

Linseis dilatometer software (WIN-DIL)

All LINSEIS Thermal Analysis Instruments are controlled through sophisticated Windows® software. The complete program consists of three sections: temperature control, data acquisition, and data evaluation. Essential sample information is entered in the data acquisition section.

Data Acquisition section

1. Set up of temperature controller with heat up speed, dwell time and cooldown speed.
2. Up to 16 different stages can be programmed
3. Up to 99 cycles can be programmed
4. Different measuring systems for single and dual push rod can be selected
5. Essential measurement data for documentation have to be entered:
Sample name, correction sample name, operator, laboratory, atmosphere, gas flow, sample material, commentary, sample length, selected measuring range, max. temperature, duration of run, sampling frequency.
6. The scheduler for automatic measurement sequences, for up to 16 preprogrammed runs can be programmed.

Data Acquisition Setup - Double Sample

Operator: Dr. Höffgen Atmosphere: air OK

Laboratory: Linseis Selb Flow Rate: 0.0 [l/h] Cancel

Piston Material: Quartz (dropdown menu open showing Alumina, Graphite, Quartz)

Dilatometer 1

Sample File: SAMPLE-1.IPR

Zero File: ZERO-10L.INL

Sample Name: Test 1

Comment: DIL measurement

Sample Length: 10.00 [mm]

Range: 250 [µm]

Dilatometer 2

Sample File: SAMPLE-2.IPR

Zero File: ZERO-10R.INL

Sample Name: Test 2

Comment: DIL measurement

Sample Length: 10.00 [mm]

Range: 250 [µm]

Sampling Interval: 1.0 [sec] Duration: 100 [min]

Max. Temp.: 1000 [°C]

Picture 1: menu for the documentation set-up

Essential data for each sample test includes; operator, laboratory, atmosphere, gas flow, material, sample file name, zero file name, comments, sample length, measuring range, max. temperature, duration of run, sampling frequency, heating and cooling rates, number of cycles.

All menus are easily understood and intuitive. The software is quickly mastered with minimal training needed.

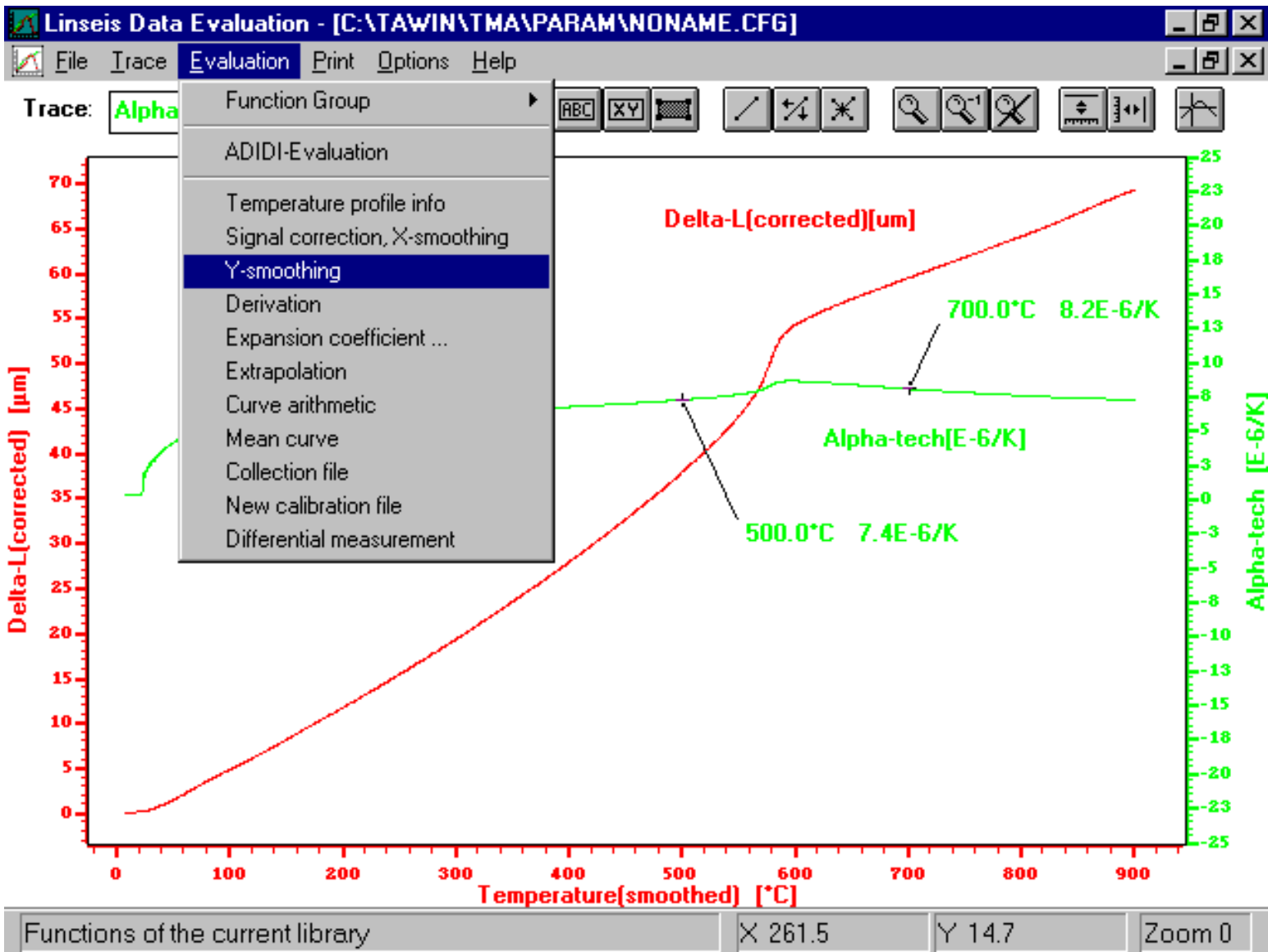
LINSEIS Dilatometer Evaluation Protocol				
Common data:				
Date/Time:	11/14/99 13:38:42	Sample:	Platinum	10.00 mm
Operator:	Pog	Reference:	-----	0.00 mm
Laboratory:	LINSEIS	Atmosphere:	Air	0.00 l/h
Comment:	Calibration	Zero:	Null-10	Piston: Quartz
Controller parameters:				
Segment	Heating [K/min]	End temperature [°C]	Dwell time[min]	
1	10.0	830.0	0.0	
2	30.0	500.0	0.0	
Table of data and coefficients:				
Reference temperature for AKt:		20°C		
Reference temperature for AKp:		20°C		
T [°C]	dL [µm]	AKt[E-6/K]	AKp[E-6/K]	dL/L0 [%]
100.0	6.94	8.68	9.66	0.069
200.0	16.26	9.03	10.82	0.163
300.0	25.85	9.23	11.12	0.259
400.0	35.49	9.34	11.40	0.355
500.0	45.21	9.42	11.62	0.452
600.0	55.78	9.62	11.98	0.558
700.0	66.33	9.75	12.34	0.663
800.0	77.24	9.90	12.75	0.772

Picture 2: results of a print-out

Data evaluation part

1. real time color display
2. automatic and manual scaling
3. time vs. Temperature profiles, or time vs. Delta L selection
4. first and second order derivatives
5. analysis save feature
6. foreground/background operation
7. multitasking operation for operation of different instruments or tasks
8. zoom / individual segment display
9. multiple curve / module overlay
10. on-line help menu
11. annotation and drawing tools
12. copy to clip board function
13. post collection editing
14. ASCII export
15. data smoothing
16. baseline file subtraction
17. cursor function
18. statistical curve evaluation (mean curve)
19. print out of table of data and coefficients
20. calculation of Delta L, CTE, relative expansion $\Delta L / L_0$
21. curve arithmetic
22. softening point evaluation standard feature

Evaluation section



Picture 3: the evaluation menu

The evaluation is part of the complete windows software, It features a number of functions enabling a full evaluation of all types of data. All evaluation and data collection can be performed simultaneously. Data can be corrected using zero and calibration correction. Data evaluations include: absolute length change, relative length change, and coefficient of thermal expansion. A mean curve with statistical analysis can be performed on multiple curves. Graphical displays can be printed on all windows compatible printers or plotters.

Data can be displayed and printed in a table format. The software also includes an ASCII export feature.