CLEANROOM ORIENTATION

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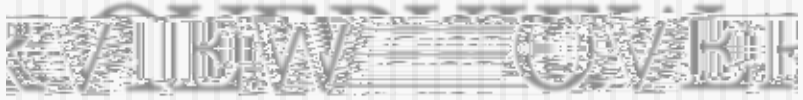
SCIENCE AND ENGINEERING BUILDING



OVERVIEW

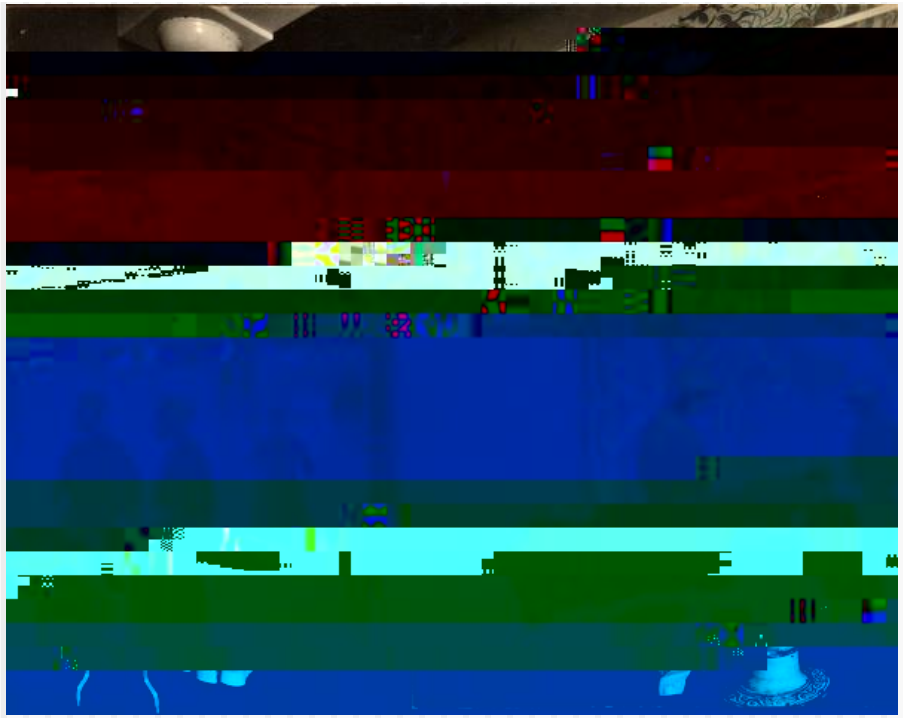
- Utility Chase Entrance Procedure
- Support Equipment
  - Wet Benches
  - Specialty Gas Hook-ups
  - Chillers
- Emergency Protocol
- Emergency Equipment
- Safety Equipment (PPE)
- Spill Response Procedures
- Polices and Procedures Enforcement
- Governance
- Cleanroom Penalties

This orientation is only a supplement for the SEB Cleanroom Manual. It is no substitution for the Cleanroom Manual. Please see the Cleanroom Manual for more information and details.

Early History & Development

First cleanrooms found in hospitals

WWII, 1st Industrial cleanrooms. Improved bombsights, guns



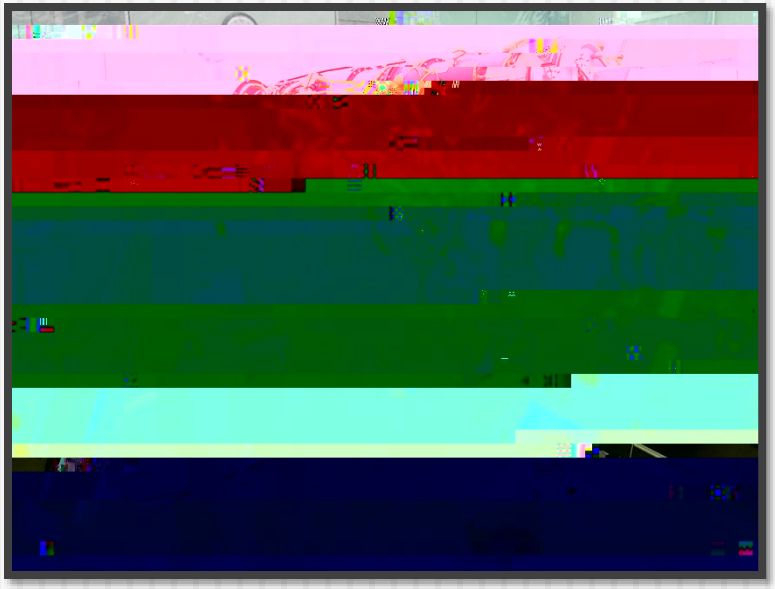
1960's , Sandia Laboratories, developed 1st unidirectional laminar air flow cleanroom technology , still used today in microlabs

WHAT IS A CLEANROOM?

Sealed room in which the concentration of airborne particles are controlled to specified limits.

Need to continually eliminate contaminants from the air that are generated by people, processes, facilities, and equipment.

The level to which particles must be held to a minimum depends upon the standards required by the facility and the processes undertaken within the facility.



PURPOSE OF A CLEANROOM

A controlled environment that allows essential products to be manufactured

Necessary in the nanotechnology, pharmaceutical, medical device, and biotechnology businesses.

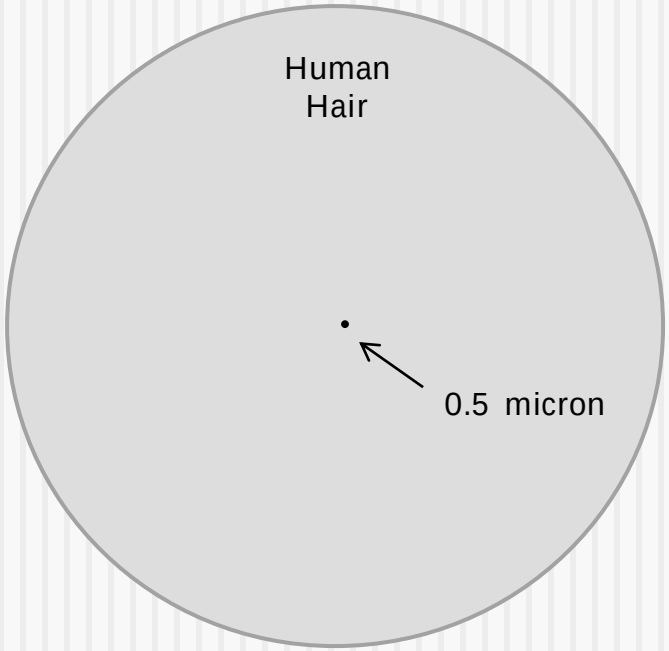
Requires an unpolluted environment to assure potentially harmful contaminants are not present in construction of products

HOW A CLEAN ROOM STAYS CLEAN

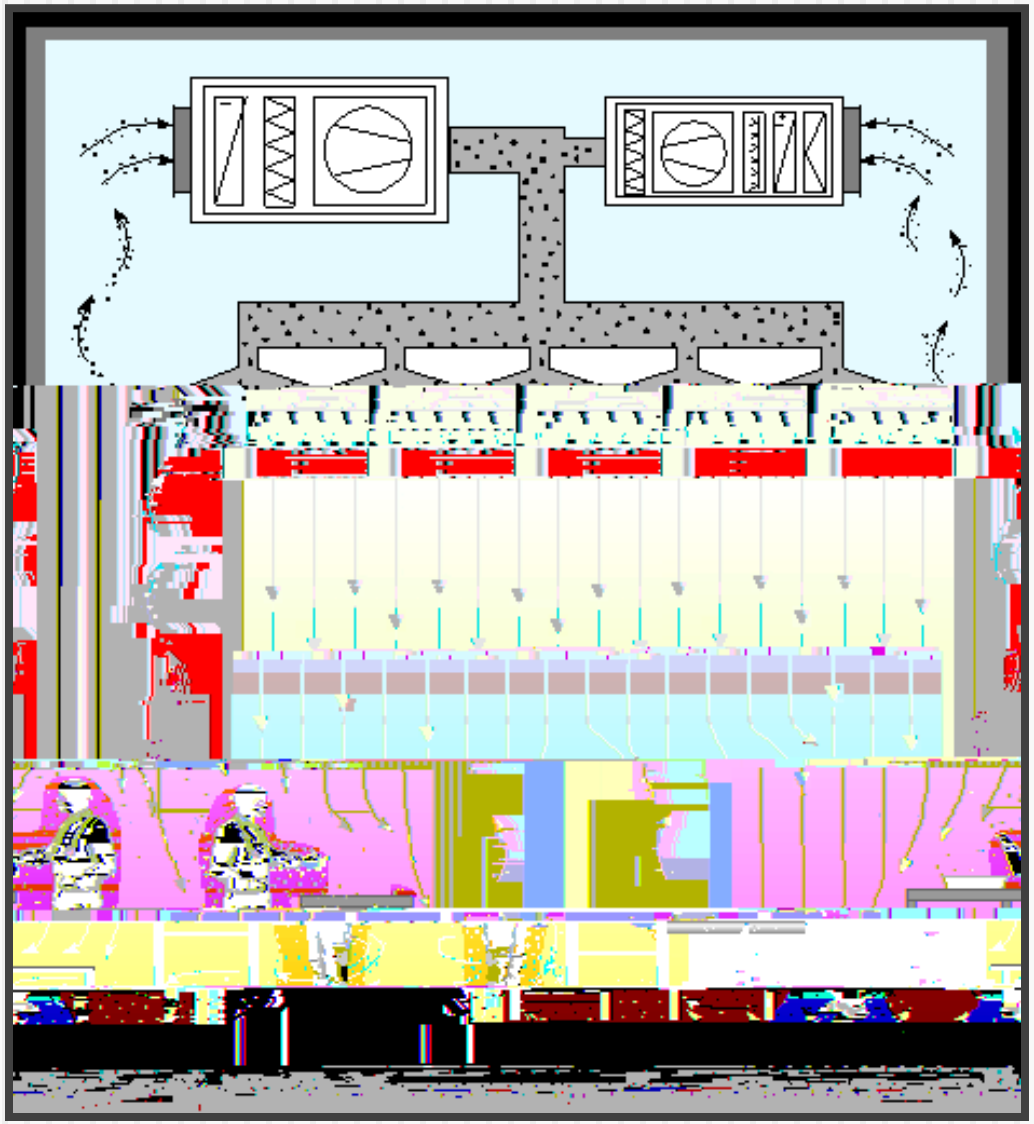
In order to control contamination:

- Air flow rates and direction, pressurization, temperature, humidity, specialized filtration, and sources of particles are tightly controlled.

- HEPA (High Efficiency Particulate Air) Filters within the ceiling filter particles as small as 0.3 microns with a 99.97% minimum particle-collective efficiency.



MOVEMENT OF AIR FLOW THROUGHOUT THE CLEANROOM



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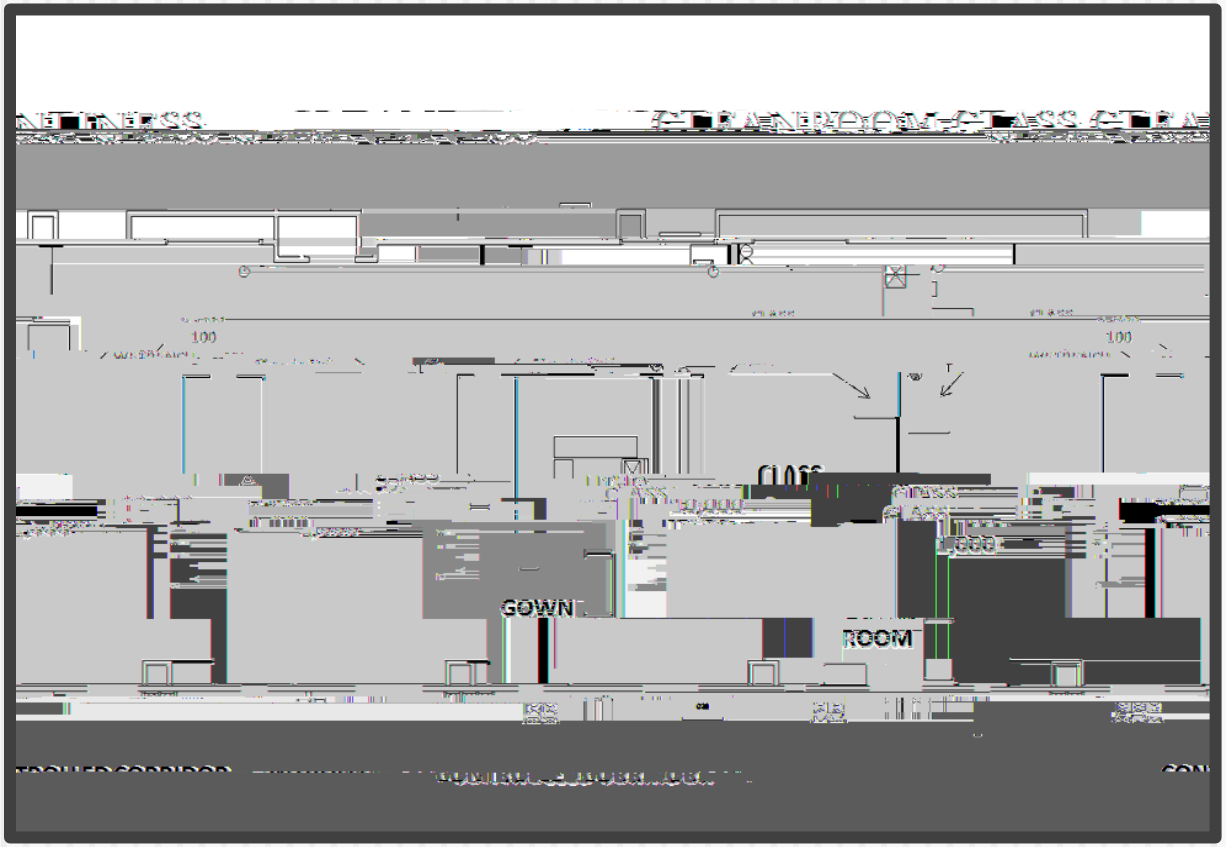
CLEANLINESS CLASSES

There are three cleanliness classes in our Cleanroom:

- Class 10,000 – East portion
- Class 1,000 – West and central portions
- Class 10 – Wet benches located in East and West portions



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TYPES OF CONTAMINATION

- Biological contamination
  - Viable organisms
  - Bacteria
  - ¾

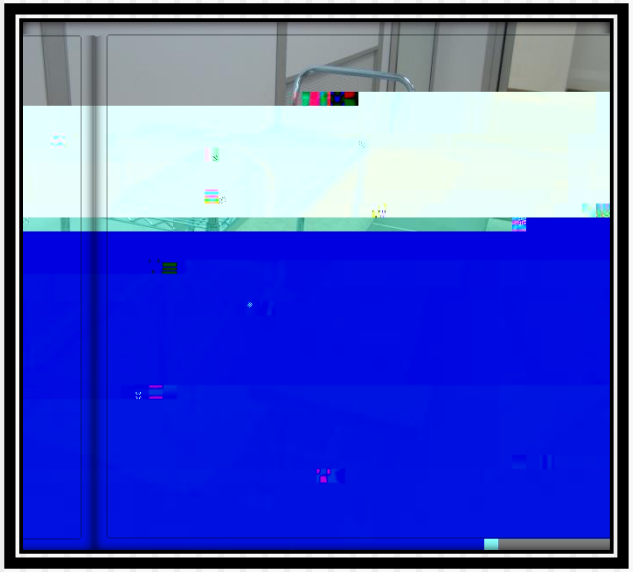
OPERATING PROCEDURES: PRE-ENTRY PROTOCOL

- Access to the Cleanroom
  - The main entrance is located in the controlled corridor on the first floor of the SEB.
  - Users must have a proximity card in order to enter into the gownroom.
  - The cleanroom is open 24/7/365.
  - The buddy system is strongly advised.
- Visitors
  - Permission from the Lab Manager, Principal Investigator, or SEB Assistant Director must be given.
  - Must always be escorted by a cleanroom qualified user.
  - Escorter is responsible for ensuring the visitor follows the facility protocol, policies, and procedures.

PRE-ENTRY PROTOCOL

Bringing Items into the Cleanroom

- All items brought into the cleanroom must undergo a coarse-cleaning in the controlled corridor, then an ultra-cleaning in the cleanroom.
- Packaged items that are specific for the Cleanroom must be opened in the cleanroom with cleanroom scissors.
- Items on a campus cart must undergo a coarse-cleaning and must then be transferred onto a cleanroom cart outside in the controlled corridor. Once in the cleanroom, an ultra-cleaning must be completed on the items on the cleanroom cart.



PREP ENTRY PROTOCOL

THE NEED FOR GOWNING

Maintain the cleanliness of the facility

Contamination of the facility by exposure to human skin, hair and outerwear must be eliminated to promote a reasonable research environment and maintenance of the cleanroom

Particles can destroy the ability of researchers to fabricate sterile devices and

CLEANROOM GARMENTS

Required attire includes:

- Shoe covers
- Bouffant
- Face-mask
- Coverall
- Hood
- Shoe booties
- Cleanroom gloves
- Safety eyewear

GOWNING PROCEDURES

GOWNING PROCEDURES

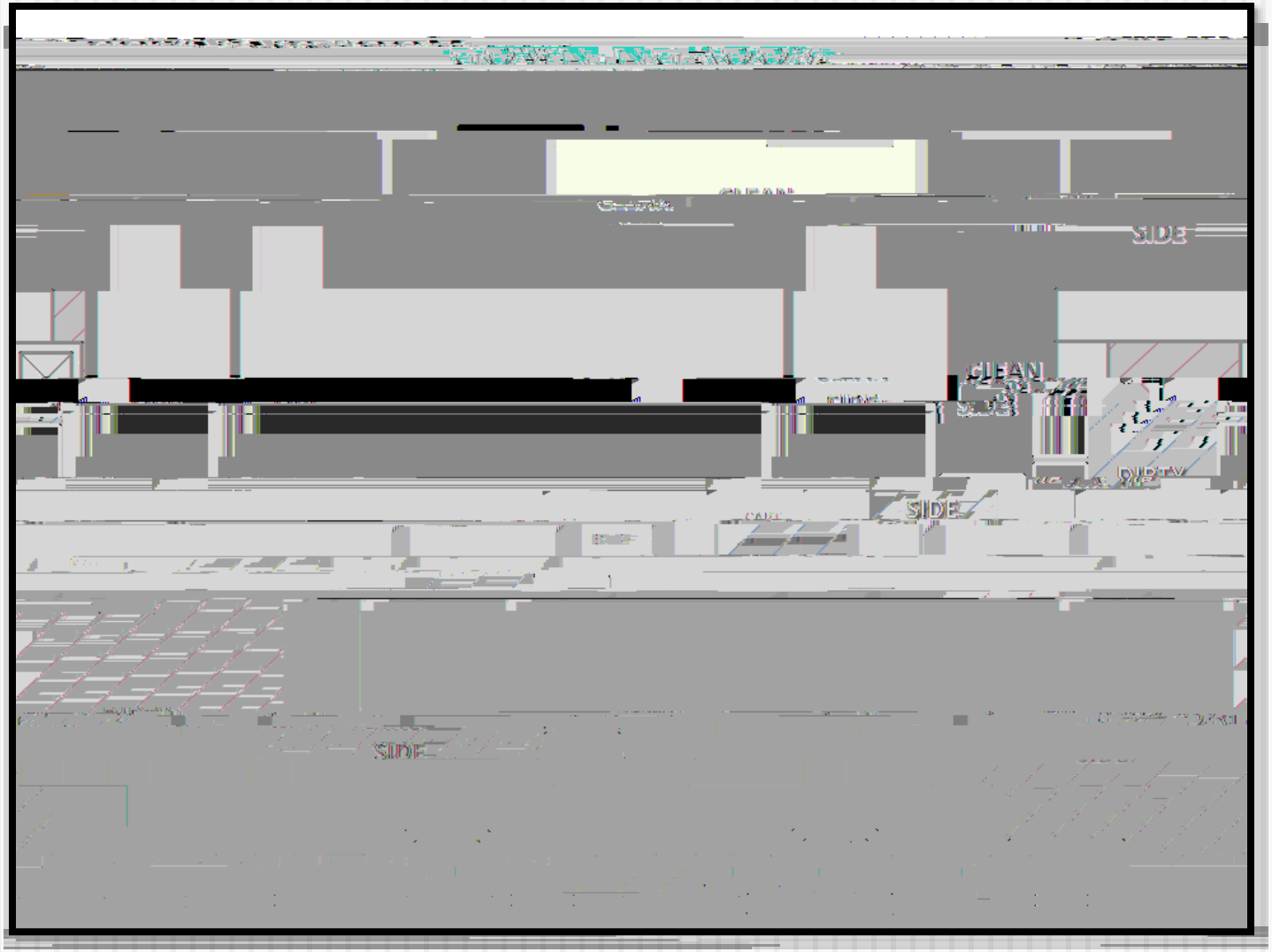
5) Put on face mask and bouffant. Bouffant is required to protect the hood and contain hair in the hood.

6) If your gown

GOWNING PROCEDURES

7) Carefully put on a hood.
8) Inspect the coverall of your gown.
9) Put on your cleanroom coverall.
    *Make sure it does not touch the ground

GOWNING ROOM



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PROPER BEAHVIOR IN CLEANROOM

Obey signs in the Cleanroom and on equipment.

When working with acids or solvents, wear chemical resistant nitrile or neoprene gloves

Do not dump solvents down the drains. Use the solvent waste bins located at the wet benches.

Be considerate by not touching or messing up someone else's work.

Dilute acid mixtures with large amounts of water when disposing down the hood sinks.

PROPER BEHAVIOR IN CLEANROOM

Personal items such as combs, cigarettes, matches, tissues, and similar particle-shedding products SHALL NOT be exposed in the cleanroom.

- Cell phones must always be attached on the outside of the gown, or must be kept in a gown pocket.

Do not wear jewelry (except plain wedding bands), watches, and pierced ear studs.

Report adverse changes in environmental conditions to the SEB Assistant Director at 5-2020.

ALWAYS clean your bench and equipment with Cleanroom wipes when done at your station.

HABITS TO AVOID IN CLEANROOM

Unfastening cleanroom garments and removing items from beneath the cleanroom garments.

Using hydrocarbon-based aerosol cans or oil pumps (this is strictly prohibited).

Unregulated use of equipment that may expel particles.

Coughing or sneezing persistently.

Bringing wooden tool boxes or wooden-handled tools into cleanroom.

Combing or brushing hair within the cleanroom or gowning area.

Scratching exposed skin areas, or touching one's face or skin with gloves.

Walking rapidly, or moving unnecessarily, including running, horseplay or any other fast motions is prohibited

Wearing torn or soiled cleanroom garments.

Wearing cleanroom garments outside of the cleanroom.

Entering the utility chases in gowning garments when un-gowned staff are within.

SUPPORT EQUIPMENT

WET BENCH

The Class 10,000 polymer and stainless steel wet benches are used to create a cleaner environment to work in. With the HEPA filter and fans it can become a Class 100 working environment or better. The open front area allows for clean laminar air to flow across the work surface while offering full access for operation. This flow captures particles and fumes and directs fumes through the exhausted slots at the rear of the station's work surface and out through the facility exhausts.

SPECIALTY GAS HOOK UPS

No tanks are allowed in the cleanroom. There are tank stalls for specific gases outside of the cleanroom in the controlled corridor. There are gas manifolds that carry the gas from the tanks into the cleanroom to adjustable valves on the cleanroom walls.

CHILLERS

Non-refrigerated, water-to-water (WW) systems are designed to remove process heat and

EMERGENCY PROTOCOL

An emergency shut-off may be required at some point in the event of the following situations:

- A large chemical spill
- Electrical fire
- Chemical fire
- Smoke

**Contact the SEB Assistant Director, RMS, or the Help Desk if this emergency situation is required.

**Do not try to clean up a large chemical spill. If the chemical spill is extremely noxious, immediately evacuate the cleanroom without degowning.

EMERGENCY EQUIPMENT

Safety Showers

Purpose: To chemically decontaminate a person and their clothing

Eye Wash Station

Purpose: To mitigate a chemical splash in the eyes

Location

EMERGENCY EQUIPMENT

Halotron Fire Extinguishers

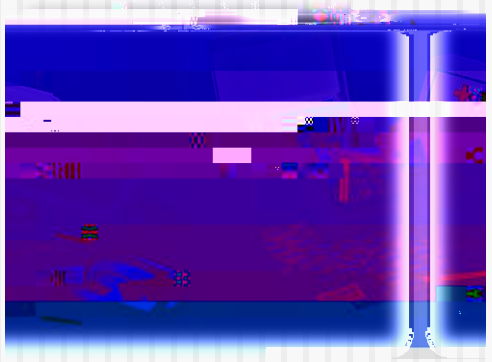
Purpose: Used for small fires by those who are trained to use them

Location: Each bay on wall

First Aid Kit, Chemical Spill Kit

Purpose: Used for small abrasions or burns; Chemical Spills

Location: Central Utility Chase 1159A



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SAFTEY EQUIPMENT

Gownroom:

Safety goggles: must be worn at all times when in the cleanroom.

Wet benches:

Face shields

Chemical resistant gloves

Heat resistant gloves

Apron:

Gownroom

SPILL RESPONSE PROCEDURES

Spill Response Kit

Located in the center utility chase.

Contains the following items necessary to combat a spill:

- absorbent spill dam
- absorbent pillows
- acid neutralizer
- caustic neutralizer
- Hydrofluoric ointment (calcium gluconate 2.5%)
- pH paper
- two pair of acid gloves
- respirators with acid gas cartridges
- two pair of vapor-resistant goggles
- trash bags

POLICIES AND PROCEDURES ENFORCEMENT

Who?

- The cleanroom is managed by a committee representing 2 members of CoE, 2 members of CoS, and 1 member of SEB who serves as chair.

Why?

- To ensure the safety of the cleanroom users
- Protect the equipment in the cleanroom
- Create an environment in which many different research groups can co-exist

Cleanroom users are expected to:

- Police themselves
- Encourage and assist one another in adhering to the policies
- Flagrant or repeat offenders will be penalized, typically through suspension or expulsion from the cleanroom.
  - The penalties are defined in the Cleanroom Penalties

CLEANROOM PENALTIES

Cleanroom Tour

Construction

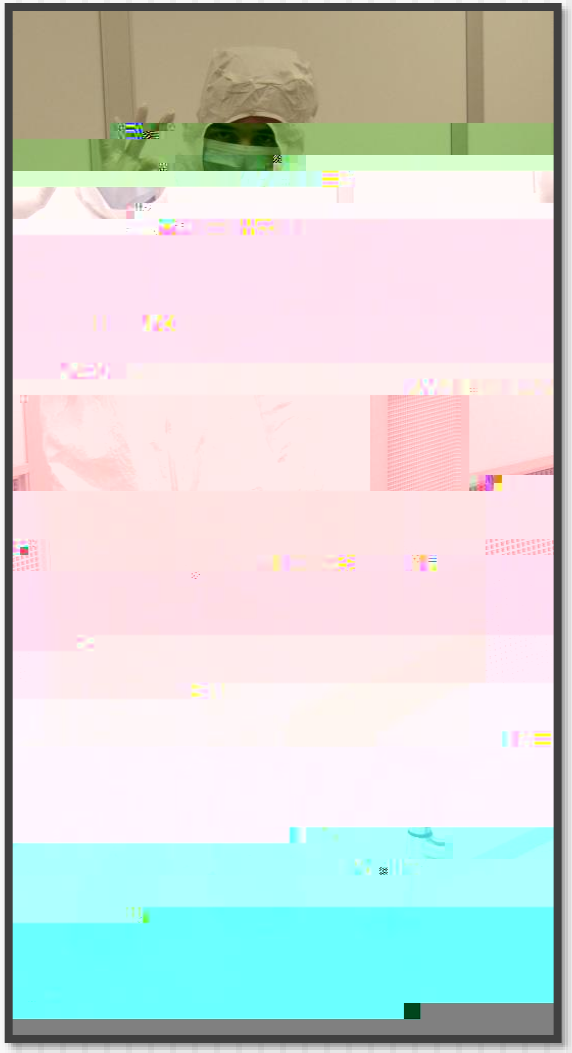
Commissioning

Certifications

Specialty Systems

Gowning Demonstration

QUESTIONS?



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