

SOP

DektakXT Stylus Profiler

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INTRODUCTION

The DektakXT® stylus surface profiler is an advanced thin and thick film step height measurement tool. The DektakXT system takes measurements electromechanically by moving a diamond-tipped stylus over the sample surface according to a user-programmed scan length, duration and stylus force. In addition to profiling surface topography and waviness, the DektakXT system measures roughness in the nanometre range.

Salient features and specifications:

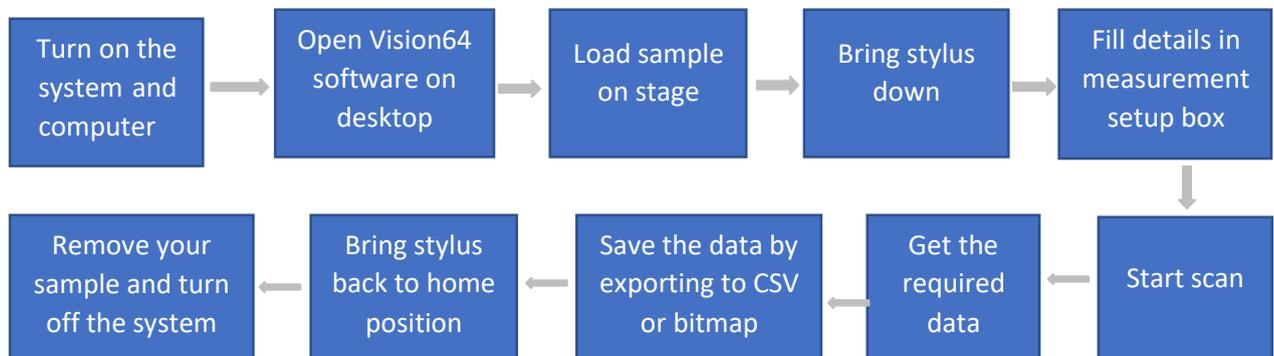
Scan Range	1) 6.5 μm	Resolution	1) 0.1 nm
	2) 65.5 μm		2) 1 nm
	3) 524 μm		3) 8 nm
Profile	1) Valleys	Measurement Range	1) 90% below zero
	2) Hills and Valleys		2) 50% below zero and 50% above zero
	3) Hills		3) 90% above zero
Stylus Force	1 mg to 15 mg		
Length	50 μm to 55,000 μm (55 mm)		
Duration	10 sec to 50 sec		

Safety measures:

- 1) **Do not let the Stylus to touch the Sample Stage. This will damage the Stylus.**
- 2) Clean the Sample with N₂ gun.

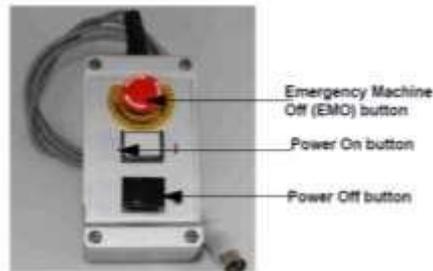
Procedure for using DEKTAKXT STYLUS PROFILER

Flow chart:

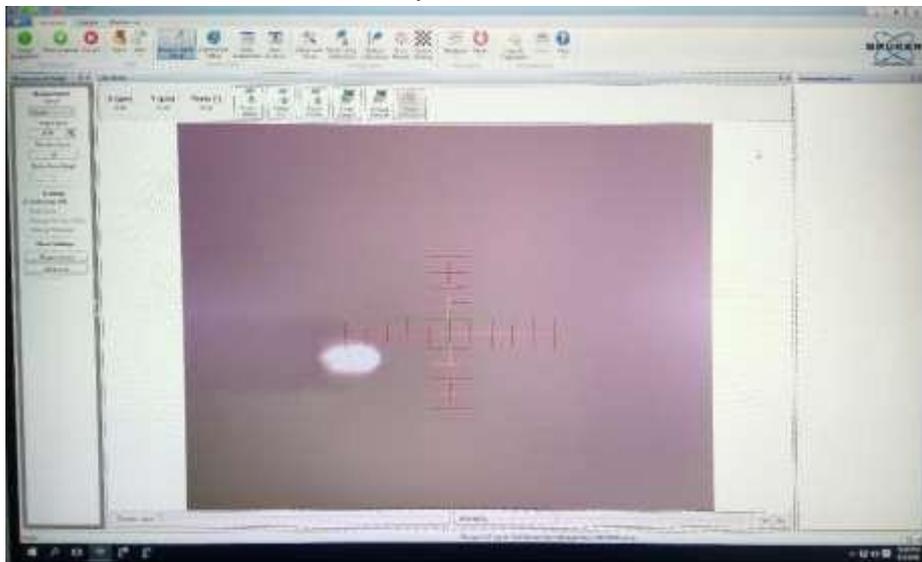


Detailed Procedure:

1. Turn on the system.
2. Turn on switch from EMO as shown in figure below.



3. Open the Vision64 software window on desktop.
4. Click on the measurement Setup.

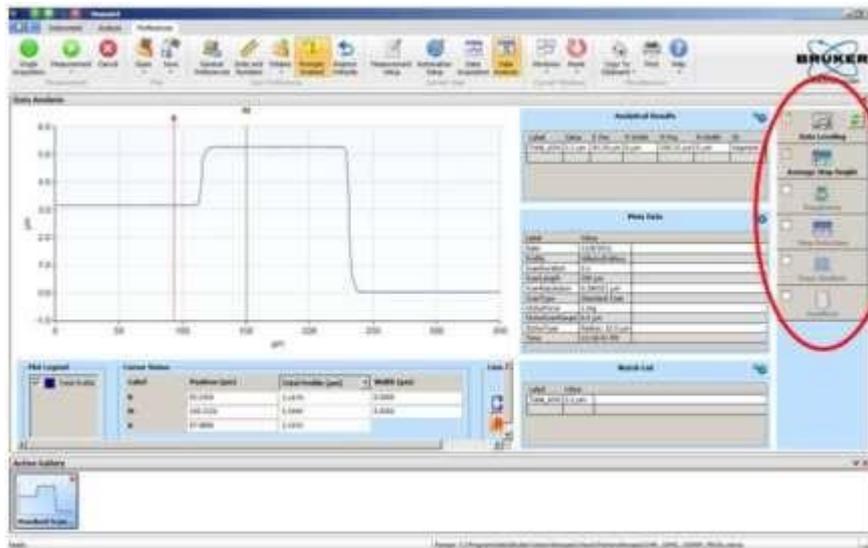


5. Click on unload sample on measurement window.
6. Load your sample on the stage.
7. Click on load sample and position stage such that sample is below the stylus tip using X-Y positioning axis.
8. Click on "Tower Down" to lower the tower assembly and make sure that stylus doesn't get out of the sample.

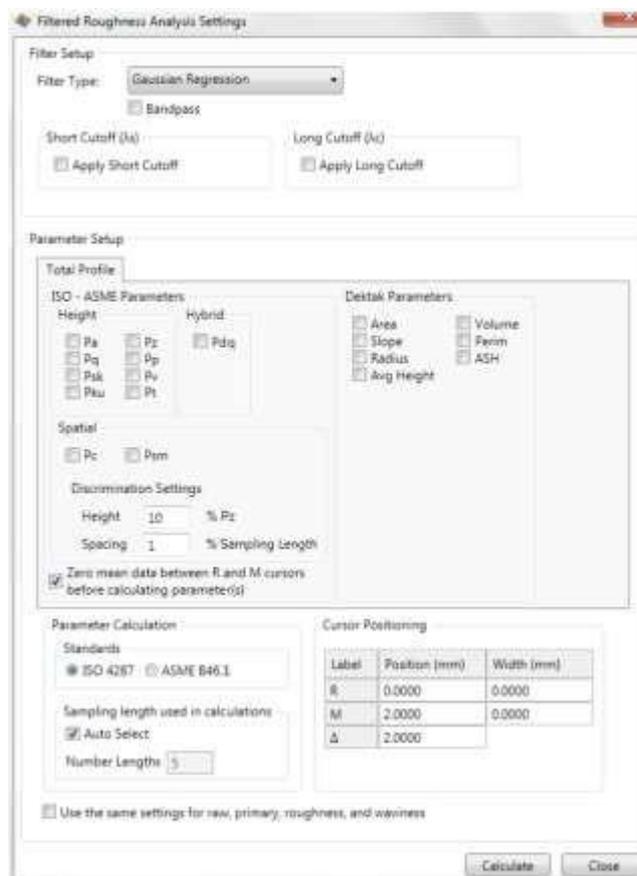
**NOTE: DO NOT LET THE STYLUS TO TOUCH THE SAMPLE STAGE.
THIS WILL DAMAGE THE STYLUS.**

9. Find suitable location for measurement using X-Y fine positioning knob. You can click on "Tower Up" to raise the tower assembly.
10. Close lid.
11. Input the requires values of Scan length and Duration with appropriate Scan Range in measurement setup box for your measurement.
12. Click on the Single Acquisition for measurement.

13. Level the measurement using reference (R) and measurement (M) at appropriate range to level the data by clicking on “Data Leveling”.
14. Click on “Average Step Height”. Then change the measurement (M) to required Valley or Hill. And this will give us the sample thickness.



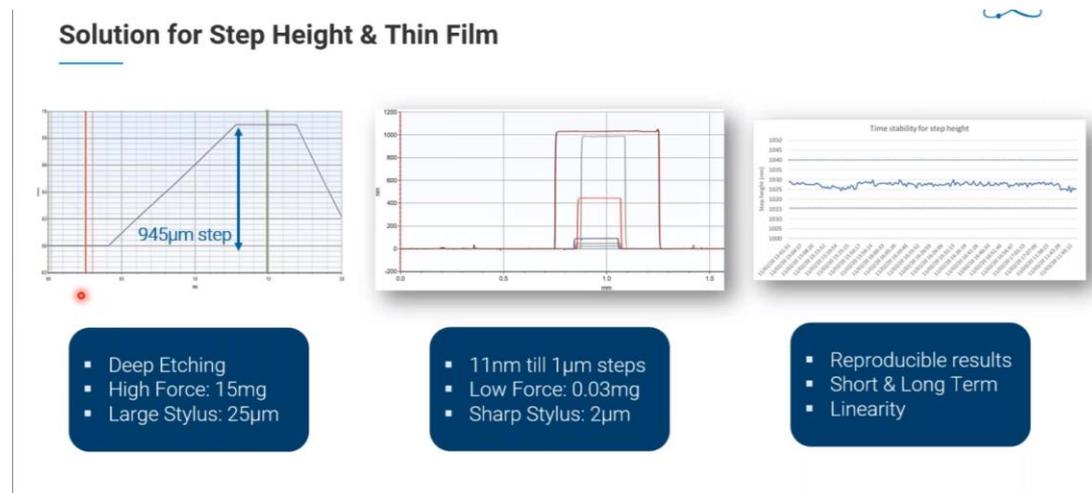
15. To measure surface Roughness, Change the reference (R) and measurement (M) to either same Valley or Hill. And then click checkbox of “Roughness” and “Roughness”. And click on Pa and Pq for Roughness and Root Mean Square respectively.



16. Export data to CSV to save or click on “copy to clipboard” to save as bitmap.
17. After measurement is done click “Tower Home” to bring the tower all the way up to its home position.
18. Click Unload sample to take the sample.
19. Click Load Sample to put back the Sample Stage to its initial position.
20. Close lid properly.
21. Turn off profiler and computer.
22. Cover the monitor.

Note: in case of emergency – like stylus coming down without sample on stage, press red switch on EMO immediately to abort operation

Please use the given parameters in the below image to measure your samples.



For more details:

<https://www.bruker.com/en/news-and-events/webinars/2021/surface-characterization-of-semiconductors--an-overview--from-to/watch-sph46-oph46-nih46-afh46.html>