

Standard Operating Procedure

SOP004

Title: General Laboratory Housekeeping

Location: CBE Laboratories

1. PURPOSE

To provide details of the practices and procedures required to clean and maintain safe operation of the Centre for Biological Engineering (CBE) laboratory unit.

2. SCOPE

This SOP applies to the Rooms H17 – H34, of the Centre for Biological Engineering (CBE) and its personnel. And describes the good housekeeping requirements to ensure that potential hazards are minimised and a clean environment is maintained.

3 SPECIAL NOTES: HEALTH & SAFETY

NOTE: Only authorised users who have had full training are permitted to work in the CBE Class 2 Laboratories un-supervised.

3.1 Use of Virkon

Virkon contains Potassium peroxomonosulphate, Sulphamic acid and Sodium alkyl benzene sulphonate. It may cause serious eye damage. The powder is irritating to skin and to mucous membranes through inhalation or ingestion.

- (i) Wear gloves and lab coat to prevent contact with skin.
- (ii) Wear goggles to prevent contact with the eyes. In case of contact with eyes, rinse immediately with water and seek medical advice.
- (iii) Avoid generating dust. Use face mask if significant dust is generated e.g. during major spill clean up.
- (iv) Wash hands after handling.
- (v) For more information, consult COSHH Risk Assessment form.

3.2 Use of ChemGene 1:50 & 1:20 dilutions

Please refer to specific SOP160 'Preparation and use of ChemGene disinfectant for use in the CBE labs'

Please note: Chemgene 1:20 wipes are used for general use, rather than paper towels. The wipes can be topped up with Chemgene 1:50 for general use and 1:20 for Deep Clean purposes.

3.3 Portable Appliance Testing Requirement

- (i) Refer to the Electricity at Work Policy
- (ii) Laboratory equipment requires annual testing. I.T equipment including computers; office

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- equipment, laboratory equipment (containing microprocessors) requires electrical testing four years after the initial testing with annual visual check of external wiring.
- (iii) Equipment must be tested after any electrical repairs have been carried out.
 - (iv) ALL new equipment, equipment loaned to or by the CBE must be tested or arrangements made with the borrowing Department to test the equipment.
 - (v) Ensure that all electrical equipment is examined by the faculty personnel and tested before it is relocated into the laboratory unit.
 - (vi) Three-phase equipment must be tested by the University's electricians.
 - (vii) PAT testing in the CBE is co-ordinated by the Laboratory Manager. However, any new piece of equipment must be tested by the Wolfson engineering electrical department.

NOTE: PAT testing can only be performed after the laboratory and equipment have been suitably disinfected (see SOP003) and a 'Decontamination Certificate' has been issued by the School/Building/Unit Safety Co-ordinator. An example of a Decontamination Certificate is given in Section 6

3.4 Asset Registration

- (i) Equipment must have an asset registration if:
 - it is valued at £1000 or more
 - it is valued at under £1000 but is a theft risk
 - It is a pressure vessel (also needs to be placed on Safety Register)
 - It is Lifting Equipment (LOLER)
- (ii) Asset Registration should be carried out by faculty personnel. Labels must be attached to the registered item and placed on the Asset registration database.

4 RESPONSIBILITIES

CBE Laboratory Users

- (i) All personnel are responsible for the proper cleaning and maintenance of equipment and laboratory surroundings according to this SOP.

Laboratory Leaders (LL)

- (ii) Laboratory leaders for each respective laboratory are responsible for the induction training of new personnel & for maintaining compliance to local rules & procedures.

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Responsible Person (RP)/Laboratory Manager (LM)

(iii) The Laboratory Manager (LM) is responsible for authorizing and coordinating the cleaning and maintenance duties by authorised staff and performing routine monitoring of the laboratories.

5 EQUIPMENT AND MATERIALS

- (i) Plastic buckets
- (ii) Disinfectant solution – 1%Virkon
- (iii) Approved Floor Cleaning Agent – ‘Ultraviolet’
- (iv) Plastic mop handles and disposable mop heads
- (v) 5L polyethylene container for 1% Virkon solution
- (vi) 10L stock bottle for 70% IMS
- (vii) 10L stock bottle for 1: 50 dilution of ChemGene
- (viii) 5L stock container for 1:20 dilution of ChemGene
- (ix) Spray bottles: for 1% Virkon,70% IMS and 1: 50 & 1:20 dilutions of Chemgene solutions for each lab.
- (x) Paper towels
- (xi) Systec VX-95 autoclaves
- (xii) Sanyo CO₂ Incubator(s)
- (xiii) Heracell Co2 Incubator(s)
- (xiv) Centrifuges & Microcentrifuges
- (xv) Water bath(s)

5.1 Preparation of 1% Virkon Solution

- (i) Add 1 sachet (50g) Virkon powder to 5 liters’ of cold water **NOTE:** To avoid splashing and powder dispersal, always add Virkon to water never the other way round.
- (ii) Stir using a long handled stir bar until dissolved.
- (iii) Label the container

CAUTION: Use protective equipment including eye protection and chemically resistant gloves when using sanitizing agents. Avoid contact with eyes, skin, and mucous membranes.

NOTE: Virkon solutions become ineffective after 7 days, evident by a loss of pink color. Do not use Virkon solution after the expiration date on the label. Flush into a sink using copious amounts of water to dilute it.

WARNING - Virkon is corrosive and when used on metals should never be given a contact time exceeding 10mins

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5.2 Preparation of 70% (v/v) IMS solution

- (i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.
- (ii) In a well-ventilated area, away from any ignition sources, use a funnel to pour 2.5L IMS (99%) into the storage and dispensing bottle
- (iii) Add 1.07L of double distilled water (DDW) to dilute to 70%
- (iv) Attach label.

Identity: E.g. 70% Industrial Methylated Spirit
Preparation date: E.g. 01.08.06
Expiry date: E.g. 08.08.06
Prepared by: E.g. YL
Storage conditions: E.g. Ambient temperature

5.3 Preparation of 1:20 ChemGene dilution

A stock solution of 1:20 Chemgene solution in a 5L container will be maintained in Room H34. This will be topped up by the Laboratory User on Duty using the following procedure:

- i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.
- ii) Fill up a 1L measuring cylinder with 950ml of deionised water from the water purifier.
- iii) Fetch a bottle of the concentrated Chemgene 5L solution and top up the measuring cylinder with 50mL of concentrated Chemgene.
- iv) Pour into the 5L stock solution container using funnel. The pouring will allow the Chemgene and deionised water to mix.
- v) Repeat to top up the stock solution container.
- vi) To ensure that the stock solution does not last longer than a month, the Lab Manager will empty the entire stock solution every three months and start from scratch. An electronic reminder will be set in the Lab Managers calendar.

5.4 Preparation of 1:50 ChemGene dilution

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A stock solution of 1:50 Chemgene solution in a 10L container will be maintained in Room H34. This will be topped up by the Laboratory User on Duty using the following procedure:

- i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.
- ii) Fill up a 1L measuring cylinder with 980ml of deionised water from the water purifier.
- iii) Fetch a bottle of the concentrated Chemgene 5L solution and top up the measuring cylinder with 20mL of concentrated Chemgene.
- iv) Pour into the 10L stock solution container using funnel. The pouring will allow the Chemgene and deionised water to mix.
- v) Repeat to top up the stock solution container.
- vi) To ensure that the stock solution does not last longer than a month, the Lab Manager will empty the entire stock solution every three months and start from scratch. An electronic reminder will be set in the Lab Managers calendar.

6 PROCEDURE

Designated 'Teams' of laboratory personnel (led by lab leaders) are required to routinely perform housekeeping duties in the laboratories according to the following schedules:

- Daily maintenance checks (autoclaving waste)
- Weekly maintenance & cleaning. (waste disposal, stocking of consumables & virkon/IMS/ChemGene, cleaning work surfaces & mopping)
- Weekly inspections for incubators & centrifuges.
- Weekly cleaning of the water bath(s) & BSC(s) .
- Preventative maintenance duties (monthly/less frequently) by the responsible person for designated equipment.
- The housekeeping rota is notified to all lab users by E-mail in advance .
- Housekeeping duty checklists & preventative Maintenance records are located outside each respective laboratory. Individuals should sign & date when each task is completed.

NOTE: It is important to open the taps on every sink for five minutes every week to flush out potential harmful bacteria.

6.1.1 Aspiration Bottles

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- (i) To ensure that the aspiration waste is treated for 24hrs, every day the first user of each BSC will exchange the used aspiration bottle for a clean bottle (whether they are using the aspiration trap or not) by following the below procedure:

1. Dispose of the 24 hr virkon treated waste contained within the spare aspiration bottle (the one not attached to the pump) down the drain followed by copious amounts of running water.
2. Rinse this bottle.
3. Add 1 x 5g virkon tablet with 50ml of water for every 250ml expected waste – if in doubt start with 1 tablet as users throughout the day can add more if required.
4. Write the date & number of tablets added on the BSC log sheet as well as on the aspiration bottle.
5. Remove the current aspiration bottle attached to the pump, making sure to fit a lid and write the disposal date on this bottle and leave to treat for 24hrs (this will be disposed of by the first user the following morning when the procedure starts again).
6. Attached the clean/refreshed aspiration bottle to the pump.
7. Throughout the day each new user is responsible for making sure that there are enough virkon tablets in the aspiration bottle for the amount of waste contained within it – if more tablets are require the user will add the desired amount of tablets an write how many were added on the bottle and the log sheet.

6.1.2 N₂/O₂/CO₂/ Gas Cylinders

- (i) In the CBE cylinders are located in the gas pods outside the laboratory. A gas indicator panel is located on the wall in the research office to indicate various gas levels.
- (ii) If the gas(s) levels are low there will be an audible alarm in the office. Please inform the Laboratory Manager. The Gas Cylinders are set up for automatic switchover. Please refer to SOP058 for more detailed information.

6.1.3 Cryotanks (CBE only)

- (i) Currently the Liquid Nitrogen level is regularly checked & replenished by designated personnel. The minimum safe level should be 19cm as indicated by the dipstick. Place the dipstick through the centre hole in the bottom of the tank before a reading is taken.

NOTE: The Dewar's are located in Gas Pod 3. Keys can be obtained from the key cabinet in the first change room (H31). The procedure for transporting liquid nitrogen into the laboratory is detailed in SOP013.

NOTE: The Cryotanks are part of the facility continual temperature monitoring system. Please Refer to SOP141 ' Temperature Monitoring & emergency response system' for more information

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- (ii) Check that the Oxygen monitors are switched on a working. **NOTE:** They will alarm if there is a depletion of oxygen. (See the manual for limits, testing and use). If the monitor alarms, leave the laboratory, leaving the door open to replenish the depleted oxygen. Only return to the laboratory when the alarm has stopped. Contact the Laboratory Manager or the Area Safety Advisor.

6.1.4 Floors

Once a week ALL the floors of the CBE laboratories including the change rooms, autoclave rooms and store rooms must be cleaned with Ultraviolet floor cleaner.

- (i) Remove as much as possible off the floor, including items under benches and ensure that incubators and BSC's are closed before cleaning the floor.
- (ii) For large hard surface areas: Rinse the mop heads in a bucket containing an approved cleaning agent.
- (iii) Retrieve wet floor hazard signs and place on floor to alert others working in laboratory.
- (iv) Clean the floors by beginning at the point furthest the entrance and moving towards the exit using overlapping strokes.
- (v) Allow to dry. **NOTE:** Avoid walking on sanitized surfaces.

6.2 Equipment Preventative Maintenance Schedule

All laboratory personnel are responsible for helping with the running of the laboratory. Some laboratory equipment is maintained as part of the housekeeping duties. However, other equipment is divided between all laboratory users to ensure each piece of equipment has a responsible person to ensure preventative maintenance is conducted & recorded. The equipment maintenance checklists are posted outside each respective laboratory. Laboratory users are expected to complete these checklists as & when maintenance is performed. This could be a decontamination, a repair or a service.

6.2.1 Class II BSC's

Please refer to individual SOPs for BSC(s) for exact procedure for preventative maintenance.

6.2.2 Incubators

Please refer to individual SOPs for incubators for exact procedure for preventative maintenance.

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6.2.2.1 General Preventative Maintenance for incubators

- i) Arrange a convenient date with lab users before commencing the cleaning.
- ii) Clean one incubator at a time. Transfer everything from one incubator to another, informing the owner of where their work has moved to.
- iii) After switching the incubator back on, allow to reach the correct temperature & CO₂ level before returning any items to the incubator.
- iv) Record maintenance procedures and outcomes in the maintenance record sheet.

6.2.3 Centrifuges

Please refer to individual SOPs for centrifuges for exact procedure for preventative maintenance.

Centrifuges should be inspected by the Housekeeping Team and cleaned by the responsible person on a regular basis. However, it should also be inspected before each use.

6.2.4 Water Baths

Please refer to individual SOPs for water baths for exact procedure for preventative maintenance

Water baths should be checked and cleaned on a weekly basis by the housekeeping team.

6.2.5 Anachem Mechanical Pipettes (General Use)

Please refer to SOP for more information.

Pipettes are calibrated & serviced annually. Mechanical pipetting aids should be checked and cleaned every 6 months by the responsible person. However, laboratory users should be flagging up pipettes that require attention.

6.2.6 Fridges and Freezers

Fridges and Freezers should be inspected every month by the responsible person

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- (i) Check contents of the fridges and freezers are securely stored. If there are any problems inform the Laboratory Manager.
- (ii) Check the fridges and freezers for signs of potential problems e.g. puddles of water, frozen reagents in the fridge or thick ice. If there are signs of any problems inform the Laboratory Manager.
- (iii) Dispose of anonymous incorrectly labelled items.
- (iv) If overcrowded, check items and rationalize storage.
- (v) Discard items out of date.
- (vi) Defrost freezer if required.
- (vii) Check Inventory, dispose of material with no COSHH assessment.

NOTE: Fridges & freezers are part of the facility continual temperature monitoring system. Please refer to SOP141 'Temperature monitoring & emergency response system' for more Details.

6.2.7 Eye Wash Stations

Eye wash stations are located next to all hand washing facilities.

Eye Wash stations should be checked every month

- (i) Check to ensure that eye wash stations are in date.
- (ii) Replace out of date or used bottles

6.2.8 First Aid and Spill Kits

NOTE: The first aid kit is located in the CBE office along with a list of contact numbers and names of qualified First Aider's. Biological & chemical spill kits are located in all change rooms & chemical spill kits are located in the first change & H34.

First Aid kits and Spill kits should be checked quarterly

- (i) Check kit contents against the enclosed itemised list.
- (ii) Check contents are in date.
- (iii) Replace out of date or used contents.

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6.3 Laboratory Deep Clean

The CBE/Wolfson laboratories need to be 'deep cleaned/Spring cleaned ' twice a year. During the shutdown, the laboratories should be cleaned using the following procedure:

- (i) Clean all surfaces (doors,walls,benches,floors...) with warm water & general detergent. Rinse.
- (ii) Dispense the required quantity of the 1% Virkon (w/v) solution into the plastic buckets.
- (iii) Remove as much as possible from on top of the benches and from beneath the benches. Clean bench surfaces (above and below), windows, sinks & floors with virkon.
- (iv) Retrieve wet floor hazard signs and place on floor to alert others working in laboratory
- (v) For small hard surface areas or difficult to reach areas, spray surface with 1% virkon solution and wipe over with paper towels.
- (vi) Clean all drains by pouring 2 litres of 1% Virkon solution into each drain.
- (vii) Clean any stainless steel surfaces with ChemGene/IMS
- (viii) Clean BSC(s) in accordance with SOP.

NOTE: BSC require deep clean prior to contractor servicing the equipment during the shutdown & decontamination certificate subsequently generated.

6.4 Personal Protective Equipment

- (i) Each person carrying out work in the CBE laboratory unit will be issued with a laboratory coat & safety spectacles.
- (ii) The Laboratory Manager will arrange for these lab coats to be laundered every month. The nominated person must ensure that these lab coats are autoclaved before being sent for cleaning. **NOTE:** Visibly dirty or contaminated lab coats contaminated should be autoclaved immediately. Refer to procedures in SOP037 "Use of Personal Protective Equipment (PPE)".

6 DOCUMENTATION

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The following records are outputs of this SOP.

- 7.1 FSOP004.1 Example of Housekeeping duties log sheet
- 7.2 FSOP004.2 Example of Disinfectant Container Label
- 7.3 FSOP004.3 Example of IMS container label
- 7.8 QS-FORM-009 Generic Equipment Decontamination Certificate

NOTE: All forms can be found on the CBE LEARN page

SOP Version History

Version Reviewed	Date Revised/ Reviewed	Revision Summary	New Version Number
001	27Sept2009 Reviewed By K. Brosnan	1) Section 4 – authorized users note – “Keys will only be issued for access when full training is complete” removed 2) Section 6 included (iii) reference to Lifeguard disinfectant as the approved floor cleaning agent. Included (x) Systec VX-95 autoclaves 3) Section 6.2 amended to include note highlight IMS reservoir maximum of 5L 4) Section 7 – changed location of lab notice board from H19 to unclassified corridor. 5) Section 7.1 a) Changed location of waste bag record from notice board to housekeeping folder H23, analytical lab. b) Changed use of yellow biohazard bags to yellow lidded containers for the transfer of waste from red lidded bins. Removed comment referring to running a daily vacuum test on autoclaves this is not a requirement with current models. Removed reference to locked waste cage as it has been decided that this cage will no longer be locked. Also added note highlight need to allow aspiration bottles to sit overnight before being emptied. 6) 7.1 Changed procedure for preparing aspiration bottles, see procedural change order located in CBE office for more information. 7) Section 7.2.3 added note to not exceed 10 minute cirkon contact time with metals. 8) Section 7.2.5 removed incorrect reference to SOP006 and replaced with reference to section 6.2. 9) Section 7.2.8, Changed physics department to	002

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		<p>Materials Laboratory. Also reworded reattachment of probe after filling cryostore to reflect what is stated in SOP013. Included key cabinet in H31 and removed getting keys from lab manager.</p> <p>10) Section 7.2.9, Changed use of Virkon as floor cleaner, to approved cleaning agent. Also included note to place wet floor warning signs before mopping.</p> <p>11) Section 7.3.1, added note to not exceed 10 minute virkon contact time with metals</p> <p>12) Section 7.3.2.Changed cleaning requirement of incubators from monthly to quarterly, updated cleaning procedure. Also removed requirement to auto zero and reprogram the incubator after a full clean. Included a inventory check as part of the weekly duties.</p> <p>13)Section 7.3.4.Change water level in water bath to 8L</p> <p>14) Section 7.2.10, added sub section to detail weekly cleaning requirement of the chemical gas pod 1.</p> <p>15) Section 7.4 changed wording to remove specific dates for shutdown as it is uncertain whether these dates will suit.</p> <p>16) Section 7.5, changed bi-monthly lab coat laundering as this is done monthly.</p> <p>17) Added list of gas pod cleaning duties section 8.2.</p> <p>18) Altered disinfectant container label to reflect new procedure for aspiration bottle (refer to procedural change order for aspiration bottles located in CBE office)</p>	
002	16.06.10 Reviewed by C. Kavanagh	<p>1) Scope-Altered to include rooms H25-H30.</p> <p>2) References – Added SOP20, SOP079, SOP88, SOP89 & SOP96.</p> <p>3) Section 4.3 – Added more detailed information regarding the PAT testing procedure in the CBE including supervision of the engineer.</p> <p>4) Equipment – Included two new centrifuges, one incubator & water baths.</p> <p>5. Section 7 – Altered to say that the housekeeping rota is located on the notice board & it is the responsibility of the individual to find cover. Housekeeping checklists are located outside respective laboratories.</p> <p>6. Section 7.1 – Altered to include the new waste disposal system using yellow & orange waste streams.</p> <p>7. Section 7.1 (vi) – altered to include the daily monitoring of the cold room temperature as well as the -80 freezer & that currently the laboratory</p>	003

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		<p>manager monitors these.</p> <p>8. Section 7.2.3 (ii) – Added a note to say that ALL taps must be opened weekly to flush out potential harmful bacteria. Currently this is performed by the laboratory manager in areas not routinely used.</p> <p>9. Section 7.2.4 (i) – Added a note to say that the Gas Cylinders are set up for automatic switchover. Please refer to SOP058 for more detailed information.</p> <p>10. Section 7.2.8 (ii) - Added a note regarding Contacting Giuseppe Forte (g.forte@lboro.ac.uk) by E-mail to arrange for collection to be made of liquid nitrogen.</p> <p>11. Section 7.3.2 – Added reference SOP079. Altered sections to say refer to individual SOPs for cleaning procedures as incubators in different areas have different procedures. Section altered to state general incubator maintenance only.</p> <p>12. Section 7.3.3 – Added references SOP088 & SOP089.</p> <p>13. Section 7.3.4 – Added reference SOP096</p> <p>14. Section 7.3.5 – Added a statement to say Individually owned pipettes should be calibrated & cleaned following appropriate SOP & manual.</p> <p>15. Section 7.3.6 – Altered to say fridge & freezers should be checked monthly instead of bi-annually.</p> <p>16. Section 7.3.8 – Altered to say first aid kits & spill kits will be checked quarterly instead of monthly.</p> <p>17. Section 7.4 – Altered to provide more detail regarding shutdown cleaning requirements.</p>	
003	September 2012 Reviewed by C.Kavanagh	<p>Major revision to reflect changes to laboratory procedure.</p> <p>1) Added T.2.08B Wolfson School to title & scope.</p> <p>2) References – Updated references with new SOPs for new equipment.</p> <p>3) 4.3 – Amended to say that PAT testing can be performed by qualified PAT testers in individual departments as an alternative to contractor <i>Plugtest</i>.</p> <p>4) 7. i) Updated to include inspection checklists & preventative maintenance.</p> <p>ii) Amended to update current procedures.</p> <p>5) 7.2.5 – Amended to include more information about housekeeping duties for Gas Cylinders in Gas Pod 2.</p> <p>6) 7.2.6- Amended to include continual temperature monitoring procedures for cryotanks.</p> <p>7) 7.3.3 – Amended to include additional preventative maintenance procedure recommended by centrifuge</p>	004

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		<p>engineer & noted that centrifuges are now subject to annual service.</p> <p>8)7.3.6 – Amended to include continual temperature monitoring procedures for fridges & freezers.</p> <p>9)8. i) Updated examples of housekeeping checklists & preventative maintenance record sheets (checklists removed from SOP & placed onto CBE website)</p> <p>ii) Removed the procedure for cleaning the Gas Pods due to repetition.</p> <p>10) Removal of forms from this section. They have been referenced & are now available on the CBE website.</p>	
004	Reviewed October 2014 by C. Kavanagh	<p>Major revision to reflect changes to laboratory procedures.</p> <p>i) Section 2. Added in the room H34</p> <p>ii) Section 3.3 Amended changes to PAT testing procedure</p> <p>iii) Section 4 Added in a section about the role of Laboratory leaders</p> <p>iv) Section 6 Condensed & amended the laboratory procedures section including:</p> <p>6.2.4 Amended the Aspiration bottle procedure</p> <p>6.2.6 Amended the maximum liquid nitrogen level in the cryostores.</p> <p>6.2.8 removed need to clean chemical Gas Pod (not in use)</p> <p>v) Section 7 – Added a form FSOP004.5 to include the supplementary information sheet.</p>	005
005	1 st November 2015 C. Kavanagh	<p>Annual review. Minor editorial changes.</p> <p>3.3 Amended to say PAT testing by laboratory Manager & Technician</p> <p>5.3 Amended the floor cleaner to 'ultraviolet'</p>	006
006	January 2016 C.Kavanagh	<p>i)Removal of the 70% IMS as disinfectant in the laboratory</p> <p>ii)Added 'ChemGene' as new disinfectant in the CBE in two concentrations 1:20 & 1:50. SOP160 details how to prepare the new disinfectant.</p>	007
007	1 st March 2016 Reviewed by C. Kavanagh	i)Addition of reference to the preparation and use of 70% IMS which has been re-introduced back into the laboratories as a 'rinsing stage' following the use of Chemgene (Chemgene can leave a residue)	008
008	18 th December 2017 Reviewed by C.Kavanagh	<p>3.3 Amended to add that anyone trained can help with PAT testing.</p> <p>6.0 – Amended to say that housekeeping duties are now done as part of 'team clean'.</p>	009
009	18 December	Added the use of Chemgene wipes	010

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	2018		
010	20 th April 2020 by C.Kavanagh	Minor amendments only	010
010	31 st January 2022 by C.Kavanagh	Minor amendments only	010
010	2 nd June 2025 by C.Kavanagh	Minor updates & amendments	011

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