

What Can Testworks Software Do?

The screenshot shows the TestWorks software interface for a 'silica 50 mN' test. The 'Define' tab is active, displaying a list of test parameters. A text box on the left says 'Change Input/Output Test Parameters' with an arrow pointing to the 'Allowable Drift Rate' parameter in the table below.

Display Name	Default	Units
Allowable Drift Rate	0.100	nm/s
Approach Distance To Store	1000.000	nm
Beta	1.034	(None)
Data Acquisition Rate	20.000	Hz
Delta X For Finding Surface	-50.000	um
Delta Y For Finding Surface	-50.000	um
Drift Determination Acquisition Rate	0.500	Hz
Drift Determination Time	50.000	s
Epsilon	0.750	(None)
Frame Stiffness Correction	0.000	N/m
Hold Segment Type	300	(Integ)
Indenter Poissons Ratio	0.070	(None)
Load Counter	1	(Integ)
Load Rate Multiple For Unload Rate	1.000	(None)
Load Segment Type	0	(Integ)
Max Segment Time	10000.000	s
Maximum Load	50.000	mN
Memo		(String)
Newtons Per Meter	1.000	N/m

The configuration panel for 'Allowable Drift Rate' is shown below the table:

- Internal Name:
- Display Name:
- Units: Units Class...
- Default Value:
- Decimal Places:
- Result
- Result Order:

At the bottom of the window, it shows 'Tests : 9' and a green status indicator.

What Can Testworks Software Do?

The screenshot shows the Testworks software interface. The title bar reads "Sample1 : XP Basic Hardness, Modulus, Tip Cal, Load Control - TestWorks". The menu bar includes File, Method, Edit, View, Insert, Configure, Tools, User, Tip, Excel, and Help. The toolbar contains icons for file operations, test execution, and a red STOP button.

The main window is divided into several sections:

- Next Step:** A section with the instruction "Enter the values for the listed inputs". Below it is a tree view showing the test sequence:
 - Start
 - Select Batch to Run
 - 1-Select Batch
 - 2-Select Options for this batch.
 - Create/Edit a Sample
 - 1-Create Sample
 - 2-Surface Find Parameters
 - 3-Surface Approach Parameters
 - 4-Required Inputs** (highlighted with a green arrow)
 - 5-Define/Review Test Locations
 - Finish
- 123.mss:** A table of test parameters:

Display Name	Value	Units
Percent To Unload	99.000	%
Maximum Load	50.000	mN
Load Rate Multiple For Unload ...	1.000	
Number Of Times To Load	1	
Peak Hold Time	15.000	s
Time To Load	30.000	s
Poissons Ratio	0.180	
- Errors:** An empty section at the bottom left.

An arrow points from the text "Set Testing Parameters" to the "4-Required Inputs" step in the test sequence.

Tests : 0

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silica 50 mN : XP Basic Hardness, Modulus, Tip Cal, Load Control - TestWorks

File Method View Test Configure Tools User Tip Excel Mode Help

STOP

Test Review Define

Legend Warning

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Load On Sample (mN)

Displacement Into Surface (nm)

Editable Inputs

Editable Inputs	Value	Units
Frame Stiffness Correction	0.000	N/m
Perform Drift Correction	0	(Integer)
Poissons Ratio	0.180	(None)
Percent Unload In Stiffness...	50.000	%

Review Data

Results	Modulus At Max ...	Hardness At Max ...	Stiffness ...	Drift Correcti...	Disp at Max ...	Load At Max Load...	Time At Start ...	Area Coef
1	72.000	9.733	184989.792	0.000	576.380	50.867	07:25:39 PM	2.44648000
2	72.818	9.597	188033.840	0.000	575.155	50.739	07:33:28 PM	2.44648000
3	70.795	9.415	184523.705	0.000	581.515	50.523	07:39:21 PM	2.44648000
4	72.194	9.713	184913.885	0.000	573.516	50.464	07:45:11 PM	2.44648000
5	72.330	9.577	187030.735	0.000	576.607	50.726	07:50:42 PM	2.44648000
6	72.103	9.735	185724.590	0.000	577.882	51.146	07:56:18 PM	2.44648000
7	72.460	9.452	188862.641	0.000	578.931	50.880	08:01:58 PM	2.44648000
R								
Mean	67.220	8.703	186150.392	0.000	651.728	50.763		2.44648000e
Std. Dev.	14.839	2.666	2048.094	0.000	223.836	0.200		0.000000000e
% COV	22.08	30.63	1.10	****	34.35	0.39		

(3.899 nm, -0.017574 mN)

Tests : 9

What Can Testworks Software Do?

Different methods currently available in Testworks:

- Hardness, stiffness, modulus, load control (allows multiple loading for indentations)
- Scratch mode
- Array of indents at decremental loads
- Indents at a specified depth

What Options are Currently Available for Upgrade on the Nano Indenter XP?

- Continuous Stiffness Measurement (CSM)
- The Dynamic Contact Module (DCM)
- Lateral Force Measurement (LFM)
- High Load Indentation (up to 1 kg)
- Sample Positioning Tables

What is Meant by “a Good Sample Surface” for Testing?

- Although there are no strict numbers to follow, the things that may affect your modulus/hardness/stiffness results are:
 - Surface roughness*
 - Surface flatness*
 - Material porosity*
 - Creep*
 - Homogeneity of surface; purity*

How Does the Indenter Find the Surface?

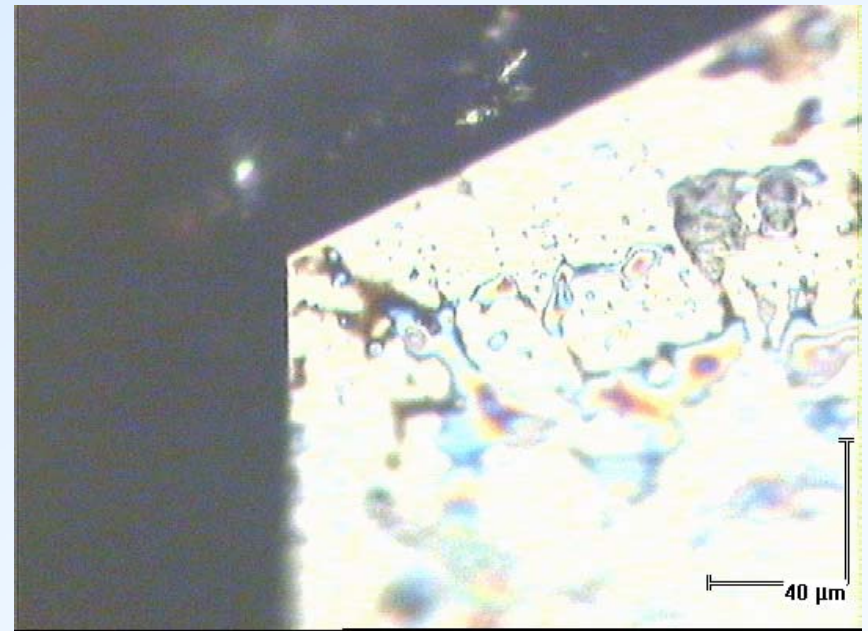
- Usually 50 microns away (in x and y direction) the indenter first makes light impressions.
- The surface height that is found at this location is taken to be the surface height at your indentation location.

What Sort of Materials Cannot Be Tested on the Indenter?

- Materials that contain diamond or diamond particles – this will damage the indenter
- Materials that cannot be mounted, polished very well or are very porous
- Materials that are not clearly solids
- Materials harder than about 40 GPa should not be scratched with the Berkovich indenter
- Materials harder than about 10 GPa should not be scratched with the cube corner indenter

Does the Tip Get Dirty After Indenting and Does It Need to be Cleaned?

- Certain materials have been known to “junk up” the indenter tip. It is good practice to clean the tip either with acetone, or even better, ultrasonically, before tests.



Can I Use Any Tip and Orientation for Scratching?

- Although it is allowed in the software, it is advised against to scratch in a direction that is not a facet intersection

