Veeco NT9100 Wyko Optical Profiler
Standard Operating Procedure

These instructions are intended for reference only, and will not replace the thorough training required for proper system operation. Contact a clean room staff member with questions or to report a system problem. Written by Cris Belfer and Boyan Penkov.
1. **Enable** the tool in BADGER.

2. **Make sure the sample stage is completely EMPTY.**
3. Make sure the stage is aligned with the **ARROWS**.

   - Please alert the Superuser or Cleanroom Staff if the stage is misaligned.

4. Launch “**VISION**” software from the desktop shortcut.

   - If the software asks you to verify an empty stage, do so and click OK. The optics turret will then rotate back and forth for a self-check.
5. Open **Measurement Options** from the toolbar.

6. Select **VSI or PSI** as a measurement type.
   - **VSI** works up to 2nm vertical resolution.
   - **PSI** is a more narrow range, but works up to 0.2nm resolution.
7. Choose the **10X** objective lens, and the **0.55X FOV** (Field-of-View) settings.

   - This gives the largest field-of-view for the initial sample location and rough focus.

   Click **OK** to close **Measurement Options**.

8. Make sure the objective and sample chuck are more than two inches apart.
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| 9.   | Load a **CLEAN** and **DRY** sample on to the chuck.  
- The chuck uses a porous stone that is **easily damaged** by dirty or wet samples.  
- The chuck can be actuated with a manual vacuum valve if necessary. |
| 10.  | **Open Intensity** from the toolbar.  
- You should see a flashing green light from the objective, projected on the sample chuck.  
Use the X/Y stage to move your sample under the flashing light. |
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<td><strong>11.</strong></td>
<td>Open <strong>Z-Axis</strong> control from the Intensity Window.</td>
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<td><strong>12.</strong></td>
<td>There are movement controls for the <strong>Z-Axis</strong> on the side of the window.</td>
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<td>-There are 5 speed settings. Click and hold above or below the green bar, then move the mouse up or down to move in that direction.</td>
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13. Lower the objective towards the sample using a fast speed setting.

Watch the lens and the sample, not the computer screen.

-If the objective is lowered too quickly, it may make a whirring-noise. Please do not continue to move at this speed.

Lower the Objective until it is about 5mm from the sample. Please be very careful and use a low speed.
14. Watch the computer screen and locate your sample by reversing the lens travel direction to move the lens up and away from the stage.

- This way, you won’t crash the lens into the stage while observing the computer screen.

| 15. Once the sample comes into view, choose a very slow Z-Axis speed and focus until you see fringes. | ![Image](image_url) |
| 16. | Open **Measurement Options** again.  
Choose **VSI** or **PSI**.  
Choose **10X** or **50X** objective.  
-If switching to 50X please make sure that nothing is in the way of the sample, including holders, tall sample parts, etc.  
Choose your **FOV** objective multiplier. | ![Measurement Options](image1.png)  
**Measurement Type:** PSI  
**Resolution:** HDVSI (Big Memory)  
**Intensity:** ...

| Objective: |...
| FOV: | 10X 50X  
| **Percent of Width for FOV** | 1.0X 5.0X 20X |  

| 17. **VSI Options:** | ![Measurement Options](image2.png)  
**Back Scan:** Leave at 5µm.  
**Length:** Approximate desired depth of scan. It is better to overshoot by 20% than to undershoot.  
**Modulation Threshold:** Leave at default 5%.  
-Everything else should be default.  
**PSI Options:** Leave at Defaults. |
18. Return to the Intensity Window. Use the **Z-Axis** to get a fine focus on the sample again.

Use the two manual **tilt knobs** to align fringes perpendicular to the step or primary feature.

Remove tilt until you only have a few fringes (**VSI**) or one fringe (**PSI**) visible.

Make sure to close the **Intensity Window**. The **Vision** program will prioritize this window unless it is closed.
19. Click **New Measurement** from the toolbar.

A measurement will automatically proceed and show up on screen.

- Do not shake the table during the measurement.

- You can adjust the scan length for optimal and rerun a new measurement.

20. **Right Click** the image and choose **Analysis Options** for different tilt compensation.

**Modal Tilt** is a typical option to use.  
(Seen here with the Modal Tilt) ➔

- Modal Tilt corrects for the tilt in Step 18.
| 21. | There are many **Data Analysis** tools available to record or visualize. Explore the options in the **Measurement** screen toolbar. |
| 22. | **Save** your dataset and images as you see fit.  
- Using **“Save Dataset As”**, you can create an ASCII file and other useful file types. |
23. When you are ready to end your session, first open the **Intensity Window** again. Use the **Z-Axis** controls to move the objective **Up** and **Away** from the sample while **watching the sample and not the computer screen**! Move at least 2” from the sample.

24. **Remove your sample** and verify that the chuck is **clean** for the next user.

   - If you used the vacuum, please deactivate before attempting to remove the sample.

   - If you need to clean to chuck after use, please be careful not to get the chuck wet.
25. Close all windows and exit the Vision Software.

26. Do not forget to Disable the tool in Badger after you are done with your session.