

Veeco Dektak Profilometer

Operating instructions:

1. Sample Loading and Alignment

Manually place sample on the center sample on stage.

Make sure you are on "Camera" mode, and if not press on "Camera" button. Use the arrow icons in the positioning screen's menu bar to auto jog the stage.

Visually confirm that the stylus head is positioned over the highest point of your sample and that there are no obstructions that could interfere with the profilometer tower descending to your sample. This is especially important for thick or irregularly shaped samples. Damage to the machine can result if the tower base hits your sample before the stylus.

Lower stylus tower (LDVT) onto sample by pressing the 'Tower Down' icon in the sample positioning screen's menu bar.

You can move the stage by the arrows (opposite direction with the real direction), or press with the mouse on the screen, and move the mouse and the stage will move (to end it press on "Esc" button).

To fine tune the alignment left click the mouse within the viewable camera display window to activate the micro-stage control. The stage will move as you roll the trackball. Use this to fine tune where you want to start your scan. The stylus will contact approximately where the green crosshairs are overlaid onto camera display. When positioning is complete left click the mouse within the viewable camera display window to de-activate the micro-stage control.

2. Recipe Setup and Run

Edit scan parameters by selecting the 'Goto Scan Routine Window' icon in the sample positioning screen's menu bar and then click on the 'Scan Parameters' button.

Length

Minimum scan length is 50um and maximum is 50,000um. Note that the length, duration, and resolution are not independent variables. As you increase the length you generally lose horizontal resolution (samples/um).

Duration

Minimum is 3s and the maximum is 218s.

Stylus Force

This is the downforce in which the profilometer head contacts your sample. A higher setting will give you less noise in the trace but posing the risk of scratching your sample if it is a relatively soft material. Minimum setting is 0.04mg and the maximum is 15mg. Otherwise 3-5 mg is a typical setting.

Measurement Range

Defines the sensitivity of vertical resolution. The options are: 1mm, 2620kA, and 655kA. For surface roughness measurements select 655kA as this will result in approximately 10A vertical resolution. For much larger, steps ($>0.1\mu\text{m}$) either 2620kA (40A resolution) or 1mm (153A) should work fine.

Profile

The expected surface topology of your measured sample. The choices are: Hills, Valleys, Hills & Valleys

Press 'OK' and then click the 'Switch to the Sample Positioning Window' icon to return to the sample position screen.

3. Save data

- You can save your data by going to file → save as → and save it in the desired format.
- You can save the screen as picture by pressing on "Print screen", copy the picture to paint, and save it as picture.

4. Leveling the scan

Click the M button in the lower right hand corner. This will activate the M cursor in the display. Move the M cursor, by using the arrows in the lower right hand corner or by click and dragging the cursor line flags, to the baseline/zero point of the trace. Do the same with the R cursor. At this point both the M and R cursor lines should intersect the trace at what you perceive to be the same, level, plane.

Press the 'Level the Trace at the Current R and M Cursor Intercepts' button in the menu bar.

5. Measuring

Put M and R cursers in the desired positions (two positions you want to measure the difference between) and then watch the ASH parameter number on the table (average height difference).

If you want to see the distance between two places you can see it on the graph, or with the two cursers, and watch the horizontal distance.

- If you want to measure specific area with closer look you can mark it with the mouse, press on right click, and choose replot.

6. Exiting

Switch to the sample position screen by clicking the 'Switch to the Sample Positioning Window' icon in the graphical menu bar.

Raise stylus tower off sample by pressing the 'Tower Up to Load Position' icon in the sample positioning screen's menu bar.

Remove your sample.

Profilometer work protocol

- Always use dry samples only!
- Do the scan only inside sample limits, and never start the scan outside the sample and go on the sample. **It will break the tip!**
- Always put your sample on stage when tip is up!
- Always take out your sample after the tip is up!
- The scan is in one axis. From you to the other side. Take it in account to stay inside sample borders.