Standard Operating Procedure **CBE/HTA-PR-SOP011**

Title: Freezer Maintenance Schedule and Manual Challenge of Freezer Temperature Alarm.

Location: CBE Laboratories

1. PURPOSE

The intent of this SOP is to describe the maintenance schedule for the Freezers in the laboratories which will include a manual challenge of the freezer to ensure the temperature alarm is working correctly. It will also include details of freezer temperature checks using a calibrated thermometer.

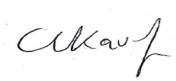
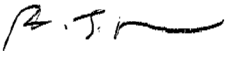
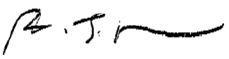
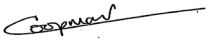
2. SCOPE

As part of the CBE Quality Management System (QMS) for research, this procedure applies to all individuals involved in the maintenance of Freezers containing HTA licensable material under the University's HTA licence for research, in accordance with the requirements of the HTA legislation, the HTA Codes of Practice and the University's HTA Licence Compliance Quality Manual. This SOP applies to all -20°C and -80°C Freezers in the CBE Laboratories (CBE Laboratory Unit, Holywell Park and T208b Wolfson School).

3. RESPONSIBILITES

3.1 The departmental Quality Manager (dQM) shall ensure that this SOP is aligned with the University procedure for the maintenance of freezers containing HTA licensable material and that it does not conflict with any other part of the CBE Quality Management System.

3.2 Laboratory Management/Technician are responsible for performing and recording the freezer maintenance schedule.

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023

3.3. The PI or Person Responsible (as delegated by the PI, and appropriately trained), as custodian of the material, and the departmental Person Designate (dPD) are responsible for ensuring the preventative maintenance of freezers (containing HTA licensable material) has been completed and recorded.

3.4. Individuals storing HTA licensable material in freezers are responsible for complying to all maintenance and usage procedures.

3.5 Individuals storing HTA licensable material in freezers have a responsibility to notify the laboratory manager of any issues with the freezer.

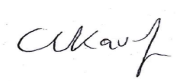
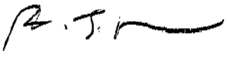
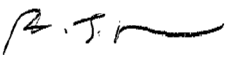
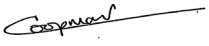
4. REFERENCES

The University HTA Licence Compliance Quality Manual

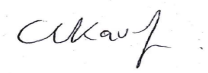
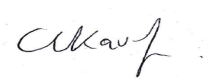
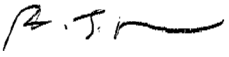
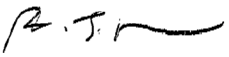
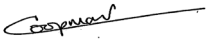
The CBE Quality Manual

5. PROCEDURE

Maintenance	Procedure	Frequency
Visual inspection/removal of ice from inside freezer (including doors).	i) Go to each freezer in turn. ii) Put on protective PPE (blue gloves). iii) Open the freezer and check each freezer for ice build around the door, at the back and top of the freezer. iv) If ice is detected, place paper towel on the floor. Have a mop and bucket and wet	Monthly (and when detected)

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023

	floor sign ready. Remove any ice build -up around the door/walls of freezer using ice scraper.. (As this can prevent the door shutting). Clear up any excess water/ice. v) Record on maintenance record.	
Freezer Defrost	i) Transfer items inside freezer to another freezer. ii) Switch off the freezer iii) Place absorbent material around the freezer. Place containers inside shelves or on the floor to catch as much water as possible. You could place hot water in these containers to speed up the defrost process but ensure they are secure so no one can burn themselves. iv) Allow to defrost. Place a wet floor sign by the freezer. v) At regular intervals check on the progress and clear up any excess water with mop and bucket and replace absorbent material. vi) Once fully defrosted switch the freezer back on and allow to go back down to temperature. Ensure the temperature is stable and correct before returning items to the freezer. vii) Record in maintenance log.	Bi-Annually (and when required)
Manually Challenge Alarm (Freezer External Alarm)	i) The Freezers are set up on the Koolzone Temperature Monitoring System. Each storage device has a small removeable probe. These are linked to software which shows continual data. Any deviation from set limits will send	Monthly

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023

	an E-mail alert & text message to designated personnel. ii) To check the probe/alarm function remove the probe from the storage device . This will automatically send an alert to designated personnel. iii) Battery health in probes is checked monthly using the Koolzone software and replaced as required. iv) Probes are calibrated by Koolzone annually. v) Record on the maintenance sheet that it has been checked.	
Manual Challenge Alarm (Internal Freezer Alarm)	i)Take each freezer in turn ii)Open the freezer, locate the temperature alarm probe/sensor .Ensure there is no ice build- up around the sensor (false reading). iii)Alter the trigger points (lower limits) on the internal temperature alarm system to just below the optimum temperature e.g -78c) . iv) If there is a warm test function use it. v)Open the freezer door & begin the removal of ice around the door/seals. This should immediately trigger the internal alarm as the trigger point is higher. vi)Alternatively you could place or manoeuvre the probe into a beaker of water or place a gloved hand over the probe/sensor. Ensure you use a blue glove designed for working at low temperatures. vi) Ensure the alarm is activated. Close the freezer door. Reset the alarm. vii) Do not have the freezer door open for	

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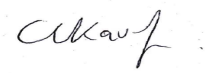
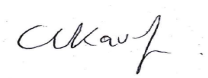
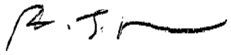
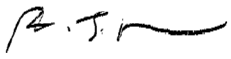
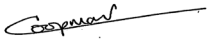
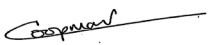
	more than 5 minutes at a time. viii) Ensure you set the trigger points back to previous limits e.g -70c). ix) Record on maintenance log.	
Thermometer calibration	i) To ensure thermometer is reading correctly we need to calibrate the temperature. This is done by two methods. ii) **Ice water** – Place ice (from ice machine) into a polystyrene box(which is long enough to house the thermometers lying horizontally). iii) Add cold water to the ice to make a slurry. (approx. 1cm below top of ice).Add enough ice and water to ensure the thermometer is submerged. iv) Leave for one hour to equilibrate. If ice starts to melt add more ice. The thermometer should read 0°c. If it does not repeat the process. v) Record on temperature monitoring record. vi) **Dry Ice/Isopropanol mix** – vii) Place dry ice in polystyrene box. This needs to long enough to allow the thermometer to be placed horizontally. . Warning :Do not use plastic containers, including high performance plastic containers, may eventually degrade and crack, causing a leak. viii) Wearing PPE , Pour the Isopropanol solution slowly into the dry ice to make a slurry. Add only enough solution to completely cover the dry ice. Don't splash the liquid. The	Annually

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023

	ethanol solution will begin to boil. The boiling will slow down as it cools off. Always wear gloves when handling dry ice and Isopropanol. If more of the solution or dry ice is needed in bath, wait until the boiling slows down before adding more. ix) Place the thermometer into the dry ice slurry and submerge. Leave for one hour. x) Check the temperature of the thermometer. This should read -78.5°C. If it does not repeat the process. xi) There is a risk assessment for this procedure . xii) Record in maintenance record	
Temperature Recording check	i) Ensure thermometer has been calibrated within the last 12 months. (Check maintenance log) ii) Ensure thermometer is in good condition with no damage and is correct thermometer for ultra low temperatures. iii) Place the thermometer inside a ziplock bag containing Lab Armor™ beads. iv) Place in freezer overnight to allow temperature to equilibrate. v) The following day check the temperature of the thermometer and record the temperature on maintenance log. vi) Move thermometer to other shelves/freezers if required and record	Monthly

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	data remembering to return thermometer to Lab Armor ™ beads to keep temperature stable. vii) Record temperature in maintenance log.	
Check Freezer Filters	i)Check filters in Freezers for build up of dust/dirt and clean/change as required. ii)Hoover internal filter every six months.	Bi-annual

Special Notes on Health and Safety

- Risk of cold burns; use the thermal gloves provided when de-icing the freezer.
- Risk of loss of sample integrity, do not leave the freezer doors open longer than necessary

6. DOCUMENTATION

The following records are outputs of this SOP:

6.1. HTA-PR-0013 Freezer Maintenance Record

These records will be filed in HTA Documentation & Forms Folder

.

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Location: CBE Laboratories

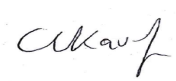
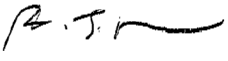
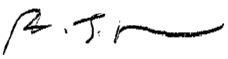
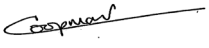
SOP Version History

Version Reviewed	Date Revised/ Reviewed	DCN No	Revision Summary	New Version Number
1.0	2nd December 2019 by C.Kavanagh	007	Amendments to update freezer maintenance procedures and add in new location T208b (Wolfson School) .	2.0
2.0	6th December 2021 by C.Kavanagh	DCN0012	Updated the sections about manual challenging the internal & external alarms to include information about Koolzone Temperature Monitoring System & revised practices.	3.0
3.0	4th December 2023 by C. Kavanagh	DCN0016	Updated section on Koolzone Temperature monitoring system to add 1)Battery health in probes is checked monthly using the Koolzone software & replaced as required. 2)Probes are calibrated by Koolzone annually.	4.0

SOP Withdrawal Date:	

Document Control

Version 004 Effective Date: 03/01/2024 Review 03/01/2026

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023

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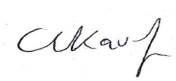
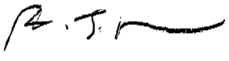
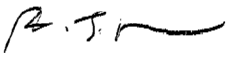
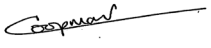
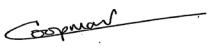
The Master Copy of all SOPs is filed by the dQM. The latest version is maintained on the CBE network. This document is not a controlled copy once printed from the network. If this SOP appears inadequate or outdated it is the responsibility of all staff to bring this to the attention of the dQM or their Supervisor immediately.

Security Statement

This SOP is the intellectual property of the CBE within Loughborough University, and as such, must not be circulated outside of the University without the written approval from the dQM and the author.

Acknowledgements

<include if appropriate>

Written by: C.Kavanagh Date:12/12/2018  Reviewed by: C.Kavanagh  Date:04/12/2023	Reviewed by: R.Thomas  Date: 16.01.2019 Reviewed by: R.Thomas  Date: 13/12/2023	Approved by: K.Coopman  Date: 16.01.2019 Approved by: K.Coopman  Date: 13/12/2023