



**NanoFabrication
Kingston**

People. Ideas. Technologies.

NFK Lab Usage Procedure

*NFK-001
V1.0*

September 4, 2015

Table of Contents

| | |
|--|-----------|
| 1. Introduction..... | 3 |
| 2. NFK User Expectations | 4 |
| 2.1. Facility Conduct Responsibilities | 4 |
| 2.2. Responsibility for New Procedures | 4 |
| 2.3. User Communication | 4 |
| 2.4. General Administration, Access and Training Policy..... | 5 |
| 2.4.1. NFK Access | 5 |
| 2.4.2. Training and Standard Operating Procedures (SOPs) | 5 |
| 2.4.3. Booking Tools..... | 5 |
| 2.4.4. Facility Fees and Billing | 6 |
| 2.5. Staffed Hours and After-hours Access | 6 |
| 2.5.1. Staffed hours | 6 |
| 2.5.2. After-Hours Access..... | 6 |
| 3. Disciplinary Policy | 7 |
| 3.1. Disciplinary Actions | 7 |
| 3.2. Appealing Permanent Removal of Access..... | 7 |
| 4. Safety..... | 8 |
| 4.1. Safety Committee..... | 8 |
| 4.2. Incident Reports | 8 |
| 4.3. Emergency Procedures..... | 8 |
| 4.4. Chemicals..... | 8 |
| 4.4.1. Chemical Storage | 8 |
| 4.4.2. Chemical Waste | 9 |
| 5. Cleanroom Protocols | 10 |
| 5.1. Personal Hygiene | 10 |
| 5.2. Footwear | 10 |
| 5.3. Cleanroom Activity..... | 10 |
| 5.4. Personal Devices | 10 |
| 5.5. Bringing Items into the Cleanroom..... | 11 |
| 6. IT Policy | 12 |
| 7. Check-Out Procedure..... | 12 |

1. Introduction

This document covers the basic operational policies for the use of facilities of NanoFabrication Kingston (NFK). All users are expected to have read, understand, and respect these procedures. This document attempts to address acceptable operating behaviour, but is not a complete list and is not a substitute for common sense. Anyone who fails to act in a professional, safe, and responsible manner while using NFK facilities will face disciplinary action at the discretion of the management. Any questions, concerns or suggestions may be directed to the lab manager, staff or advisory boards.

2. NFK User Expectations

2.1. Facility Conduct Responsibilities

The staff and management of NFK have implemented reasonable measures to ensure the laboratory provides a clean and safe working environment. All users in NFK are expected

- to act in a professional, courteous, and safe manner at all times while in the facility,
- to maintain the cleanliness of the lab by keeping your workspace tidy, putting chemicals and tools back where they belong, and cleaning up chemical residue,
- to identify the hazards associated with the activities for which he/she bears responsibility,
- to warn those who may be affected by them, and
- to ensure that the health and safety of other users will not be endangered.

Every user is required to take reasonable care for his/her own health and safety and that of others who may be affected by his/her acts or omissions at work. Every user has a duty to not interfere with, or misuse, anything provided or organized in the interest of health, safety, or welfare.

NFK takes workplace violence and harassment seriously. The Queen's University policy on workplace violence and harassment applies to NFK and can be found at the following links:

- <http://www.queensu.ca/humanresources/policies/workplaceissues/harassment.html>
- <http://www.safety.queensu.ca/violence/>

2.2. Responsibility for New Procedures

New safety procedures are sent to everyone with access to the lab via email, and are posted on the facility website and in a prominent location within NFK. It is each individual's responsibility to become familiar with and follow these procedures. Ignorance of new procedures that have been posted is not an excuse or a defense.

2.3. User Communication

NFK operates effectively when NFK staff is aware of the problems and issues in the facility. If there is a problem with a standard process not working, or a piece of equipment that is not working properly, please let NFK know by noting it in the Lab Usage Log or by contacting NFK staff.

In the event of an incident involving injury, damage, or potential for either, you must submit an Incident Report Form (can be found on our website) to NFK staff as soon as possible.

2.4. General Administration, Access and Training Policy

2.4.1. NFK Access

Access to NFK is only approved by the following procedure:

- **User registration:** each user must be registered with NFK. Instructions for registering can be found on our website.
- **Project Plan:** all users must submit a Project Plan to NFK for reference. NFK staff will use this information to identify possible hazards or incompatibilities with NFK procedures. The form can be found on our website.
- All users must have valid current WHMIS training certificate.
- All users must attend an NFK Orientation Session, which is a one-hour lecture held periodically that includes basic Lab Safety Training. The user is expected to pass the corresponding safety quiz.
- All users must review the Check-In form with NFK staff. This form can be found on our website. The form must be signed by NFK staff, the user, and the user's supervisor.
- **Access Badge:** Users will be issued badges to access Innovation Park and NFK once the Check-In form is completed. Badges are the property of Innovation Park and must be treated with respect.
- **Guests:** Users may request approval by NFK staff each time they wish to bring guests to NFK. Guests are visitors who would not otherwise have access, and must be supervised at all times while at Innovation Park. A reason for the visit must be provided, and the number of simultaneous guests is limited.

2.4.2. Training and Standard Operating Procedures (SOPs)

Once a user receives an access badge, training on tools and processes become available. The lab manager or lab engineer will work with the user to determine the process and tools required by the project and give specialized training. Each tool and standard process has specific training and SOPs, which will be provided to the user upon request and when scheduling allows. The nature of the training depends on the tool or process, and may involve several sessions and/or a quiz. Users will be able to book a tool and use it without supervision only after the training program is completed and NFK staff are satisfied with your competence. If you gain sufficient experience with a tool, you may have the opportunity to become an Advanced user of that tool. This status allows you to perform modifications and maintenance of the tool, and train novice users, in exchange for time on NFK tools.

2.4.3. Booking Tools

After receiving all necessary training on a tool, it may be booked for use by the user via a scheduling calendar found on our website. Instructions for using the calendar and any booking restrictions are provided on our website. In general, be respectful of others when booking equipment. If you book a tool, use it for the period you have booked. Do not use someone else's time, and do not use a tool you have not booked. You may not book a tool for which you have not received full training.

2.4.4. Facility Fees and Billing

NFK is able to provide service in two main ways. You can become a user of the facility, receive training, and operate the equipment yourself, or you can have NFK staff perform a task. Most work at NFK will be done by users, and the costs for using the facility are provided in a fee table on our website. Fees are administered as an hourly rate for the use of equipment, and are dependent on the type of equipment and whether the user is from an academic institution or industry. In the event that NFK staff perform the work, a quote will be issued after reviewing the Project Plan.

2.5. Staffed Hours and After-hours Access

2.5.1. Staffed hours

NFK is open to users 24/7, but the facility is staffed from 8:30 am to 4:30 pm Monday to Friday (except holidays). During this time, all users can access the facility and all processes are available.

2.5.2. After-Hours Access

- NFK policy for users working alone is stated in the NFK Safety Manual. In summary, users must not work alone in the cleanroom at any time—a second qualified person must be present to ensure the safety of the work and the equipment. You may assume that during Staffed Hours someone will be present to act in this capacity, but After Hours you must arrange for someone to be present while you are working in the cleanroom.
- A PIN is required to enter the building After Hours, and will be issued to users upon request and if NFK staff deem it appropriate.
- After-Hours processing is allowed at the discretion of NFK staff. Before booking a tool for After Hours, submit a brief work plan to NFK staff outlining what you will be doing, over what time, what chemicals (if any) you will be working with, who your companion will be, and the contact information of each of you.
- Use of chemicals that NFK deems particularly dangerous will not be permitted After Hours. Currently such chemicals include all strong acids and bases with concentration greater than 10% by weight, and hydrofluoric acid at any concentration.

3. Disciplinary Policy

All users must respect the rules, guidelines, and procedures provided by NFK at all times. The safety of everyone who works at NFK depends on your choices while in the lab, and users should be able to expect that their hard work and expensive materials will not be compromised by the poor choices of others. It is the responsibility of all users to contribute to a safe work environment. The following Disciplinary Policy has been developed to encourage a safe work environment for all users and their work.

3.1. Disciplinary Actions

NFK staff may issue Yellow Warnings and Red Warnings if a breach of rules, guidelines, or procedures is observed.

Initial Disciplinary Actions are defined as follows:

- **Green Warning** – Minor mistakes that arise in an attempt to follow the rules will be corrected by discussion, reminders, or re-training.
- **Yellow Warning** – Minor infractions against NFK rules that are observed by either staff or users. Yellow Warnings are generally the result of repeated mistakes, carelessness, or behaviour that directly affects the safety of others. Yellow Warnings will be communicated to the user verbally and via email.
- **Red Warning** – Serious or major infractions of NFK rules. Red Warnings are generally the result of blatant disregard for safety, the laboratory, or the authority of the rules, and for disrespectful or belligerent behaviour toward NFK staff or other users. A Red Warning is also issued automatically after issuing the third Yellow Warning in any 12-month period.

Upon issuing a Red Warning, the user will have their access suspended, effective immediately, until such time that the case can be reviewed by NFK management and disciplinary action is decided. NFK will work with the user and user's supervisor to implement appropriate disciplinary action, which may be suspension of After Hours access, suspension of NFK access, or retraining. Disciplinary response to Red Warnings will also depend on previous Red Warnings and the user's willingness to cooperate, and multiple Red Warnings may be grounds to permanently revoke a user's access.

3.2. Appealing Permanent Removal of Access

The user, with support from the user's supervisor, can appeal a disciplinary decision to permanently revoke access to NFK by submitting a request to NFK management. All previous user history within NFK will be made available to the committee in consideration of a final decision.

4. Safety

4.1. Safety Committee

The Safety Committee acts as an advisory body in all matters of safety, and will have representation from NFK staff and users. Users are encouraged to engage the Safety Committee to discuss hazards or unsafe practices in their work area and to offer suggestions. The committee performs the following tasks:

1. Regular inspection of the work area to identify hazards and suggest solutions.
2. Review Incident Reports and provide corrective actions.
3. Review the NFK Safety Manual and recommend changes.
4. Oversee safety training programs.
5. Ensure users meet WHMIS compliance.
6. Ensure emergency equipment is up to date and working properly.

4.2. Incident Reports

In the event of an incident involving injury, damage, or potential for either, you must submit an Incident Report Form to NFK staff as soon as possible. The form can be found on our website. The purpose of this report is to bring incidents to the attention of the Safety Committee so that corrective actions can be taken to prevent similar incidents from happening.

4.3. Emergency Procedures

The response plan for emergencies is included in the NFK Safety Manual. This manual, along with emergency contact numbers, are also posted on the message board at the entrance to NFK. It is the user's responsibility to become familiar with the emergency response plan, and to know the proper response to emergencies associated with the user's work. This includes planning ahead of time what to do when presented with an emergency, such as if the chemicals you are using are spilled or catch on fire, if the tool you are using malfunctions, or if the power goes out. If you are unsure about the appropriate response under any given circumstances, please ask NFK staff.

4.4. Chemicals

Guidelines and techniques for handling and storing hazardous chemicals, and for disposing of waste chemicals, are described in the NFK Safety Manual. Procedures for use of chemicals at NFK are described in sections 4.4.1.

4.4.1. Chemical Storage

Users are informed of the locations of chemicals stored within NFK during training, and users must return chemicals to their designated locations when work is finished. Do not keep chemicals in the fume hood when you are not using them, as they add to the potential hazard of

your work. For each storage compatibility class, there is temporary storage in the chemical cleanroom to avoid having to exit the cleanroom frequently during work, but these chemicals must be returned to their home location when work is finished. Wash bottles containing hazardous solvents are considered hazardous and should be returned to the appropriate storage location when you are finished with them.

4.4.2. Chemical Waste

There are temporary chemical waste containers for each waste compatibility class within the cleanroom. When you have waste to add, determine the appropriate container and add your waste, if safe to do so. Record the amount and nature of the waste you add to each container on the Waste Log provided in the cleanroom. If you are ever unsure of the appropriate waste container for your waste, please ask NFK staff. Remember, it is unsafe to combine incompatible wastes. If a temporary waste container is full, inform NFK staff. If NFK staff are not available, put the waste in an empty, chemically compatible container with a lid that can seal tightly and label it clearly with the chemical you have in it, the hazards it presents, your name, and the date.

For solid debris, including wipes, gloves, swabs, etc., that is NOT contaminated with hazardous materials, place them in the waste receptacle in the cleanroom as directed. For similar debris that IS contaminated with a hazardous chemical, place the material inside a sealable plastic bag provided and label the bag with the main and/or most hazardous contaminant and place it in the separate waste receptacle in the cleanroom as directed.

NFK staff will handle the transfer of wastes to disposal containers, and arrangements for the contractors to remove the wastes. If you have any questions about the waste disposal process, or have waste that is incompatible with any of the classes described here, ask NFK staff for clarification.

5. Cleanroom Protocols

Procedures for entering NFK, entering the cleanrooms, and preparing items for entry to the cleanroom are described in the NFK Gowning Protocol, which can be found on our website. Other procedures are described in sections 5.1 through 5.5.

5.1. Personal Hygiene

The cleaner you are when you come to NFK, the cleaner the room will be. Refrain from bringing anything, especially clothing, that releases particles. This includes, but is not limited to, clothing with heavy lint, pet hair, or dust/grass from outdoor exposure. Particles may also be unrelated to dirt; makeup or scented products like perfume or lotions should not be worn in the cleanroom. Cigarette smoke is also a contributor to particles, and it is recommended that you not smoke for at least four hours prior to entering the facility.

5.2. Footwear

Only flat-soled, closed-toe footwear is allowed in any part of NFK. Indoor-only shoes are recommended, and can be transported by the user or stored at NFK for frequent users. In the absence of clean shoes, shoe covers must be worn at all times and are located at the NFK entrance.

5.3. Cleanroom Activity

Users are, by far, the greatest contributor to particles in the cleanroom. Do not:

- Talk unnecessarily or shout
- Touch scalp, skin, hair, or eyes
- Write on garments or equipment
- Sand, drill, or file (or perform any activity known to generate particles)
- Remove any piece of cleanroom apparel
- Wear cleanroom apparel that is torn or contaminated
- Reach under cleanroom apparel
- Work in the cleanroom if you are coughing or sneezing

5.4. Personal Devices

Mobile phones and laptops are permitted in the cleanroom, but must be brought into the room like any other item (see section 5.5 Bringing Items into the Cleanroom). Do not keep your phone under your garment if you plan to use it, and use it only when necessary. No recordings are permitted to be taken in NFK without permission by NFK staff, including photographs, videos, or audio recording.

Personal listening devices are not permitted. Music players may be allowed if approved by NFK staff, but volume must be low enough to hear potential problems such as equipment noises, calls for help, or safety alarms.

Do not remove your cleanroom gloves to operate your device, and do not touch anything (including your device) with gloves you are using as Personal Protective Equipment.

5.5. Bringing Items into the Cleanroom

- You must get approval from NFK staff before bringing any new item into the cleanroom. In general, unnecessary items and items that generate particles will not be allowed. It is typically not necessary to bring packaging into the cleanroom, and often plastic bags are useful for transporting materials in and out of the cleanroom. All items must be wiped down prior to entering the cleanroom, as described in the NFK Gowning Protocol. Examples of items that generate particles include:
 - Wood or cardboard (plastic or metal are alternatives)
 - Paper (cleanroom-rated paper is available)
 - Pencils, erasers (use pens)
 - Duct tape or masking tape (use clear tape or cleanroom tape)
- If you wish to bring a hazardous chemical to NFK, you must request permission from NFK staff. The chemical must be added to NFK's official chemical inventory, unless it is present in the lab for only a day or two, and must have a MSDS available. In any case, you *must* follow the regulations described in the Transportation of Dangerous Goods Act (TDGA). For Queen's University users, there is a service offered by the Queen's University Department of Environmental Health and Safety where they will transport the chemical back and forth from Queen's to Innovation Park. Ask NFK staff for details.

6. IT Policy

Use of the network provided by NFK is restricted to responsible activity as described in the Queen's University IT Policy. Furthermore, computers that operate tools at NFK are not permitted to be used for checking email, browsing the internet, booking equipment, checking MSDS, etc. Computers will be provided in the entrance area and in the cleanrooms for this type of use.

Data stored on computers at NFK must be stored in the locations directed by NFK staff and removed when directed by NFK staff. If the data is sensitive for Intellectual Property reasons, the user is responsible for removing the data as it is generated. Under most circumstances, NFK is unable to guarantee the protection of sensitive data.

7. Check-Out Procedure

At the completion of your work at NFK, you are expected to review the Check-Out procedure with NFK staff. This procedure ensures that you do not leave anything behind in the laboratory that does not belong there, including notebooks, chemicals, samples, and data.