

Cleanroom User Orientation

General rules for entry

Two levels of training/orientation will be needed to be certified as a authorized cleanroom (CR) user:

- (1) General Laboratory and Clean-Room Safety orientation followed by a short test will be offered before the certification. The ID cards will be used to control the access to the CR.
- (2) Each major equipment or equipment group (e.g. microlithography or dry etching) will require further training related to the equipment. If your name is not in the “Authorized User for the specific equipment”, you cannot use the equipment even if you are an authorized CR user. You need to be an authorized CR user to be trained for the specific equipment.

General rules for entry

Each equipment or equipment group has a “reservation calendar” and a paper log-book. The reservation has to be made ahead of time to insure timely allocation of the equipment. The paper log-book must to be filled-out EVERY TIME before use –NO EXCEPTIONS.

Standard CR operating times will be 8:30-17:00.

Should you need to use the CR after-hours, inform Onur Serbest/Bulent Koroglu at least one (1) hour ahead of time by email which should include name of the authorized CR user (Buddy).

In addition, it's the user's responsibility to let the security guard know that you are entering the CR. Remember that the “BUDDY-SYSTEM – not working alone” is strictly enforced for the CR. Your “buddy” should be an authorized CR user too.

General rules for entry

Points to remember

- It is **FORBIDDEN** to enter the clean room without using your personal ID card
- Guests unattended by authorized users are not permitted.
- The ID card is for the personal use **ONLY**
- All the chemicals going into the clean room must be tracked and cataloged by Dr Burak Birkan, Facilities manager

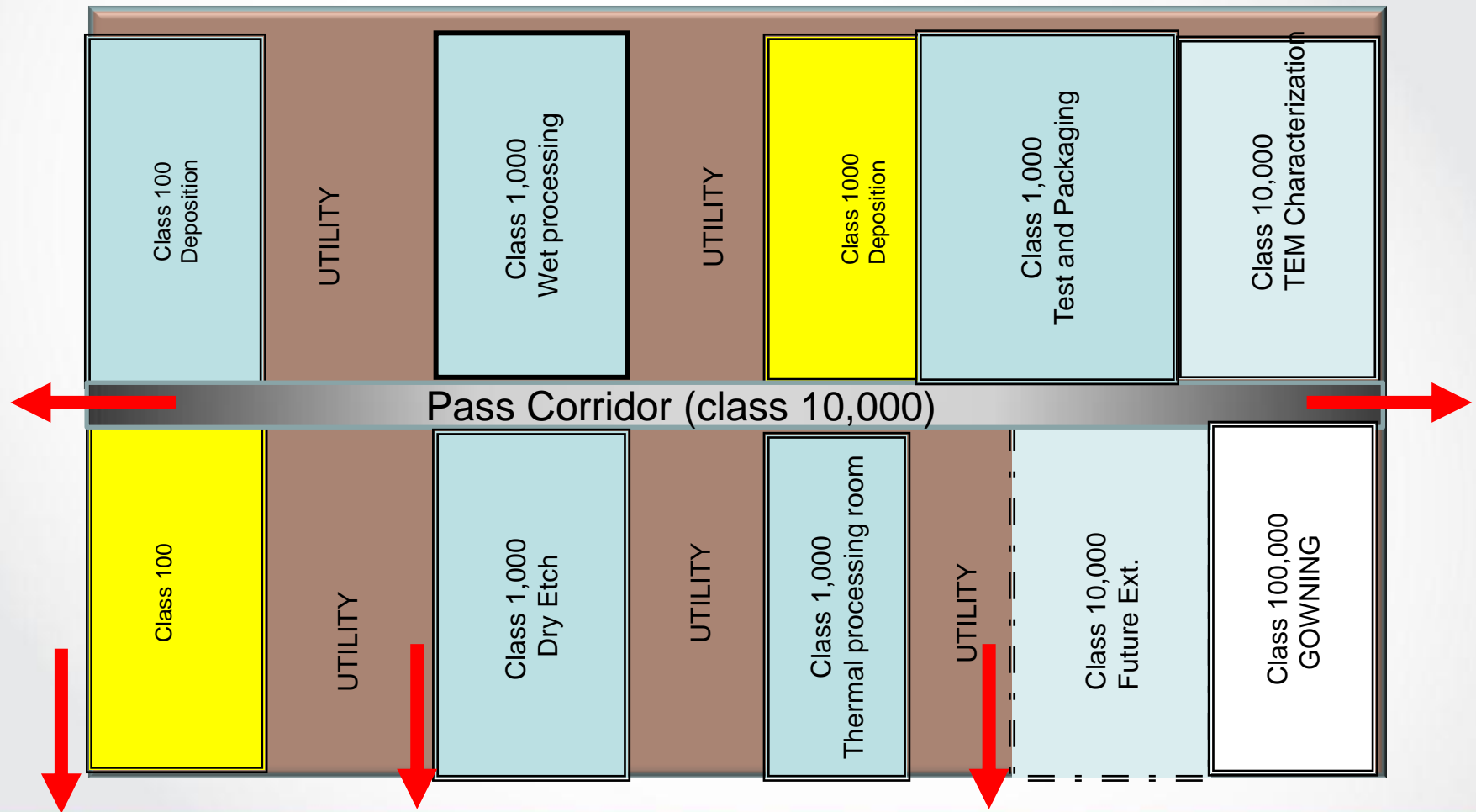
Alarms

Any alarm (Fire, Smoke, Exhaust or Security)

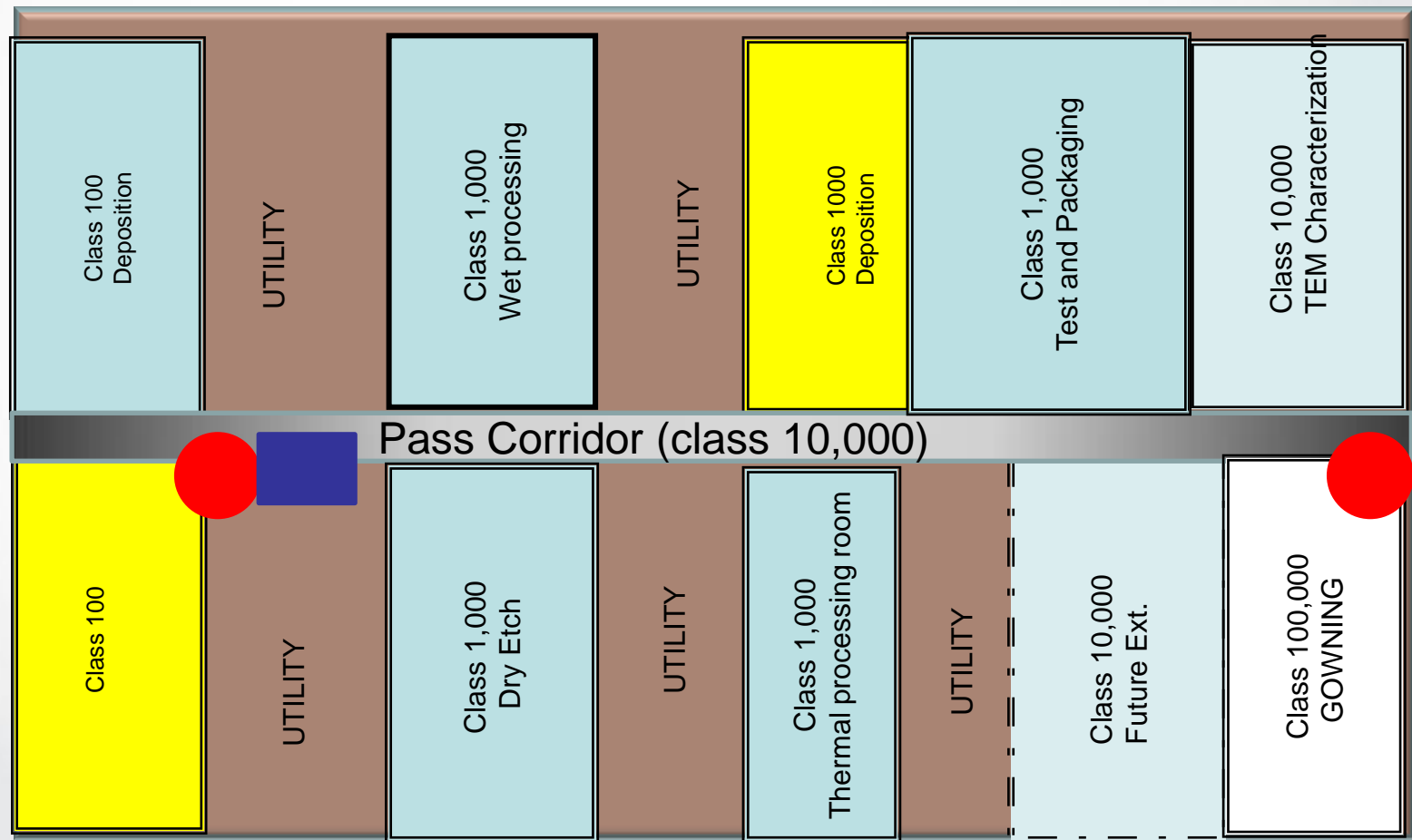
No need to remove your coverall's

**Go out from the clean room
using the nearest exit**

Safety exit's in case of EMERGENCY



WATER SHOWERS and **KITS** location in case of **EMERGENCY**



Safety KITS in case of EMERGENCY



Use for hydrofluoric
acid spill accidents



Use for burn accidents



Use for any other
acidic/basic spill
accidents

Clean Room Protocol - Purpose

- Ensure **Personal Safety** in the Clean Environment
- Promote Successful Clean Room Operations
- Provide Operational Conditions that Meet Process & User Needs

What is a Clean Room?

A clean environment designed to reduce the contamination of processes and materials. This is accomplished by removing or reducing contamination sources.

Types of Contamination Sources

- Particulates from Dust, skin, hair, makeup
- Chemical such as Oil, grease, metal ions, perfume...
- Biological: Bacteria, fungi,
- Radiation: Ultraviolet light...

Particle Characteristics

- Humans generate $>1 \times 10^5$ particles per minute when motionless (fully gowned)
- Humans can generate $>1 \times 10^6$ particles when walking in the clean room

Contamination Sources

- Ventilation ~15%
- Room Structure ~5%
- Equipment ~5%
- Users ~75%

Contamination Control

- Personnel Control
 - Dress code
 - Personal Hygiene
 - Gowning
- Environmental Control
 - Entrance and exit
 - Materials and supplies
 - Cleaning and maintenance
 - Atmospheric

Dress Code

- No sleeveless shirts
- No shorts or skirts
- No slippers or sandals
- No jewelry that can puncture garments or gloves
- Avoid clothing that sheds

Personal Hygiene

- Control Dermatitis & Dandruff
- Do not smoke before entry
 - Wait at least 20 min. after smoking to enter the clean room
- No chewing gum or
- No Cosmetics should be worn
- Facial hair will need to be covered

Gowning

- Proper gowning order
 - Hair cover
 - Shoe covers
 - Mouth cover (only for those with mustache or beard)
 - Coverall
 - Booties
 - Gloves
 - Safety Glasses

Gowning Basics

- Garments should not be removed from clean room unless in approved container
- Don't walk out of the clean room with your garments on (except in case of emergency)
- Change garments when soiled or showing any visible signs of wear

Garment Reuse and Storage

- Reusable – Store in the Gowning Room
 - Coveralls
 - Booties (not the blue disposables)
 - Safety Glasses
- Not Reusable – Throw in trash
 - Hair cover
 - Blue disposable shoe covers
 - Gloves
 - Mouth cover

Materials and Supplies

- Do not carry non-clean room items into the clean room
- Do not carry clean room items out of the clean room
- Do not use pencils or erasers
- Do not cut the clean room wipers
- Clean everything you carry into the clean room
- You can carry smartphones/notepads (no laptops)
- It's the user responsibility to purchase lint-free paper notebooks
- Single paper/sheet (not notebooks) can be used **Temporarily** by placing them in a plastic sleeve

Chemicals

- Do not take new chemicals into the clean room/SUNUM building without informing of Dr Burak Birkan
- Always read MSDS for every chemical you use
- Large quantities of chemicals must be stored outside the clean room
- Chemicals inside the clean room should be properly stored in their storage cabinets
- All chemical containers should be clearly labeled with their contents and Hazard Classification
- Unattended chemicals and experiments should be labeled with the owner's note.

Chemical Handling

- Do not transport chemicals in open containers
- Chemicals (acids and bases) should be on three etch stations (Wet processing room only)
- Full apron, Trionic gloves and full face shield are required for using all acids and are considered minimum personal protective equipment (PPE) **when handling ANY chemical**
- Do not come out of wet processing room with PPE. Change gloves if you intend to work in other areas of cleanroom.

Chemical Handling

- In case of a small spill (Volume less than 1 litre)
 - Alert all users in the clean room
 - Clearly mark the affected area
 - Inform SUNUM staff to clean up and provide assistance in cleaning up
- In case of large spill (Volume more than 1 litre)
 - Alert all users in the clean room
 - Mark the area and evacuate from wet processing room
 - Inform SUNUM staff
- In case of hydrofluoric acid (HF) spill (Any quantity)
Alert all users in the clean room and SUNUM staff.
Evacuate from wet processing room

Chemical Handling

- Chemical solvent/acid waste (acetone/developers/resist leftovers) should be properly disposed in the appropriate waste container into the wet benches
- Solvents (acetone/developers/resist leftovers) **should not be poured** down the drains
- Personal waste containers should be properly marked as such
- If you have questions about disposal contact SUNUM staff member

Housekeeping

- Every user is responsible for keeping the clean room clean
- Always clean your workspace before leaving
- Don't leave or store items on or in equipment
- Store your personal items (samples, wafers, tools) in the locker located in the CR gowning room
- Do not set liquids on any equipment
- Properly store all materials before leaving the clean room
- On request, users can avail storage space in cleanroom desiccators
- Last one out should make sure the room is in a safe idle mode

Cupboard issuing and using policy

SUNUM will provide a cupboard in the gowning room (for tools), and a storage cabinet inside the cleanroom (depending on the need for sample storage) to research group as a whole and the members of that group should share the key's in between.

These policy can be revised with time and on case basis, purely at the discretion of cleanroom manager/Director.

Handling Tools/Glassware using policy

General glassware (petridish and beakers) will be provided in wet processing, photolithography and CVD deposition rooms. It is the user responsibility to define the requirement, use, clean and dry the glassware after process.

Anything special other than specified/ of specific use, the research group should get approval from facilities manager and cleanroom manager (It is for the record what kind of glassware/tools we have inside the SUNUM facility) and procure it from their own budget.

These policy can be revised with time and on case basis, purely at the discretion of cleanroom manager/Director.

Violations of Rules/ Improper use of equipment

- First time
 - Written Warning
 - Report to Advisor
- Second time
 - Suspension of access
 - Report to Advisor-Director
 - Re-training may be required
- Third Offense
 - Suspension of access for a period of time
 - Report to Advisor-Director
 - Access will not be renewed until an acceptable resolution is reached by the Cleanroom manager.
 - Clean Room re-orientation/equipment user training will be required to gain access

Thank you