

Microwriter ML 3 Usage policy March 2025

- The Microwriter ML 3 is a direct-write photolithography tool.
 - a . Users can get authorized **only for direct writing on the substrate** using this tool.
 - b . **Mask writing is restricted only to be done by the SO/ Operator (IITBNF staff) of the tool.**
- Booking of Microwriter ML 3 slots can be done through the virtual equipment Microwriter ML 3 (which has been created for this purpose). **It is mandatory for the user to mention the pattern file name, Lithography Level and the estimate for the writing time in the summary window.** These details will be checked periodically.
- **Instructions for the trainee**
 1. Log into your account on the Equipment Usage Request Management system (http://www.cen.iitb.ac.in/equipment_usage/index.php) and fill out the Equipment Usage Request form. Please select “Training Request” in the field “Type of Request”. An AU will be assigned against your training request by the SO. A slot will be booked for your first training session within 48 hours. The whole training session has to be completed within 21 working days.
 2. It is recommended that you bring your own sample for training. By default, the Microwriter training is for both first and second level patterning. It is also expected/ advisable that you will have generated a pattern file for the training sessions. If you do not have a sample/pattern, training will be conducted on a dummy sample, making use of some pre-existing pattern. This will be applicable for both categories:
 - (a) users who do not have pre-existing pattern
 - (b) users who need training for only first level lithography.
 3. The training session involves (a) watching the AU perform first and second level patterning in the first two sessions (demo sessions), (b) performing the Microwriter slot with the AUs guidance in the third and fourth sessions (hands-on sessions) and (c) demonstrating the capability of running the process.
 4. On the first day of the training (and if required, on subsequent days), read the SOP and usage policy thoroughly. Take detailed notes in the demo sessions. At the end of the second session, you get the notes (neatly typed in A4 sheet) checked by the AU (outside the cleanroom).
 5. Based on your notes, the AU decides whether you are ready for the subsequent hands-on sessions.
 6. Follow AU’s instructions meticulously. The AU reserves all rights to cancel your training, if deemed necessary. Fill in the training log sheet after every session.
 7. Note that a no-show or delay of more than 30 min (without prior intimation) on any of the training days will attract cancellation of your training request, and de- prioritization of any subsequent request within the next three months.
 8. All costs associated with the training sessions will be borne by the trainee’s research group/institution/organization.

- **Instructions to Authorised Users (AU's)**

1. Once a training session is assigned to you by the SO, you are required to book the earliest available Microwriter slot (for the first training session), within 24 hours.
2. It is also recommended to have a meeting with the prospective trainee, to give her/him an overview of the Optical Lithography process and to understand the general nature of the trainee's Lithography requirements. In case you are unavailable for a training session assigned to you, it is solely your responsibility to find a replacement for yourself.
3. You will conduct all the steps related to Microwriter during the demo sessions (sessions 1 and 2). You will encourage the trainee to get all doubts clarified, and help her/him take detailed notes. At the end of
4. the first two sessions, you will check the notes prepared by the trainee and email a pdf copy of the same to the SO (with your name and comments mentioned on it).
5. You will ensure that the trainee strictly adheres to the training policy, maintains punctuality, and correctly uses the tool in sessions 3 – 6.
6. You will sign the session log after each session and inform the SO after completion of six sessions.
7. You will reserve the right to cancel the training session at any stage, if deemed necessary. If such an action is taken, you will send an email to the SOs and the FIC, with the trainee in cc, immediately after the cancellation

- **Instructions for the System Owners (So's)**

1. You will assign an AU against a training request within 24 hours (after due checks and assessments) of receiving the request. You are required to ensure that the training assignments are uniformly distributed within the pool of AUs. You will also send an email to the prospective trainee, requesting her/him to read the policy document carefully, before the training process commences.
2. You will ensure that the training process is completed within 21 working days from the day the request is placed.
3. You will arrange for the authorization test of the trainee, once six sessions are completed and the AU has notified of the same.

Usage of Microwriter ML3

- **Instructions to Authorised Users (AU's)**

1. AUs will be assigned training responsibilities as per the training needs. In addition, AUs may be asked to do process runs for others (in case of non-availability of operators).
2. Authorized users are expected to take care of process runs of other users from the same group.
3. In the slot booking module, as an AU, you will have to fill out the usage request form but your request will be auto-approved (no SO approval needed).
4. While you can book your slots for Microwriter by yourself, you are required to declare to the SO/Lab Manager/Process Technologist/FIC, if you are planning to work on a new material (system), or samples which have been processed

completely/partially outside CEN. This step is required to ensure that the contamination policy is not violated. Any lapse in this regard will attract heavy disciplinary action/penalties, amounting to de-authorization for up to 3 months.

5. Slot booking can only be done at most three days in advance.
6. Regular Micro writer slots are restricted to a **maximum duration of three hours per user. An user may book up to 3 slots (totaling to 9 hours) per week, however two consecutive slots booking on any day is not allowed.**
7. The 3-hour slot (10:00 AM - 01:00 PM for morning sessions and 02:30 PM - 05:30 PM for afternoon sessions), 4 days per week is blocked for INUP users. However, these slots will be made available to general users, as and when available. The consecutive slot booking can be carried out for an INUP user (if required) on a case by case basis after FIC approval.
8. The overview for slot booking reserved slots for users as shown in table below:

	Monday	Tuesday	Wednesday	Thursday	Friday
SLOT 1 (Morning slot)	INUP User (10:00 AM - 01:00 PM)	INUP User (10:00 AM - 01:00 PM)	AU/Operator/ SO for Student	AU/Operator/ SO for Student	External User (10:00 AM - 01:00 PM)
SLOT 2 (Post Lunch slot)	AU/Operator/ SO for Student	AU/Operator/ SO for Student	INUP User (02:30 PM – 05:30 PM)	INUP User (02:30 PM – 05:30 PM)	External user (02:30 PM – 05:30 PM)

9. If the external user slot is not planned/Slot 1 can be used for INUP Users, Slot 2 needs to be released for students. *The same slots may also be used for baseline measurements.*
10. However, these slots will be made available to general users, as and when available.
11. More than five auto-cancellations (for reasons which are not due to technical/administrative faults) in a month will attract disciplinary action (amounting to cancellation of authorization for at least one week). Consideration may be given to compelling reasons for auto- cancellation, if an email is sent on the same day with necessary explanation.
12. Self-cancellations should be done 12 hrs. before the actual slot. More than five self- cancellations a month will attract disciplinary action (amounting to at least 1- week of de- authorization). Consideration may be given to compelling reasons for self-cancellation, if an email is sent on the day/time of cancellation, with necessary explanation.

● **Instructions for non-AU users (INUP users included) and AUs assisting non-AU users.**

1. A non-AU user is required to fill out the usage request form, available on the CEN website. The request needs the approval of your guide and lab manager/FIC (INUP co-coordinator, for INUP users) for training requests.
2. Provided all the required information is clearly mentioned, the SO assigns the Microwriter slot session to one of the AUs.
3. The AU is required to make the slot booking within 24 hours of being assigned the Microwriter slot/session.
4. The AU will book the earliest available slot. While it is strongly recommended

that the non- AU user accepts the earliest available slot, if this slot is not acceptable to the non-AU user, an alternative slot has to be booked as per the convenience of both the AU and the non-AU user.

- **Maintenance of Microwriter Tool**

1. The SO(s) are responsible for maintaining stock of spare parts and performing periodic health check of the Microwriter ML3 tool and associated facilities (UPS, chiller, N2 – supply).
2. The SO will act as the SPOC for all communications with the Microwriter engineers, during equipment maintenance. S/he will communicate all maintenance and purchase requirements to the FIC/Lab Manager.
3. The SO(s) will take the lead during in-house maintenance of the Microwriter tool. They will be assisted by operators (if any) and members from the “Equipment Maintenance Team” in maintenance operations. When further assistance is required, the SO may involve AUs.

- **General Instructions for all users of Microwriter**

1. The allowed feature sizes (line/space) range from 2 μm (minimum) to 50 μm (maximum) for mask writing, and from 1 μm (minimum) to 50 μm (maximum) for direct writing.
2. The design file (.cif) must be reviewed and **approved by the system owner/operator**. After approval, the design should be burned onto a disk and submitted to the operator at least 24 hours before the scheduled slot.
3. The design writing area should be 2” x 2” for a 3-inch mask plate and 4” x 4” for a 5-inch mask plate. The design must stay within the wafer outline boundary. Users should be prepared to adjust their designs to meet these specifications.
4. A mask plate issue request must be submitted through the online module on the IITBNF website and approved by the guide. Without this online approval, the mask cannot be written.
5. Mask plate etching will be conducted once a week. If urgent etching is required, users must send an email to iitbnf.process@gmail.com with the guide approval and keep the SO, FIC (Prof. Kasturi) copied in this email.
6. All users are supposed to fill the log book (online and offline) for the tool after their slot.
7. Please note that violation of any of the above policies will attract penalties amounting to de-authorization for up to 30 days.
8. Two days in a month will be blocked for the baseline of the tool.