

Risk Assessment Form

Procedure	Use of Binder CO ₂ Incubators
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Name(s) of person performing the work	Users (Lab manager & Lab Technician & Tenants)		
Name & position of assessor	Khwaja Islam & Laboratory Manager	Signature	
Date of assessment	01/10/2018	RA Number	BioE 0010

Outline of procedure / activity:

CO₂ incubators (Binder C160) are designed to copy a cell's natural environment with a relative humidity of around 95%, a temperature of 37°C and a pH of 7.2 to 7.5. They are most common in biology labs performing tissue or cell culture and are used in any process where cells need to be cultured for a few hours or many weeks or where cells need to be expanded or maintained.

The CO₂ incubators (Binder C160) are equipped with multifunctional microprocessor display controller for temperature, CO₂. It consist of inner chamber, the pre-heating chamber and the inside doors are all stainless steel. The chamber's heating system permits hot-air auto-sterilization (187.5°C). Thus, a temperature of 180°C is maintained for at least 30 minutes on all internal surfaces. A highly precise CO₂ infrared measuring system with the permanent mixture of CO₂ gas allows precise and constant CO₂ concentrations for long periods. This creates optimum growth condition for cultures. The temperature range is from 7°C to up to 140°C and the CO₂ range is from 0 vol.-% up to 20 vol.-%). The permadry water pan system ensures high humidity inside the chamber. The permadry water pan consists of two pans in which the outer one is heated and the inner one cooled. The outer pan is filled with distilled water (approx. 2 litres) (or DI water that has been sterilized i.e. autoclaved) up to the filling mark on the edge of the inner pan with 2 ml of aqua-resist. There are four CO₂ incubators which are located in TC lab (696.10.26).

Factory setting:

The chamber is supplied with the following basic parameters:

- Temperature set point 37°C.
- CO₂ Concentration 5 vol.-%.
- Safety controller class 3.1 38.5°C
- Sterilization temperature 187.5°C.
- Audible alarm signal (buzzer) turned on.

Operator must be trained in operating CO₂ incubators to guarantee safe daily use. Untrained Personnel are not be allowed to operate the CO₂ incubators. Users should operate the CO₂ incubators according to instructions in the manual. User must always ensure that power cable is in good condition, no wires exposed.

Start up:

1. Turn **On** the chamber by the main power switch (on side of the incubator). The pilot lamp shows the chamber is ready for operation (front of the chamber next to the context-sensitive buttons).
2. Note: the chamber is in stand-by mode when the main switch has been turned on and yet the controller is dark. Turn on the chamber by pressing any controller button.
3. Warming chamber may release odours in the first few days after commissioning. This is not a quality defect. To reduce odours quickly we recommend heating the chamber to its nominal temperature for one day.
4. After chamber start up power supply was interrupted symbol will appear on in the controller display. Confirm with OK to close the window and make the icon disappear.

Equilibrium time:

1. Temperature: equilibrium time is approx. 1 hour.
2. CO₂: after approx. 5 minutes, the CO₂ concentration equilibrates automatically to the pre-set value of 5 vol. % CO₂.

Notes on handling CO₂:

- Carbon dioxide in high concentrations is hazardous to health. It is colourless and almost odourless and therefore practically imperceptible.
- High concentration of CO₂ (>2 Vol.-%), danger of death by suffocation and poisoning.
- If the CO₂ is released, leave the area immediately. The beacon and alarm will sound simultaneously outside the laboratory.
- Only re-enter the laboratory if it is safe to do so from authorised personal.

Hot-air sterilization at 180°C:

The chamber can perform an automatically controlled hot-air sterilization cycle. This procedure will take approx. 10 hours (heating up phase and holding phase is in total 4 hours). This ensures that 180°C is maintained on all internal surfaces for at least 30 minutes. Followed by cooling down phase of 6 hours until 37°C is reached).

1. Before carrying the first hot-air sterilization, remove any protective lamination sheet from the inner metal surfaces.
2. When starting hot-air sterilization, CO₂ controls automatically deactivated.
3. The safety controller settings are inactive during sterilization.
4. Empty the permadry water pan before sterilization.
5. Water pan and shelves must be inside the chamber.
6. Close the inner glass door and the outer chamber door.
7. Before starting a hot-air sterilization, the entire interior must be clean and dry. No residue e.g. water, medium or plastic must remain inside the chamber.
8. To start the hot-air sterilization cycle, go to MENU or QUICK MENU>HOT-AIR STERILIZATION.
9. Select "START".
10. Press the operating button (big round black button).
11. "Warning: samples and water must be removed! Is displayed. Confirm the message with "OK". Make sure the all samples and water have been removed.
12. Select "really start" and press the operating button.
13. The controller returns to the initial view, and hot-air sterilization begins.
14. STE symbol on the controller display in the initial view indicates that the hot-air sterilization is

running.

Aborting the hot-air sterilization – general procedure: three events lead to aborting the automatic sterilization cycle prematurely:

- Abortion via the controller menu.
- Opening the outer door.
- Turning off the chamber at the main power switch, or a power failure.

To abort the hot-air sterilization cycle via the controller menu:

1. Go to MENU>hot-air sterilization.
2. Select “STOP”.
3. Press the operating button.
4. Submenu “stop hot-air sterilization”.
5. To abort the hot-air sterilization, select “Really stop”.
6. Press the operating button.
7. The interior may still be hot. Do not touch the glass door and inner surfaces for approx. 7 hours after aborting sterilization.

Safety:

- DO NOT install the chamber in unventilated recesses.
- Ensure sufficient ventilation for dispersal of the heat.
- DO NOT operate the chamber in potentially explosive areas.
- KEEP explosive dust or air-solvent mixtures AWAY from the chamber.
- DO NOT introduce any substances into the chamber which is combustible or explosive at working temperature.
- NO explosive dust or air-solvent mixture in the inner chamber.
- The chamber must NOT become wet during operations or maintenance.
- DO NOT touch the inner doors, the inner door and glass door handles, and the inner surfaces after sterilization.
- DO NOT spray the disinfectant directly on the CO₂ sensor.
- Wipe the sensor with a lint-free cloth soaked with disinfectant.

Potential hazards

Substance or item handled	Associated Hazard (s)	Existing Control Measures	Risk (L/M/H)	Further Action required	Risk (L/M/H)
Use of CO ₂	High concentration of CO ₂ – risk of asphyxiation. Danger of poisoning.	All operators should be trained on proper operating procedures before operating the incubator. Must wear PPE (lab coat and gloves and safety specs). There is a CO ₂ warning system in the laboratory. If the alarm is SOUNDING, leave the lab immediately, close the door. DO NOT enter the lab until it is safe to do.	M	No further action required if the existing control measures are adhere to.	M
Use of CO ₂ Incubators	Heat sterilization of incubators (187.5°C) – danger of burning.	All operators must wear PPE (lab coat and heat resistance gloves and safety specs). During sterilization and straight after the inner doors, the inner and glass door handles, and the inner chamber will become very hot. Do not leave the Tscan probe in the chamber otherwise it will damage it.	M	No further action required if the existing control measures are adhere to.	M
Use of CO ₂ Incubators	Electrical hazard - Electrical shock – danger of death.	Only switch on the device if the device and power cable are undamaged. Only trained personal are allowed to use the machine. Incubator is earthed, protective earth connection for the machine is	L	No further action required if the existing control measures are adhere to.	L

		provided using 13A plug fitted to the machine (RCD protected). Make sure it has been PAT tested. The chamber must not become wet during operation or maintenance. Regular visual checks of power cords for fault, fraying or wear and regular electrical safety check. Any faults reported and repaired before use.			
Use of 70% Ethanol	Highly flammable	Use spray bottle and limit amount of ethanol used to avoid creating an explosive atmosphere. Refer to BioE COSHH 0003.	M	No further action required if the existing control measures are adhere to.	M
Use of Aqua-resist	Highly flammable	Use 1ml per 1 litre of water. Refer to BioE COSHH 0008.	L	No further action required if the existing control measures are adhere to.	L

Persons potentially at risk:

Only the user or others near by

Action in event of an accident or emergency:

1. **Fire:** raise the fire alarm and evacuate the area.

Arrangements for monitoring effectiveness of control:

Daily inspection of equipment by lab technician.

Annual preventative maintenance and calibration carried by external contractor.

Instruction and training given to all operators which is reviewed annually.

Existing operators receive annual refresher training.

Annual pat testing by external contractor.

Arrangements for monitoring effectiveness of control:**Review of the Risk Assessment:**

Date of review		Name of reviewer	
Date of next review		Signature	

Have the control measures been effective in controlling the risk?

Yes	No
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Have there been any changes in the procedure or in the information available which affect the estimated level of risk from the listed substances

Yes	No
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What changes to the control measures are required?

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