



ENVIRONMENTAL HEALTH & SAFETY

The University of Alabama at Birmingham

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Guidelines for Using Cold Rooms

Old style cold rooms for labs consisted of insulated boxes without any ventilation. But some of the newer models were provided with a small volume of fresh air to help ventilate the rooms to reduce the buildup of carbon dioxide generated from personnel in the room or any other toxic vapors released during experiments. Unfortunately, this small volume of supplied air can create moisture in the room to cause mold growth and a potential for exposure to personnel.

Scope

The intention of cold rooms is to properly store certain agents in small quantities and to conduct certain experiments at lower temperatures. Personnel can experience inhalation exposures to mold and a buildup of carbon dioxide when they are in cold rooms. These guidelines are developed to provide recommendations for minimizing mold growth, properly storing/using chemicals/biologicals, and identifying some activities/behaviors that are prohibited in cold rooms.

Minimizing Potential Mold Growth

The storage of cellulose containing materials (cardboard boxes, paper etc.) is one of the leading causes of mold growth in cold rooms. Mold growth can contribute to health problems caused by inhalation of the spores as well as contamination of research materials. Mold growth in cold rooms can be prevented to some extent by controlling condensation/moisture and removing materials contributing to mold growth. The following actions must be followed if you work in a cold room.

- Promptly clean spills (e.g., buffers, media etc.). Mold can thrive on any organic medium.
- Report water leaks to Facilities by calling 934-WORK (9675)



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- Keep door firmly shut to prevent condensation. Open doors can increase the relative humidity in the room and increase mold growth. Monitoring the humidity in the room using a relative humidity (RH) gauge and maintaining the RH at less than 60% can help control the mold growth.
- Damaged door gaskets can cause condensation on doors and other surfaces in the cold room. Contact EH&S at 205-934-2487 for an evaluation of the problem.
- Remove all cardboard, paper and wood products from the cold room. If you have wooden shelving, replace them with open stainless steel shelves that permit air flow throughout the storage area. If paper products like Kim wipes are required, place them in a closed plastic container between uses. Should visible mold be found on any product, discard the item immediately.
- Keep surfaces clean at all times. If you notice minor mold formation, dampen a cloth with a non-ammoniated soap or detergent (do not mix ammonia and bleach; the fumes are toxic) and wipe gently. Dry cleaning like sweeping, dusting, or brushing will release mold into the air and can cause inhalation exposures and spread potential contamination. Dry all surfaces after wet cleaning to ensure moisture has been removed. If mold reappears soon after cleaning, use any hospital approved disinfectant, dry surfaces after cleaning to ensure moisture has been removed.
- Place a notice on the cold room door to remind users not to store paper/wood materials in the cold room and clean up small spills immediately.
- Users will be held responsible for cleaning mold if EH&S safety review notices improper actions that could contribute to mold growth.

Proper Use/Storage of Chemicals in Cold Rooms

Cold rooms are designed to recirculate the air contained within. Chemicals vaporizing into the air can accumulate and pose inhalation exposure to personnel or create an explosion hazard.

- Flammable solvents can release sufficient amounts of vapors to form explosive atmospheres in unventilated cold rooms. Fans/lights and other electrical laboratory equipment in the cold rooms can act as potential ignition sources to cause fire and explosion. Large quantities (>1 liter) of flammable solvents should not be stored in cold rooms.
- Toxic chemicals like chloroform may vaporize causing exposures to personnel. The lab staff must consider this risk when evaluating the safety of their procedures and perform those procedures where vapors are released in a chemical fume hood. Quantities need to be limited to less than 250 ml (chemicals such as chloroform vaporizes very quickly).
- Volatile toxic and flammable chemicals should NOT be stored in squeeze dispenser bottles.
- Spills of organic chemicals must be cleaned immediately.

Prohibited Activities

To ensure the safety of employees and students, the following activities are prohibited in cold rooms:



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- Storage of food/drink: In the past, EH&S has found food/drink stored in cold rooms. Such storage is unacceptable.
- Compressed gas usage: Gases released from incubators and other devices in cold rooms can result in lowering of the oxygen level, resulting in possible asphyxiation. Gases should be used outside of a cold room. In the event gases must be used in a cold room, an oxygen sensor, equipped with a local alarm, must be installed in the cold room to warn staff should a low oxygen level occurs.
- Never store dry ice in a cold room. Dry ice can create an oxygen deficient atmosphere when it sublimates and releases gaseous carbon dioxide.
- Never store liquid nitrogen dewars in cold rooms. Evaporating nitrogen can create an oxygen deficient atmosphere

Allowed Occupancy in Cold Rooms

University of Rochester's Occupational Safety Unit has tested the buildup of carbon dioxide in a cold room and determined that the OSHA Permissible Exposure Limit (PEL) of 5000 ppm for carbon dioxide can be achieved in just 55 minutes if 4 individuals occupy a cold room continuously. Based on this study, the recommend occupancy for a cold room is a period of 2 people-hours/day (**a total of two hours per 24-hour period (1 person for 2 hours, 2 people for 1 hour, etc.)**). There may be slight variations in the number based on the size of the cold room.

Administration

Because many cold rooms are shared between multiple groups, a single individual can create problems affecting all users. Should a problem be found, the designated responsible party or, if one is not appointed, all users must take the appropriate action to resolve the issue. EH&S will notify users of cold rooms of improper use issues as we become aware of them.

Guidelines to Work Inside a Cold Rooms

Any area where hazardous materials are handled must have a negative airflow; the air must flow from outside of the area to inside. Cold rooms have closed-air circulation and generally recirculate the air. The aluminum refrigeration coils in cold rooms are susceptible to corrosion if exposed to corrosive chemicals. Due to the above reasons, it is advised to follow the below guideline while working in cold rooms:

- Never store compressed gases and liquid nitrogen/dry ice in cold rooms. Evaporating or leaking gases can cause asphyxiation by displacing oxygen in the room
- Never store hazardous chemicals in cold rooms
- Avoid using/storing large quantities of flammable liquids inside cold rooms. Evaporating liquids can generate explosive atmosphere and fans and other electrical components of cold rooms are not spark proof and can act as ignition sources.
- Never use hot plates inside cold rooms



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- Do not use extension cords and instruments must be directly plugged into the outlet.
- Ensure door release mechanisms are working and doors are free of obstructions.
- Never work alone in a cold room
- Dress appropriately for warmth and use gloves to protect hands
- Avoid mold contamination by keeping cardboard or other paper products out of the cold room.
- Care must be taken to avoid slip/fall. Cold rooms can be slippery due to water condensation and ice formation.
- Keep the door closed to avoid moisture build up and maximize the ventilation efficiency