.2 Training requirements

Prior to using the autoclave individuals should:

- Read and sign this POD.

- Undergo appropriate autoclave training and/or provide a proof of an external training to the clinical analysis supervisor prior to use.

2.3 General precautions

- To avoid possible damage, do not leave the autoclave un-attended while in operation.
- Make sure the power cord is plugged into the back of the unit and also plugged into a power source.
- Personal Protective Equipment and clothes and other safety measures should be used at all times.
- For proper sterilization do not overload the chamber. Only autoclavable products shall be used; please refer to the materials or instruments manufacturer's instructions for sterilization of unknown materials or instruments.
- Should the autoclave fail to reach the sterilizing temperature/pressure, always check first that the door is fully sealed. If not, then tighten the door bolt further, as described above, until completely sealed.
- USE DI WATER ONLY. The impurities in tap water will create the need for more frequent cleaning and maintenance; in addition they will accumulate and block the hole of the Air Jet. This will prevent the temperature in the chamber from rising properly. It is essential from time to time during heating and sterilization phases that a spray of steam should escape, from the Air Jet, causing a hissing sound. If no escaping steam is evident or no hissing sound heard then cleaning the Air Jet is recommended.
- For cleaning, do not use steel wool, steel brush or bleach as this can damage the chamber and trays.
- To avoid being burned by hot steam, do not place your face over the safety valve.

2.4 Relevant documents

- Autoclave Operators manual

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3. Procedure

3.1 Autoclave Operation

3.1.1 Preparation before autoclaving

- Instruments to be sterilized must be clean and free from any residual matter, such as debris, blood, pads or any other material. Such substances may cause damage to the instrument or the sterilizer.
- After ultrasonic cleaning or thorough cleaning rinse under tap water for 30 seconds and pat dry to remove residual minerals. If the tap water has a high mineral content then rinse a second time in a bath of distilled water and pat dry.
- Launder textile wraps prior to reuse, but do not use bleach.
- Be sure that instruments of dissimilar metal (stainless steel, carbon steel, etc.) are separated. Carbon steel instruments should be bagged or placed on autoclavable towels and not directly on stainless steel trays (mixing will result in the oxidation of these metals).
- Load items within the boundaries of the tray so that they do not touch the chamber walls, or fall off when the tray is inserted into the autoclave. The chamber walls are very hot, items that come into contact with the wall can be damaged.
- Place a sterilization indicator in each tray or inside each wrapped pack. When using a paper / plastic bag the plastic side should always be down.
- All instruments must be sterilized in an open position.
- Surfaces that are hidden because the item is in a closed position will not be exposed to the steam and will not be sterilized.
- Disassemble or sufficiently loosen multiple-part instruments prior to packaging to permit the sterilizing agent to come into contact with all parts of the instrument.
- Do not overload the sterilizer trays. Overloading will cause inadequate sterilization and poor drying. Load trays loosely to capacity. Instruments should be loaded one level deep only.
- Empty canisters should be placed upside-down, in order to prevent accumulation of water.
- Wrapped instruments should be packed in material which will allow steam penetration and promote drying, such as autoclave bag, autoclave paper, or muslin towels.
- If spotting is detected on the instruments the first step would be to use an ordinary eraser to remove the spot. If there is no pitting under the spot then the spot was only dirt. Dirt spots on an instrument may be an indication that the autoclave needs to be cleaned or that the instruments were not adequately cleaned or dried. If removal of the spot reveals pitting then the spot was most likely rust. It may also be an indication that the instruments were rinsed in tap water with a high content of minerals. These minerals when exposed to high temperature and steam will accelerate the oxidation of the metal. One suggestion would be to final rinse the instruments in distilled water.

- If the instruments exhibit a discoloration this can be due to the mixing of carbon steel and stainless steel. When these two metals come into contact with each other electrolysis occurs that breaks down the metal. The best solution is to separately wrap the carbon steel to insulate it from other instruments or the trays.

3.1.2 Loading and unloading the Device

3.1.2.1 Loading

Correct loading of the autoclave is essential to successful sterilizing for several reasons. Efficient air removal from the chamber and the load will permit steam penetration and saturation, and allow proper drainage of condensate. Additionally, correct loading will reduce damage to packs and their contents and maximize efficient use of the sterilizer.

3.1.2.2 Unloading

On completion of the cycle, the load shall be immediately removed from the sterilizer and a visual inspection made to ascertain that the load is dry, and that sterilizing indicators have made the required color change.

3.1.3 Fill the Water Reservoir

Note: Daily before operation, check the water level in the reservoir and add DI water when required. Once a week or after 20 cycles (the shorter period) replace the water in the reservoir. Enter the date and time for each use in the log book.

- Ensure that the drain valve is in a CLOSED position.
- Remove the water reservoir cover.
- Pour 350-400 mL distilled water or mineral free water into the reservoir through the opening on top of the autoclave, until it reaches the base of the safety valve holder. Under no circumstances fill any higher than the base of the safety valve holder. For the empty reservoir pour 3 Liters DI water.
- For proper operation make sure the water level is above the coils of the cooling coil.

3.2 Preventive maintenance

Daily

Clean door gasket with a mild detergent, water and a soft cloth or sponge. The gasket should be clean and smooth.

Weekly

1. Clean the air jet. To ensure that the temperature inside the chamber rises properly it is necessary to keep the air jet clean.

2. Once per week clean and descale the chamber, copper tubes and the reservoir using Chamber Brite.
3. Take out the tray holder and trays. Clean the tray holder and trays with detergent or a non-abrasive stainless steel cleaner and water, using a cloth or sponge. Rinse the tray holder and trays immediately with water to avoid staining the metal.
4. Put a few drops of oil on the 2 door pins and door tightening bolt screw shaft and bearing.
5. Clean the outer parts of the autoclave with a soft cloth.

Periodically

1. Once every month clean and check the safety valve (see sec. 8.5 of user manual).
2. Replace the door gasket every 12 months, or as needed (see sec. 8.4 of user manual).
3. Once a year inspect the locking device for excessive wear.
4. Draining the Reservoir approximately after 20 cycles.

Draining the reservoir

Caution:
Before draining, ensure that the electric cord is disconnected and there is no pressure in the autoclave.
The drain valve is located on the front left side of the autoclave after the door is opened. The function of the drain valve is to drain the water reservoir.
1. Connect the silicone hose, supplied with the autoclave, to drain into a bucket.
2. Turn drain valve counter clockwise to the open position.
3. Fully drain the reservoir
4. With a quart of tap water flush out the reservoir
5. Turn drain valve clockwise to the close position.
6. Connect the electric cord to power source.
7. Fill the reservoir with 3 liters distilled water to just below the safety valve (see sec 7.2 of user manual)
8. Turn on the main power switch.
9. The autoclave is now ready for use.

Cleaning the Air Jet

(Located in the water reservoir)
A dirty air jet is the number one cause of failed cycle
The elimination of air from the sterilization chamber during heat up is critical to the proper operation of the autoclave. Failure of the air removal system will be responsible for incomplete sterilization, indicator strips that do not turn and failed spore tests.
The air jet consists of a small orifice with a clean out wire inserted in it (wire is permanently installed and will not come out). It is required that the air jet be cleaned once per week or more often if necessary, to remove any accumulated dirt and debris.
It is preferred to clean the air jet when the unit is running a cycle and under pressure. This is so that any loosened debris will be blown away, however, it can be done while the unit is idle.

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1. Remove the water reservoir cover.
2. Clean the hole of the jet by manipulating the air trap wire back and forth 10 times. It is important to clean the hole of the air trap,

Replacing the Door Gasket

Pull off the gasket from the door groove. Install the new gasket as described in the manual. Caution: This gasket is designed with a trapezoidal cross section. The gasket should be placed with the widest side towards the door.

Checking the Safety Valve

(Located in the water reservoir)

In order to prevent the safety valve from becoming blocked, it is necessary to allow the steam pressure to escape through the valve. This procedure should be done every month as follows:

1. Run a sterilization cycle with a sterilization temperature of 273°F according to the manual.
2. Allow a pressure of approximately 30 psi (260 kpa) to build up in the chamber.
3. Turn the timer back to 0 minutes.
4. Remove water reservoir cover. This next step will expose you to HOT STEAM so be careful. To avoid being burned, by hot steam, do not place your face over the safety valve.
5. Pull the ring of the safety valve using a tool, i.e. screwdriver, hook etc. and open the safety valve for 2 seconds then release. Be careful not to burn your hands.
6. Verify that the valve releases steam and closes immediately.
7. If the safety valve is stuck in the "open" position, let the pressure decrease to zero (atmospheric pressure).
8. After the pressure in the chamber decrease to zero, pull the valve ring to release the valve.
9. Repeat operations 1 to 6.
10. If the valve is stuck again in the open position, call for service.
11. After a successful check turn the multi-purpose valve to the Exh/Dry position.
12. Wait until the pressure decreases to zero, only then can the door be opened.

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APPENDIX I

POD Training Record Form

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Use and Maintenance of Tuttnauer Table-Top Autoclave

Ownership	Document type	Area	SOP Number	Version
PC	POD	CA	006	V02

Training Record

Full Name	
Institution/PI	
Contact (e-mail or phone number)	

Signature

Sign here

Date