**Purpose**

The purpose of this SOP is to ensure the user has a basic understanding on how best to safely operate the Priorclave autoclave. This equipment should only be operated by authorised personnel or lab personnel.

**Scope of policy**

This SOP will include how to operate the autoclave in the safest way possible, how to maintain and clean the autoclave on a regular basis, and important safety information to consider when using the autoclave.

**Introduction**

The laboratory bench top autoclave (Priorclave compact 40) is used to steam sterilization of liquid (media or other fluids in unsealed containers) and dry (instruments, plastic, dry glassware). The laboratory bench top autoclave is used every day for the sterilization of laboratory equipment, glassware, liquid, and is situated in the innovation laboratory (696.10.14) on the ground floor. The equipment weighs in excess of 120kg and requires at least two persons to lift. The autoclave uses immersion heaters in a reservoir of water below the lower shelf to raise steam. The heaters are protected from boiling dry by a low water cut-out.

**Thermal Lock**

Safety thermal lock (50°C door retention device) is set for load. Under normal circumstances the autoclave cannot be opened until the temperature of the load has fallen below 50°C. The thermal lock can be overridden using the key-switch on the control panel. This will cause the main vent to open. Great care should be exercised when using the key-switch since the loads could boil over if vented at elevated pressures and glassware could be damaged.

**Water supply**

Reservoir should contain 75% De-ionised and 25% tap water in the chamber as it rely on electrical conductivity to detect water supply.

**Bench load**

The autoclave when loaded and with a full water charge will weigh around 100-150kg. 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 or apprentice lab technician.

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 2 pre-programmed cycles installed in the benchtop autoclave

* Cycle 1: Dry/plastic – 121°C for 15 min.
* Cycle 2 Liquid – 121°C for 20 min.

**Access codes**

* Key position (000) **1** it will only allow the user to start/stop the machine and open the door.
* Key position (000) **2** which allows to start/stop the cycle and switch between programs. The user will not be allowed to change the settings within the programs.
* Key position (000) **3** allows full access. The user will be able to start/stop the cycle, switch between programs and to change the settings within the programs if required please contact lab manager or apprentice lab technician.

**Switch between the programs**

* Step 1 – press the OK button on the control panel for 4 seconds.
* Step 2 - The screen will then ask for the user to enter the access code which is **0002** by using the up and down arrows on the control panel and press OK.
* Step 3 – Once the access code is entered you will be asked if you want to clear faults. Select YES or NO then move to the right arrow to move to the next page symbol and press OK.
* Step 4 – next available screen will allow you to select a pre-programmed cycle’s see above. Scroll up and down with the arrows keys and press OK when the desired program is selected. It will return to the main screen and press start.

**Opening the Door**

1. Check the electricity supply is **ON**, and that the power is switched on at the wall socket.
2. To open the autoclave door press and release the **DOOR** button, which will bleep, and wait for a short time (about **20** seconds) until the **door** indicator illuminates and the sounder **bleeps** again.
3. During the wait time the temperature display will show **Hold** (confirming that the autoclave is waiting during its safety delay).
4. On pressing the **door** button a second time, you may hear the locking solenoid operate. You may now lift up the locking handle to the safety catch position. The safety catch is released by pushing it forward with your thumb and then lifting the locking handle to its fully open position. The door now can be pulled **open gently**.

**PPE**: Care should be taken when opening the door as it will be hot and steam may be released. Heatproof gloves and face shield should always be worn when unloading autoclaves.

**Checking water level**

1. Always check the condensate collection bottle on the right hand side of the machine, to make sure it is empty and not over flowing. Empty when ¾ full as to the marked black line.
2. The reservoir should be filled with **tap and de-ionised** water to a level just below the weir plate at the front of the autoclave. Always check the water level before starting a cycle.

**Loading**

1. Load the autoclave with the either the glassware, liquid or waste to be sterilised directly onto the shelves or in baskets, or in the case of waste loads which may leak liquids when autoclaved, water tight discard containers:
	1. In the case of liquid, check that the bottle lids are not tightly shut to prevent pressure build up with the bottle.
	2. In the case of dry/plastic, ensure the probe is left loose and that any bottle lids are not tightly sealed.

**Settings**

1. Once the autoclave has been satisfactorily loaded the controls should be set for the process cycle you require. See section pre-programmed cycles.

**Closing the pressure door**

1. When you have selected your pre-program cycle close the door with the locking handle in the fully raised position.
2. Then, in a single action push the handle down into the locked position. The door will now be properly secured.

**Starting a cycle**

1. Ensure the door is properly secured and the autoclave screen will display **VENT CLOSED DOOR CLOSED** Ready to Start. Then press the **START** button on the autoclave to begin the cycle.
2. The complete cycle will be displayed on screen, and the autoclave will emit a bleep for a short time (about 10 seconds). The autoclave is now ready to open and unload.
3. Use the heat resistance gloves and face shield provided to unload the autoclave.
	1. In the case of liquid, reseal the bottle lids while wearing heat resistant gloves.
4. Aborting a cycle, simply press the **start** button.

**Trouble shooting:**

* If an over-temperature is detected from the sensor then power to the heating circuit will be switched off and fault code **F018** will be shown in the temperature display. Should this occur, then the autoclave should be switched off and allowed to cool to a safe temperature and pressure, before opening for examination of the water level.
* It uses a water conductivity probe which detects water level using the conductivity of the water. If the water falls below the sensor the autoclave shuts down, the lower water warning is lit and fault code **F004** is shown in the temperature display.
* In hard water areas (i.e. Oxfordshire) softened water must be used to prevent scale from forming in the autoclave.
* The **F018** or **F004** indication must be manually re-set when the door is opened by turning the program setting lock key-switch from positon 1 to 3 and back again.
* Refer to manual page 34.

**Aborting a cycle**

To abort the cycle at any stage press the **START** button.

**Thermal lock Override:**

1. First abort the cycle as above.
2. After checking that there is no pressure within the autoclave turn the thermal lock key to the right hold it there.
3. Press the DOOR button once, keeping the thermal lock key held over.
4. Wait during the HOLD display until there is a bleep and the DOOR indicator illuminates.
5. Keep the key held and press the DOOR button once to unlock the door.
6. The key-switch can now be released and the door opened as above.
7. If the key is released at any stage the procedure must be repeated to open the door and reset the display.

**Note:** Initial set up of the autoclave is 3 litres of Di-ionised water and 1 litre of tap water in the reservoir bottom of the autoclave below the lower shelf.

**Note:** Care should be taken when loading the baskets or containers are not to pack them too tightly with material.

**Note**: Depth of un-perforated discard containers should be no greater than 180mm for effective air displacement from the load.