



**NanoFabrication
Kingston**

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NFK Gowning and De-Gowning Protocols

***NFK-006
V2.0***

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1. Introduction

This document describes proper gowning and de-gowning protocols for the NanoFabrication Kingston lab (NFK). Following these rules helps maintain the cleanroom standard and minimizes contamination of samples and devices built in the cleanroom. Micro- and nano-fabrication often requires a low particulate environment, and keeping particulate levels down is critical for working with some tools.

At NFK, various areas are designed to meet cleanroom standards at several levels. Figure 1 shows the areas and Table 1 identifies the designation for each area. Gowning areas are transition areas where you prepare to enter cleaner space. If you have any questions, or want to receive additional training, contact NFK staff.

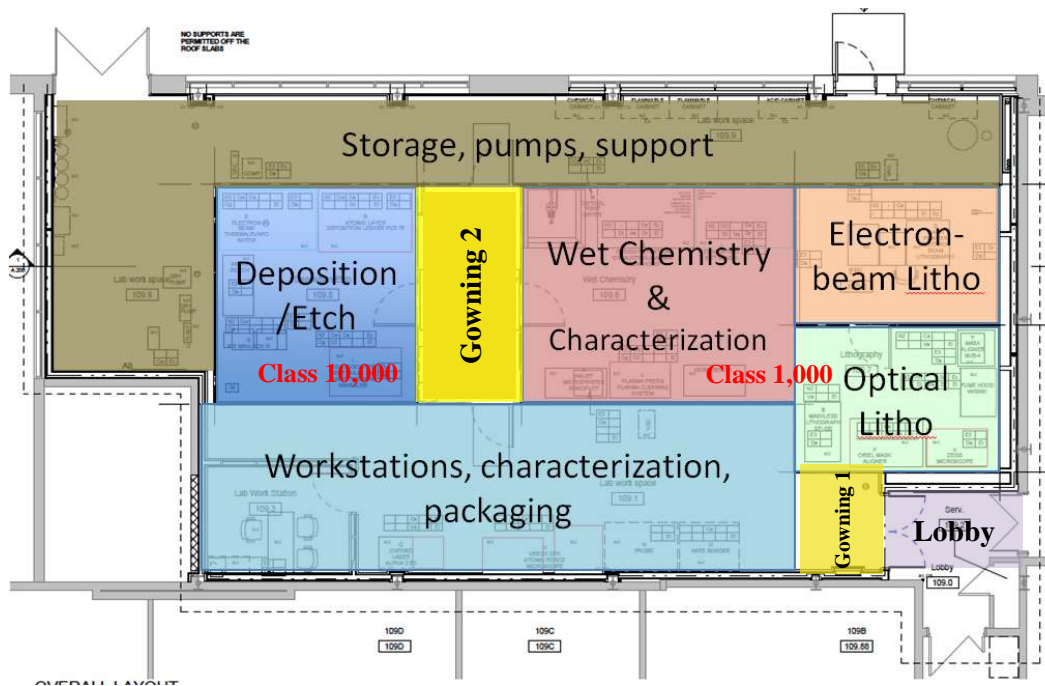


Figure 1: Lab Rooms and Gowning Areas

Table 1: Lab Rooms and Designations

Areas	Designation	Notes
Lobby Entrance room (Workstations, characterization, packaging) Service room (Storage, pumps, support)	Not designated as cleanroom space, but users are expected to keep these areas as clean as possible	
Optical Lithography Wet Chemistry and Characterization	Class 1,000 (1,000 particles > 0.5 μm per ft^3).	Contains light- and particle-sensitive photolithography processing
Electron beam Lithography	Located within the Class 1,000 room, but designated Class 10,000 and adheres to Class 1,000 protocols	
Deposition/Etch	Class 10,000	
Gowning 1 and 2	Transition areas where you prepare to enter cleaner space	

2. Procedure in the Lobby and Gowning 1 Area

The lobby area is the first room you enter when opening the R109 door from the hallway. You can enter the Gowning 1 area through the lobby.

1. When entering the Gowning 1 area, leave winter boots or outdoor shoes on the mat and change into indoor shoes (preferably with flat soles). It is recommended that you bring indoor shoes with you, or keep them on the shoe rack if you expect to come to the lab frequently.
2. While in the Gowning 1 area, put garments (e.g., coat, hat, or sweater), backpack, and other items onto a coat hook or into a locker. Access to the lab is restricted, but to keep your belongings safer, bring a lock with you to secure your valuables in a locker.
3. If indoor shoes are not possible, put on disposable shoe covers at this point.
4. Step on the sticky mat several times to clean the soles of your shoes.

The doors to the deposition room and wet chemistry room must be closed before you enter the Gowning 2 area. If these doors are open, wait for them to close.

3. Procedure in the Gowning 2 Area

All cleanroom apparel, such as coveralls, hairnets, beard covers, gloves, cleanroom shoe covers, and wipes are stored in the Gowning 2 area. To maintain its level of cleanliness, and to avoid crowding other users during the gowning or de-gowning process, limit the number of simultaneous users to two at any given time. There are two gowning benches and two areas on the floor marked by tape that are considered “clean” areas.

Do not put anything that is not ready to enter the cleanroom in the “clean” areas, or anything you want to keep cleanroom-ready in the other “lab” areas.

Note: You must get approval from NFK staff to bring any of your own materials or tools into the cleanroom.

1. The doors to the deposition room and wet chemistry room must be closed before you enter the Gowning 2 area. If the doors are open, wait for them to close.
2. As you enter the Gowning 2 area, step on the sticky mat a few times and step toward the rack on the left.
3. Put on a hood/bouffant/hair net as soon as possible. Make sure that all hair is covered. Long hair must be completely covered as well as your ears. Users with facial hair, even a goatee or a few days of growth, must wear a beard cover.

4. Any items or small equipment that are brought into the cleanroom must be cleaned at this time.
 - a. Put on gloves and use dry wipes and 70% isopropyl alcohol (IPA) to wipe down all items. The 70% isopropyl alcohol is located in the flammable cabinet in the service area.
Note: Do not wipe materials for which contamination with alcohol or water can pose a safety or performance problem.
 - b. After cleaning, set items in the “clean” area of the Gowning 2 area.
 - c. Discard gloves used for cleaning in the waste receptacle.
5. Put on a cleanroom coverall using the following process:
 - a. Take your labelled coveralls off the hanger, or open a new package located on the rack opposite the hangers.
 - b. Inspect the garment for tears and contaminants. If the garment is compromised, dispose of it and open a new one.
 - c. Put on the coveralls, legs first, taking care not to let any part of the garment touch the floor.
 - d. Check to see if the sleeves are long enough to cover your wrists during normal work.
 - e. Pull the zipper all the way to the top.
6. Check the mirror to see if your hair cover, beard cover, and coveralls are covering you properly.
7. Cover your shoes using the following process:
 - a. Take cleanroom shoe covers from the drawer and collect cleanroom gloves (by the cuffs). These are organized and labelled by size.
 - b. Sit on the bench with both feet on the “lab” side.
 - c. Keep all cleanroom apparel from touching the floor.
 - d. Put your shoe cover on one foot and swing that leg over to the “clean” side.
 - e. Put your shoe cover on the other foot and swing that leg over to the “clean” side.
 - f. Stand up on the “clean” side of the bench and adjust apparel, if necessary.
8. Put on the cleanroom gloves using the following process:
 - a. Ensure that your thumbs are in the hooks on the coverall sleeves.
 - b. Pick up only one glove at a time, and hold it by the cuff side.
Note: Do not touch the finger tips while adjusting the gloves.
 - c. Pull the cuff of the gloves over the sleeves of the cleanroom coat.
9. Step several times on the sticky mat located at the door of the cleanroom.
10. Prior to opening the door to the cleanroom, verify that all other doors to the Gowning 2 area are closed.

4. De-Gowning Procedure

This procedure covers the removal of all cleanroom garments when exiting the deposition room and wet chemistry cleanrooms.

1. Prior to exiting the cleanroom, verify that all other doors to the Gowning 2 area are closed.
2. If you are the last person leaving the cleanroom for the day, turn off the lights using the switch next to the door.
3. Set any items you might be removing from the cleanroom down in the Gowning 2 area.
4. Sit on the bench with both feet on the “clean” side.
 - a. Take off your shoe cover on one foot and swing that leg over to the “lab” side.
 - b. Take off your shoe cover on the other foot and swing that leg over to the “lab” side.
5. Stand up on the “lab” side.
6. Remove gloves and discard them in the waste receptacle.
7. Remove your coveralls and hang it on a hanger.

Note: If the garment is well-used, you may discard it in the waste receptacle. For guidance, the garment is not reusable if it is torn or contaminated, or if you have used it more than about 3 times or longer than about 10 hours total.
8. Straighten and zip the coat up so that it will not slide off the hanger. Write your name on the sleeve.
9. Remove your hairnet and discard it in the waste receptacle. If you plan to enter the cleanroom again soon, the hairnet and shoe covers can be re-used once. Store them inside the sleeve of your coveralls.
10. Prior to exiting the Gowning 2 area, verify that all other doors to the Gowning 2 area are closed.

5. Other Resources

Further reading is available at:

http://capsnet.usc.edu/sites/default/files/all_departments/EHS/CHPSOPcleanroomgowning.pdf.