

DAMTP

Laboratory Cold Room

The laboratory in the basement of Pavilion C houses a walk-in Cold Room for experimental research which requires low ambient temperatures. The room has internal dimensions of 3m x 4m x 3m high and a working temperature range of -40°C to $+30^{\circ}\text{C}$. This manual explains the procedures and safety measures that must be adopted.

Working in an enclosed space at extremely low temperatures could be fatal.

These working procedures are mandatory and have been designed to ensure safe and responsible use of the facility.

Procedure for use.

1. In the first instance, the principal investigator must contact the Laboratory Safety Officer and the Chief Technician to discuss the overall feasibility of the project. This initial meeting should serve to satisfy both parties that the project is appropriate and achievable, and should highlight at an early stage if any special requirements are necessary.
2. If the project is deemed satisfactory, then ALL users of the facility (principal investigators, research users and safety buddies) must undergo an induction course provided by the Chief Technician. The induction will include:
 - a. Instructions for operation of controls, doors and alarm systems
 - b. Instructions for user procedures in normal office hours
 - c. If appropriate, additional instructions for user procedures out of normal office hours.

An induction form must be signed by all parties to confirm that the information has been imparted, received and understood.

3. Following induction, the users must then complete a full risk assessment of the project using the standard laboratory Risk Assessment form. The form must be approved by the Laboratory Safety Officer before work may commence.
4. Once permission has been granted, access to the facility is then only allowed upon collection of keys and user badges from designated Authorisers (as listed on the main Cold Room door), and with full compliance of the buddy system and signing in/out sheet procedures.

Cold Room Induction Sheet

- **Authorisation**

- Prior to use, the user must sign-in with a designated Authoriser (as listed on the main Cold Room door).
- The Authoriser must first see a written Risk Assessment for the experiment, validated by the Laboratory Safety Officer. The Risk Assessment will include confirmation that the user has undergone the Cold Room induction course.
- The Authoriser is responsible for ensuring the user fully understands the correct operation of the Cold Room, including relevant Health & Safety features, particularly the internal panic button, occupancy timer alarm and using the correct clothing that is supplied. Once satisfied that the user is competent, the authoriser may issue a *user badge*. The name of the user along with the initials of the Authoriser, date, expected time and frequency the Cold Room will be in use, is logged on a work sheet in the Lab office.
- The Authoriser will assign a *safety buddy* to the user. The safety buddy must be either a designated Authoriser, or another person who has undergone the Cold Room induction and has been approved to act as such by the Laboratory Safety Officer. The buddy is issued with a *support badge*, indicating to others that he is responsible for monitoring the user whilst signed-in. The buddy will provide a level of monitoring of the user in the Cold Room appropriate to the frequency and duration of occupancy, and to the exposure temperature. If at any time the buddy cannot meet these responsibilities, the support badge should be passed to a colleague who can assume the role.
- If **after hours** occupancy is anticipated, users **must discuss** this with the Laboratory Safety Officer. Each experiment will be judged on a case by case basis before permission is granted, and additional fail-safe procedures will be instigated as appropriate, these being fully specified in the Risk Assessment document.
- Authorisers must make sure that when experiments have ceased, all badges are returned, clothing hung up correctly, the user has “signed out”, and that the equipment is shut down correctly as per instruction sheet.

- **Access**

- Before access, the user must fill out the work sheet located by the Cold Room air lock door. This provides a record of the person operating the equipment, time in, time out and contact details etc.
- Protective suits, hats, gloves and masks are located just outside the main air lock door and should be used appropriately.
- Access to the Cold Room is normally gained through the main air lock door. Room access is monitored via door switches to both the air lock and goods door. Opening of these doors will cause the **red room occupied light** to illuminate. This triggers a **twenty minute delay timer**. When this time has elapsed a **flashing red room evacuation** beacon is activated, and the occupant must now leave the room and turn the **RE-SET** key switch located next to the air lock door to “1”.

Failure to carry out the above evacuation and re-set procedure within 5 MINUTES will result in operation of the local audio visual alarm. Refridgeration will cease and the heaters will be activated to bring the room temperature rapidly back to +20°C.

Once the RE-SET has been performed, the user may return immediately back inside the Cold Room, thereby activating the next twenty minute delay timer.

THE RE-SET PROCEDURE HAS BEEN INSTALLED FOR SAFETY REASONS. PLEASE REMEMBER THAT FAILURE TO COMPLY WILL CREATE UNNECESSARY NOISE AND DISTURBANCE AND IS LIKELY TO SPOIL YOUR EXPERIMENT.

Resetting the temperature control to de-activte the cut-in heaters can only be performed by the Chief Technician?

- **Exit**

- All doors are fitted with heated seals and push-knobs designed not to freeze up. In extreme cold, the push-knobs may require a sharp punch with an open palm to undo the lock.

- **Emergency**

- A panic button is installed within the Cold Room beside the inner air lock door. This activates an audible alarm. To mute the alarm, twist and pull out the button.
- If an external emergency (e.g. fire) arises, the regular department alarm system is routed inside the Cold Room and activates a blue flashing strobe. Users should leave the Cold Room immediately and follow normal evacuation procedures.

- **Temperature Control**

The temperature control panel is situated at the rear of the unit. It is recommended that only the Chief Technician should operate these controls. If user operation is warranted, then specific permission should be sought from the Laboratory Safety Officer or Chief Technician.

- If the power supply is turned off – at least eight hours notice must be given by the user to technical staff to turn on the equipment and allow the plant to warm up correctly.
- Ensure that the main control panel on/off selector switch “A” is in the “OFF” position and that the auto-off-minus 40 switch “B” on the temperature control panel is also in the “OFF” position.
- Turn on the mains supply isolator on the main control panel (after having first signed for the key)
- Observe the temperature values displayed on the main control panel – they should all display approximately the same temperature values as the temperature control panel.
- Once the warm up period has expired – the plant may be placed back in operation.
- Turn to “ON” the selector switch “A” on the main control panel; the rotary chemical drier room ventilation system will start up.
- The “set point” value may be changed by first pressing and then using the ▲ or ▼ to set the desired temperature of the Coldroom.
- Press again and the room temperature and “set point” are displayed.
- The temperature control system is now in standby mode.
- For temperatures above -30 deg C turn the selector knob “B” to “auto” and a single cooler unit will start up approximately 30 secs later, and pull the temperature down to the “set point” value.
- For temperature requirements below -30 degC, and down to -40 deg C it is essential that the room be started from warm, thus ensuring that both cooling coils are free of frost. Set the desired temperature as above, but turn the selector knob “B” to -40 degC, after 30 secs both coolers will start up and pull the temperature down to the “set point” value.
- Note: in “auto” mode the cooler incorporates a twelve hour cyclic timer before defrosting, the other unit will remain in standby mode. At the completion of the twelve hour cycle, refrigeration will begin with the standby unit or No 2 unit, it is inevitable the temperature of the room will be affected to some degree during this changeover period.
- In the -40 degC mode both units will run on a cyclic timer for six hours pulling down the temperature before one unit defrosts. When this defrosting process has been successful they swap roles.
- To SHUT DOWN, turn the selector knob “B” on the temperature control panel to OFF, continue on the main control panel and turn the selector switch “A” to OFF. This completes the shutdown process.

Cold Room Induction Checklist

The instructions for Cold Room use, comprising procedures for:

- Authorisation (please tick)
- Access
- Exit
- Emergency
- Temp Control

as detailed in the preceding pages, have been imparted, demonstrated and understood.

Name Signature Date

Chief Technician

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User(s)

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Approved by Laboratory Safety Officer:

.....Name

.....Signature

.....Date

document.

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