

# Safe use of the Autoclaves

## In Containment Level 3 suites

### 1. Introduction

The autoclaves in the containment level 3 are general-purpose laboratory autoclaves intended primarily for media preparation, the making safe of ordinary laboratory and pathological waste and other apparatus sterilisation purposes.

The autoclave in the lobby is to be used for any tip boxes/waste generated in the lobby and the large CL3 suite, whilst the autoclave in the small suite is meant for waste generated in the small suite only.

Waste must be accumulated in the autoclave bags within the metal buckets provided in the facility. Once  $\frac{3}{4}$  bags must be autoclaved as per the Standard Operating Procedure described below.

A rota exists for each suite, nominating the person on duty for autoclaving waste for the said week.

In case of break down waste will have to be treated as per the procedure detailed in the Code of Practice of the CL3 suites.



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## 2. Operating summary

1. Load the autoclave:
    - a. Close the autoclave waste bag loosely with a cable tie (do not fasten it all the way).
    - b. Place the bag within its metal bin in the autoclave. **Place the probe in through the holes of the bucket and rest it between the inner and outer autoclave bag** – if double bagged or inside the load.
    - c. Be careful not to pinch the cable when loading two buckets.
    - d. Shut the lid of the autoclave, be careful not to trap the cable of the probe.
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2. Set the program, functions have already been selected for each program:
    - a. Program 1 for general waste **136C 12min**
    - b. Program 2 for liquid waste **136C 12min**  
(No liquid waste should be produced from CL3 suites)
    - c. Program 3 for tip boxes **123C 12min free**
  3. Move the locking handle to the left in one action to lock the door.
  4. Wait a few seconds for the 'start' indicator to illuminate, and press the 'start' button to begin the cycle.
  5. After approximately 3 hours the cycle will have completed itself.
 

**Do not move the handle until the thermal lock has withdrawn as this may lead to damage (55C)**

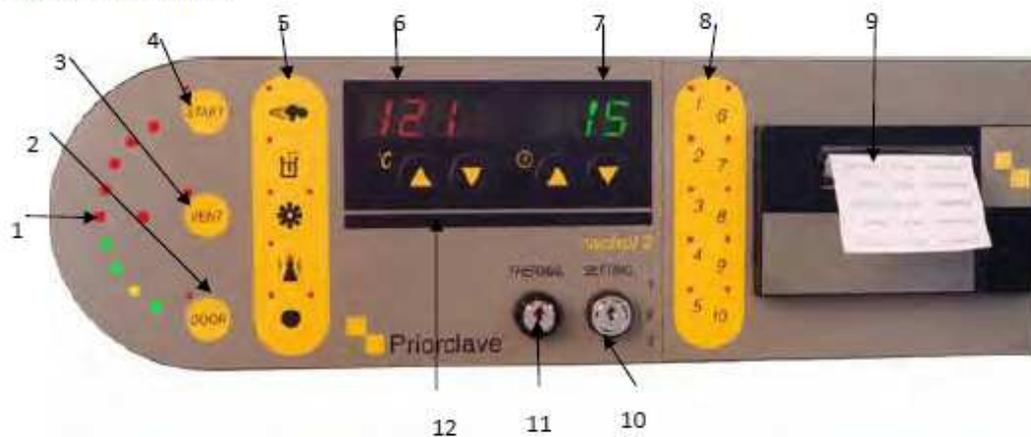
    - a. Press the Door button, the instrument will display HOLD, wait approximately 20sec.
    - b. When the instrument emits a loud noise press the button door again and open the lid by moving the locking handle from right to left until it reaches its safety stop.
    - c. Release the safety catch by pushing it down with your thumb and move the locking handle to the end of its travel. Open the lid.
  6. Take care of not jerking the probe when lifting the buckets out of the autoclave.
  7. Tip excess water back into the autoclave.
  8. Fasten the zip tie fully, then place the autoclaved load into a yellow clinical waste bag.
  9. Zip the clinical waste bag tightly and place it in the yellow bin outside of the Cat3 lobby.

### 3. Cycle Abort

Aborting a cycle

- To abort the cycle at any stage press the 'Start' Button
- Allow the load to cool down below 55°C before opening the lid.  
Note this will take considerably longer as none of the cooling option will be activated after aborting the cycle.

Control Panel Details



- |                             |  |
|-----------------------------|--|
| 1. Cycle Progress Display   | 7. Time Display & Setting Buttons          |
| 2. Door Button & Indicator  | 8. Program Buttons & Indicators (Optional) |
| 3. Vent Button & Indicator  | 9. Printer (Optional)                      |
| 4. Start Button & Indicator | 10. Setting Lock Keyswitch (Optional)      |
| 5. Function Display         | 11. Thermal Lock Key                       |
| 6. Temperature Display      | 12. Operating Buttons                      |

### 4. Cycle options



#### ***Pulsed free steaming***

With certain loads and in certain situations the efficiency of the free-steaming process can be improved by pulsing. When available according to program then free-steaming commences as described above but at a higher temperature (usually about 112°C). Instead of remaining open for the entire free-steaming period the vent valve shuts off at a lower temperature (usually about 107°C). The autoclave then heats up again to the temperature at which the vent valve opens again. The autoclave will continue this cycle for the time set when selecting free steaming.

This continual pulsing of steam out of the autoclave creates considerable turbulence within the autoclave, helping to draw trapped air out of the load.

If fitted, this function is program specific and is usually set up during commissioning or by request on particular programs in response to customer requests at the time of ordering.

When selected as part of the program the pulsing function replaces the standard free-steam function described above.

Setting of the free-steam time for a particular program is as described above.

**Pulsed free-steaming is not suitable for bottled liquids and should not be selected for cycles intended for these types of load.**



### **Rapid Cooling**

A fan is fitted into the bodywork of the autoclave to direct cool air over the autoclave vessel. If selected by using the **cooling** button, the cooling fan will switch on automatically during the cooling stage of the cycle. There are three possible settings for rapid cooling, and these operate as follows:

**Off** - No indicators lit.

**Immediate start** - the cooling fan does not operate at all during the cycle.

Left hand indicator lit. - 1 press of the **cooling** button.

The cooling fan starts as soon as the cooling stage is reached.

**Delayed start** - both indicators lit- 2 presses of the **cooling** button.

The cooling fan starts after the autoclave chamber has cooled to 100oC.

This setting is useful when autoclaving some fluid loads, as bringing the cooling fan on at temperatures above 100oC may reduce the chamber pressure too rapidly, causing the load to boil.

**In both cases the fan will switch off automatically when the cycle has reached the complete stage.**

**Pulsed free-steaming is not suitable for bottled liquids and should not be selected for cycles**

## **5. Common error messages**

### **Report any fault to Tiph Bouriez-Jones**

- **SERVICE** This means that 500 cycles, or six months have passed since the autoclave was last serviced.  
The engineer will cancel the message when the autoclave is serviced.
- **LOCK** This warning will light when the thermal lock key switch is in the override position.
- **F000** If your autoclave is fitted with the optional self-validation system, an error in the temperature measurement system is signalled by fault code **F000**.  
Usually this would mean that a critical error has developed in the temperature measurement system, however, as the detection system is extremely sensitive it is possible that it may be triggered by fluctuations in the electrical power supply. If fault code **F000** appears it may be cleared by the method described below.  
If the fault code will not clear, or continues to re-appear then the user cannot correct the fault. In such a case please contact Priorclave service or your local Priorclave approved service agent.
- **LOAD + FAULT CODE F001**  
This warning is activated in the event of the failure of the load sensing thermocouple. The thermocouple should be replaced as soon as possible. Great care should be taken to ensure that loads which would ordinarily be autoclaved with load sensed process timing are adequately sterilised.

- **F002** Failure of the temperature control, display, or load simulator thermocouple.
- **O/HEAT + FAULT CODE F003**

The heater over-temperature protection thermocouple may have sensed that the heating element became too hot. This is probably due to a low water condition, which was not sensed by the low water probe. The water level and the condition of the probe (see Maintenance) should be checked before attempting to use the autoclave again. If heater over protection is not fitted then the over-heat cut out will only operate under extreme conditions, such as a failure of the temperature control system. The next attempt to run the autoclave should be closely observed and if problems persist contact Priorclave Service.
- **WATER + FAULT CODE F004**

The water level has fallen below the minimum level and must be topped up before the autoclave can be run. The warning will automatically cancel when the door is opened and the water level is topped up. The low water condition may have caused a running cycle to abort, and the load may need to be autoclaved again.
- **F005** The chamber temperature falling below the set temperature by more than 30C during the process dwell time.
- **F006** Power to the autoclave being interrupted when a cycle is in the heating or process dwell stage of the cycle.
- **F007** Vacuum stage timeout (loop break). The autoclave has not achieved the pre-set level of vacuum during the Pre-cycle vacuum stage during the pre-set time.
- **F008** Heating stage timeout. The autoclave has not reached process temperature within the Pre-set time.
- **F009** Vacuum cooling set-point not achieved. The autoclave has not achieved a low enough level of vacuum during the post cycle vacuum stage (Vacuum Cooling or Drying Cycle)
- **F010** Air detector input activated. If fitted the air detector system has detected an over pressure condition symptomatic of excess air remaining in the load.
- **F011** Printer Timeout / Malfunction. The control system has not received confirmation from the printer within its pre-set timeout.
- **F012** Door micro-switch fault. If a door micro-switch opens during a cycle this fault code is displayed
- **F013** Jacket Timeout -If a jacket is fitted it has not reached the required temperature within the Pre-set time. This would indicate a problem with steam supply or inlet or drain valve operation
- **F014** Jacket Over temperature - If a jacket is fitted the temperature has exceeded the pre-set alarm temperature
- **F015** Jacket under temperature - If a jacket is fitted the temperature has fallen below the pre-set operating temperature band.
- **F016** Water Fill Timeout - the upper level water probe level has not been reached within the allowed time for filling and the filling operation has been stopped. This function prevents continuous unsupervised operation of the water fill, which could lead to flooding.
- **F017** Free-Steam - During Pulsed Free-steaming operation the lower of the two set temperatures has not been achieved. The temperature has not fallen sufficiently following the opening of the vent valve.
- **F018** Heater Overheat. If this fault occurs then the most likely cause is a Low Water condition. Check the water supply is turned on and the condition of the heater before resetting this fault.

- **CANCELLING FAULT MESSAGES**

The fault messages are cancelled by first correcting the source of the original fault, then turning the setting lock key switch to position 3. If a key-switch is not fitted they are cancelled by pressing the reset button. If 2 or more faults occur at the same time, the one with the highest priority is displayed. (F000 is the highest priority and F012 is the lowest.) If a higher priority fault is cleared it will be replaced by the next active fault, unless this too is cleared by the same action.

## **6. Cleaning of water sensor probes**

The autoclave uses immersion heaters in a reservoir of water at the bottom of the autoclave to raise steam. The heaters are protected from boiling dry by a low water cut-out. If the water level falls below the sensor the autoclave shuts down, the **low water** warning indicator is lit and fault code **F004** is shown in the temperature display.

**Great care should be taken to ensure that the un-insulated part of the low water sensor is clean (see diagram in Maintenance section) as a build-up of contamination here will prevent the low water cut-out from working and could lead to heater damage.**

### ***Maintenance***

- Turn off the instrument at the wall.
- Empty the autoclave of load if present.
- Remove the shelf at bottom of the unit
- Syphon out all water present using the syphon located in the CL3 lobby.
- Gently scrub the two water sensors situated at the bottom of the unit.
- Turn the instrument back on, check that water level are coming up to the second water sensor.
- Replace the shelf above the probes.
- Make a note of the cleaning in the Instrument Maintenance Records.
- The autoclave is ready to be run.

**Instrument Maintenance Record Sheet**

Lobby Autoclave

Last validation:	
Error messages:	Maintenance:
	Cleaning of probes 13/03/2015 TBJ

Small suite Autoclave

Last validation:	
Error messages:	Maintenance:
	Cleaning of probes 17/03/2015 TBJ