Standard Operating Procedure (SOP)

Filmerics F50
(MET-03)

In case of emergency please call 911

For any other major safety concern contact EHRS at: 215-898-4453 or via email: ehrs@ehrs.upenn.edu

If there is an error on the system/tool please report it on IRIS, we will take care of it

Please DO NOT run diagnosis without a staff member’s approval

General safety tips and common mistakes

1) Make sure that you are logged into the tool on IRIS before use. If you do not log in, you cannot run the tool.
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7 Check-out
1. **Check-in**
   1. Log-in on the IRIS scheduler

2. **Start-up**
   2.1. Turn on light source on front panel of main F50 unit.
   2.2. Wait at least 5 minutes for proper lamp warm-up.
   2.3. Ensure “FILMapper” software program is open.

   If software is not running, double-click “FILMapper” icon on the tool’s PC desktop.

   Keep hands clear of system, and allow to initialize completely.

2. **Reference check**

   2.1 Baseline setting
   2.1.1 Measure Tab

   1. Locate the 4” Filmetrics wafer labeled “Si Reference Wafer” and "SiO2 on Si Test wafer".
2. Click the “Measure” tab at the top of the screen
3. Click “Baseline” and follow on-screen instructions

2.1.2 Step 1

1. The following dialog box appears.

2. Place the "SiO2 on Si Test wafer" on the stage.

The wafer stage is set up with alignment tabs to accommodate 4” wafers; the tabs can be moved to accommodate other sizes using the supplied hex head key.

3. Click the "Take Sample Reflectance" button.
2.1.3. Step 2

1. The dialog box for step 2 appears when step 1 is completed.

2. Place the "Si Reference wafer" on the stage.
3. Choose "Si" from the "Reflectance Standard" pull-down menu of box.
4. Click the "Take Reflectance Standard" button.
5. Remove the Si Reference wafer when it is done.
2.2 Check standard SiO2 reference wafer
1. Locate the 4” Filmetrics wafer labeled “SiO2 on Si Test Wafer”

2. Place the Test Wafer on the stage.
3. While still on the “Measurement” screen, click the “go to” button.

4. The following dialog box appears. Set coordinates to X=0, Y=0 and click “ok”.

5. Select “SiO2 on Si” from the pull-down menu above the “Edit Recipe” button and click “OK”.
6. Click “measure” to obtain SiO2 thickness (standard = 7268.7Å)
   - If measurement is ≥ +/- 28 Å of expected thickness, contact lab staff
7. Remove the Test Wafer from the stage.

3. One spot measurement to confirm the best fitting

3.1 Baseline setting

* Note: If the substrate of your sample is still a Si wafer after the above process, then skip 3.1, and go to 3.2.

3.1.1 Measure Tab

1. Click the “Measure” tab at the top of the screen
2. Click “Baseline” and follow on-screen instructions
3.1.2 Step 1

1. The following dialog box appears.

2. Place the sample wafer to be measured on the stage.

The wafer stage is set up with alignment tabs to accommodate 4” wafers; the tabs can be moved to accommodate other sizes using the supplied hex head key.

3. Click the "Take Sample Reflectance" button.
3.1.3 Step 2

1. The dialog box for step 2 appears when step 1 is completed.
2. Place the blank substrate on the stage.
3. Choose the substrate material from the pull-down menu of the "Reflectance Standard" box.
4. Click the "Take Reflectance Standard" button.
5. Remove the blank substrate when it is done.

3.2 Confirm the fitting of measured data with calculated data

1. Place the sample on the stage.
2. Click the "Go To" button in the "Measure" tab.
3. The following dialog box appears. Set coordinates to X=0, Y=0 and click “OK”. The sample wafer will move beneath the optical fiber probe.
4. Click the “Edit Recipe” button to open the “Edit Recipe” window.
5. Click “Film Stack” to add, remove, or change film types in the stack to be measured.

6. Save an edited recipe as a new recipe, if necessary.

7. Click the "Measure" button.

8. Make sure that the fitting of measured data with calculated data is good enough.
   If not, adjust the parameters.

Note: To change or add the parameters, check Meas box, and change or add the parameter.

4. Creating/editing wafer mapping recipes

1. Open the "Edit Recipe" dialog box.
2. Click “wafer map” and select appropriate wafer diameter, desired coordinate system (“polar” is recommended, to start), number of points to be
measured, desired edge exclusion, and appropriate wafer indexing (flat, notch, etc.)
3. Save the recipe, if necessary.

5. Running wafer mapping recipe and reviewing data

1. On the “WaferMap” tab/screen, click “new” and fill-in the wafer ID

Note: the previously used wafer ID will be applied to new maps if not changed

2. Click “start” to run wafer mapping recipe
3. Once completed, review measurement data in the lower right of the screen under “results”.

4. Under “Display”, select 2D or 3D wafer map for review, as desired

3D wafer maps can be rotated using the PC mouse
5. If multiple layers exist, each can be viewed individually by using the “Parameter to Display” pull-down menu.

6. To run another wafer, click “new”, fill-in the wafer ID, and click “start”.

**6. Leaving the tool in an “idle” state**

1. When done using the F50, turn off the light source only, unless another will be using the tool immediately after you.
2. Leave the FILMapper software open.
3. Leave main unit power on.

Feel free to contact the staff members with any questions about your process and the tool.

Last modified: 11/15/2021 by Hiromichi Yamamoto