



University of California San Diego

Dept. of Bioengineering Standard Operating Procedure SOP000026 V0.5

PFBH room 341 Steris Autoclave Operation

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I. SCOPE

In this Standard Operating Procedure (SOP) is described the method for safe operation of the Department of Bioengineering's main autoclave, located as part of the Biotech Core complex in room 341 of PFBH. This autoclave is only for use by Bioengineering faculty, students and staff and their designated affiliates. Review of this SOP followed by training by a designate of the department or the approved (by the Sr. Dev. Engineer) designate of the user's research lab is required. This training must be tracked and kept in the Autoclave notebook of the department or the safety training records of the user's lab.

II. EQUIPMENT

- 2.1. Steris Hospital/Industrial Autoclave, 20x20x38in chamber, model number SG-120, serial number 0115603-03 located in PFBH 341.
 - 2.1.1. 2 removable shelves
- 2.2. Autoclave Setting sign
- 2.3. Autoclave sign-up sheets
- 2.4. Appropriate autoclave grade secondary containment (see warnings below)
 - 2.4.1. Autoclave bags – purchasable from Marketplace
- 2.5. Hot item gloves – not provided at the autoclave

III. WARNINGS

- 3.1. To wake up the Mitsubishi controller on the autoclave touch the lower left corner of the display. This will prevent you from accidentally aborting the current run if active.
- 3.2. Not all Nalgene products are autoclave rated. Only tubs and trays marked "AUTOCLAVABLE" or manufactured from a thick, rigid, polypropylene (marked PP) are to be used in the autoclave. HDPE trays and tubs melt in the autoclave and can cause expensive damage.
- 3.3. Do not change any cycle values. If you need a custom cycle or one of the cycles changed, please contact the department Research & Development Engineer.
- 3.4. Do not abort a run unless that is the only way to deal with an equipment failure (signified by an alarm or steam coming out through the door). Aborting and opening a liquid run in progress is very dangerous, as the liquid can explosively depressurize and spray over anyone standing in front of the autoclave, causing severe burns.



- 3.5. Be careful, the unit is kept hot and the door and chamber walls are always very hot. It is easy to get burned, so remember to use hot item gloves and pull the shelves out to you to place and retrieve items.
- 3.6. In an equipment failure, contact the department Research & Development Engineer at **858-967-5369** (or MSO at 858-822-0493) if the Res./Dev. Engr. is unavailable.

IV. DEFINITIONS

- 4.1. Autoclave – a device for sterilizing equipment, consumables and reagents. Operates on the principle of pressure cooking any biological contaminants, thus killing them. A hospital grade run (per FDA requirements) is 30 minutes at full temperature and pressure.
- 4.2. Autoclave cycle – a preprogrammed temperature/pressure cycle on the autoclave. They are optimized for different uses and times. They are summarized on the **AUTOCLAVE SETTINGS** sign posted on the machine. All cycles have a description followed by the sterilization time, a dash and the drying time (if there is a drying period).
 - 4.2.1. Liquid – optimized to sterilize liquids such as media with the minimum possible evaporation. On this controller these are indicated by cycles starting with **LCD**.
 - 4.2.2. Unwrapped – optimized for exposed equipment not in autoclave bags. On this controller these are indicated by cycles starting with **GRA** (for gravity).
 - 4.2.3. Wrapped – optimized for equipment and supplies in autoclave bags, tip boxes, or covered bottles. On this controller these are indicated by cycles starting with **VAC** (for vacuum).
- 4.3. Controller – the digital control system for the autoclave. For this unit it is made by Mitsubishi and has a touch screen interface system, as shown in figure 1.
- 4.4. Senior Development Engineer – department staff member responsible for facilities and safety issues. Handles training for autoclave use unless an individual lab wishes to designate an internal trainer.

V. PROCEDURES

- 5.1. Bring your items to be autoclaved to room 341 in PFBH and locate the autoclave shown in Figure 1. If the autoclave is being used you can use the **AUTOCLAVE SIGN-UP** sheet (located to the right of the Control Panel on a hanging clipboard) to sign up for the next run or later in the current day (put the time you wish to start – for the next run try to estimate based on cycle total time).
- 5.2. Insert or remove the shelves you need as necessary.
- 5.3. Place your items in the chamber to be autoclaved.
- 5.4. If you are running a liquid cycle, you will want to put 1 inch of water in the tub holding the containers of liquid. This will ensure proper sterilization as this unit does not have a liquid temperature probe.
- 5.5. Close the door manually.
- 5.6. If the controller is not showing any buttons or text (see figure 2) then touch it at the lower left corner of the screen to wake it up. The autoclave was still running, the screen had gone into screen saver mode.

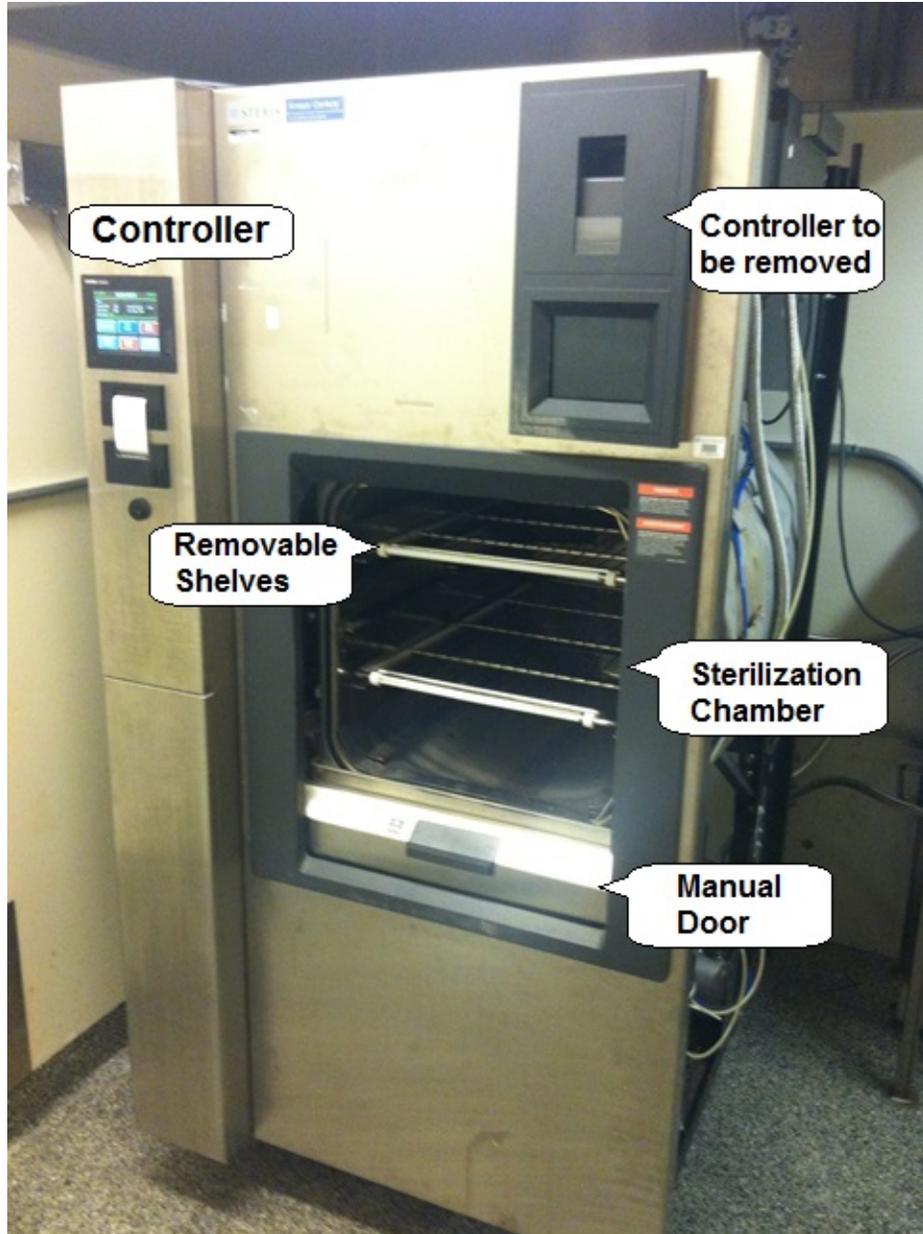


Figure 1. Autoclave in PFBH 341 with chamber door open



Figure 2. Autoclave controller Main Menu screen

- 5.7. If the autoclave was done with a cycle, it should be in the Main Menu screen, as shown in figure 2. To select a cycle, press the Select Cycle button (top row, left).
- 5.8. Once in the Select Cycle menu you have 2 screens of cycles to choose from, as shown in figures 3 and 4. Press on the More Cycles button at the lower right corner of the screen to see the second screen of cycles. There are a total of 7 for use by the labs. Table 1 shows what each cycle is used for. Total times of the cycles are not yet known, so that column is empty.

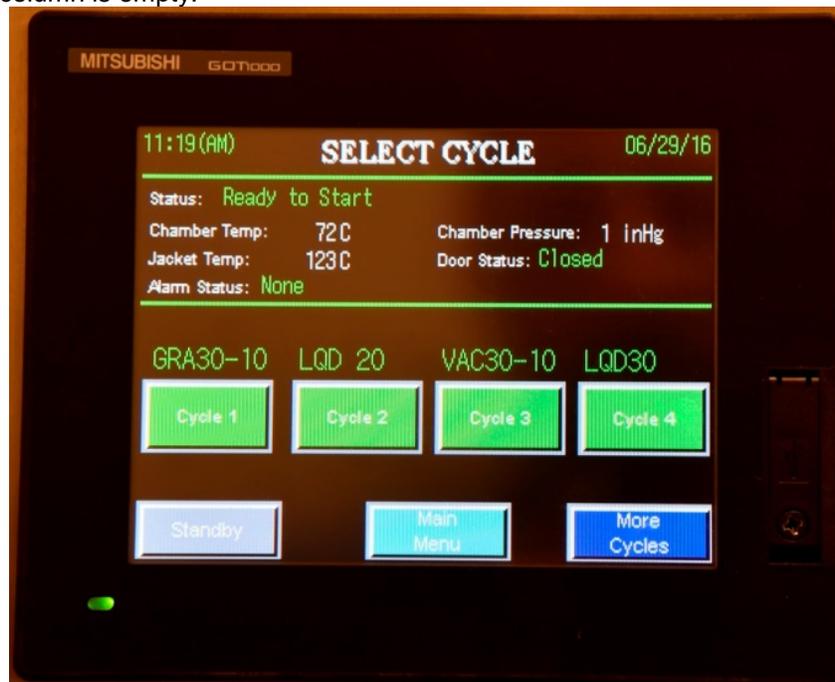


Figure 3. Select Cycle menu 1

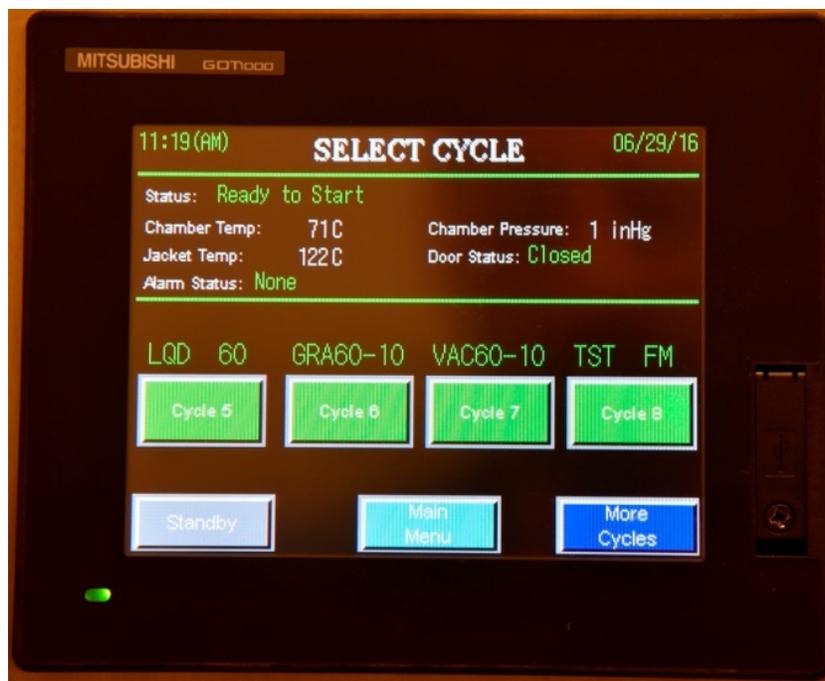


Figure 4. Select Cycle menu 2

CYCLE #	TYPE	NAME	TEMP (°C)	STERILIZE TIME	DRY TIME	TOTAL TIME
1	UNWRAPPED	GRA30-10	121	30	10	1hr 25min
2	LIQUID	LCD 20	121	20	0	43min
3	WRAPPED	VAC30-10	121	30	10	1hr
4	LIQUID	LCD 30	121	30	0	1hr
5	LIQUID	LCD 60	121	60	0	1hr 25min
6	UNWRAPPED	GRA60-10	121	60	10	1hr 55min
7	WRAPPED	VAC60-10	121	60	10	1hr 25min
8	FM TEST	TST FM	-	-	-	

Table 1. Autoclave Settings: Cycle number, settings and total run times

- 5.9. Once you have chosen a cycle, press on the cycle number button, you will be taken to the cycle run screen, as shown in figure 5.



Figure 5. Cycle run menu 1

- 5.10. To run the cycle, press the round green Start Cycle button on the lower right of the control screen. You will then see the second cycle run screen as shown in figure 6.



Figure 6. Cycle run menu 2

- 5.11. The cycle run menu 2 screen will be on the controller and showing an Abort Cycle button where the Start Cycle button was. The touch screen will go into power saver mode after a number of minutes. To wake it back up (to see how long it has left to run, etc.), make

sure you only touch the screen at the lower left corner in order to prevent accidentally aborting a cycle run.

- 5.12. If you need to abort a run (do only if the system has failed) then press the Abort Cycle button on the Cycle run menu 2. You will then see the screen in figure 7. Please wait until the abort procedures are finished before opening the door. Remember that very hot steam may still be in the chamber, so please step back.

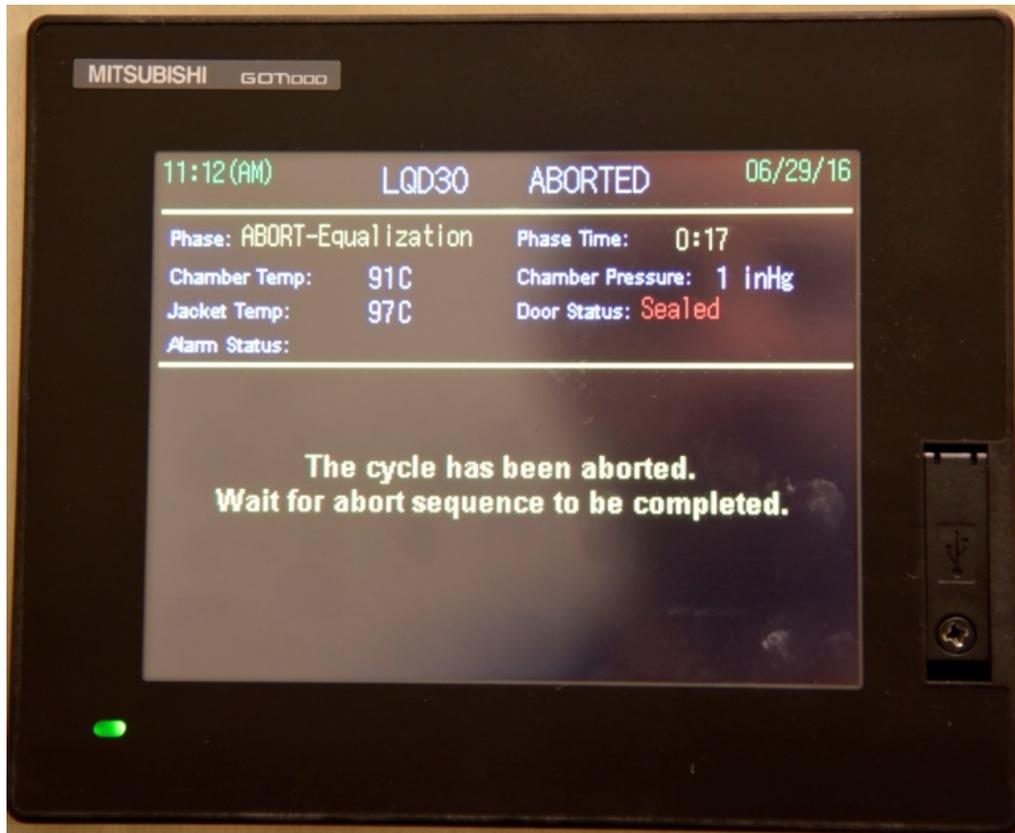


Figure 6. Cycle abort screen

- 5.13. When the cycle run has completed, remove your items while wearing the hot items gloves. Be careful as the walls are still very hot.
- 5.14. Enter a check under the successful column on the **AUTOCLAVE SIGN-UP** sheet.
- 5.15. Please leave the chamber door closed as this will reduce heat loss. The Steris does not pressurize the door gasket until a run is supposed to start.

VI. TROUBLESHOOTING

- 6.1. NOTE: When the building has lost power, compressed air, natural gas or deionized water, the autoclave is not functional, as it depends on all four to function. It may also not function if we are having a load shed (in which the campus selectively shuts down power) or brownout power situation.
- 6.2. When you can troubleshoot on your own – Failure modes still being analyzed.
 - 6.2.1. Autoclave does not respond to touch controller – power may be off, contact the department Research & Development Engineer.
 - 6.2.2. Autoclave has gone into a failure mode or won't seal the door – contact the department Research & Development Engineer or FM.



VII. REVISION HISTORY

This preliminary SOP000026 V1 was created on 4/3/2017 and replaces SOP000026 V0.5 created on 6/24/2016.