

“Particle Solutions” Software v. 4.0

Quick Start Guide

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HARDWARE REQUIREMENTS

A PC Running a supported release of Windows 10 or 11 with at least one high-speed USB-A port.

INSTALLING THE PROGRAM

To install the program, you must run the setup program provided on the USB Drive. You may also need to install some additional runtime support software, depending on the configuration of the computer being used. You can also request the latest Particle Solutions installer from the download form at www.brookhaveninstruments.com/product-category/software and navigating to the appropriate product page. Current customers can also request new license keys there, or by contacting info@brookhaveninstruments.com. When requesting a license key or a software installer, please provide us with both the serial number and date of manufacture of your NanoBrook.

Setup process is as follows:

1. Insert the USB Drive into the Instrument Computer. Copy the Particle Solutions installer to your Desktop and click to run. Note: this may require an account with administrative privileges to authenticate at various points during the installation process.
2. If you are upgrading from a previous whole number release (ex. V2 or V3) of Particle Solutions installation it is recommended to backup your data and SOP directories (usually found in C:\Bicw32\ParticleSolutions\Data and C:\Bicw32\ParticleSolutions\SOP) and performing a clean install.
3. The final screen of the setup program will ask if you want to run the Particle Solutions program. Also, a shortcut will be created for Particle Solutions in the “Brookhaven Instruments” section in the Start Menu.

OVERVIEW OF MAIN WINDOW

BIC - Particle Solutions v. 4.0.1.102 - Licensed To: Evaluation Customer

Particle Solutions Brookhaven Instruments

DLS Particle Sizing Measurement **NEW**

Menu Bar

Database | OPTIONS | PROTEIN CALC | POLYMER CALC | SPC

Measurements Tab
Displays saved experimental data

New Measurements
Used to collect new measurements and add them to the database

Data Grid
Contains experimental data sorted by Measurement Type

Detail Tabs
Can be used to show reports, graphs, and statistics for one or more measurements

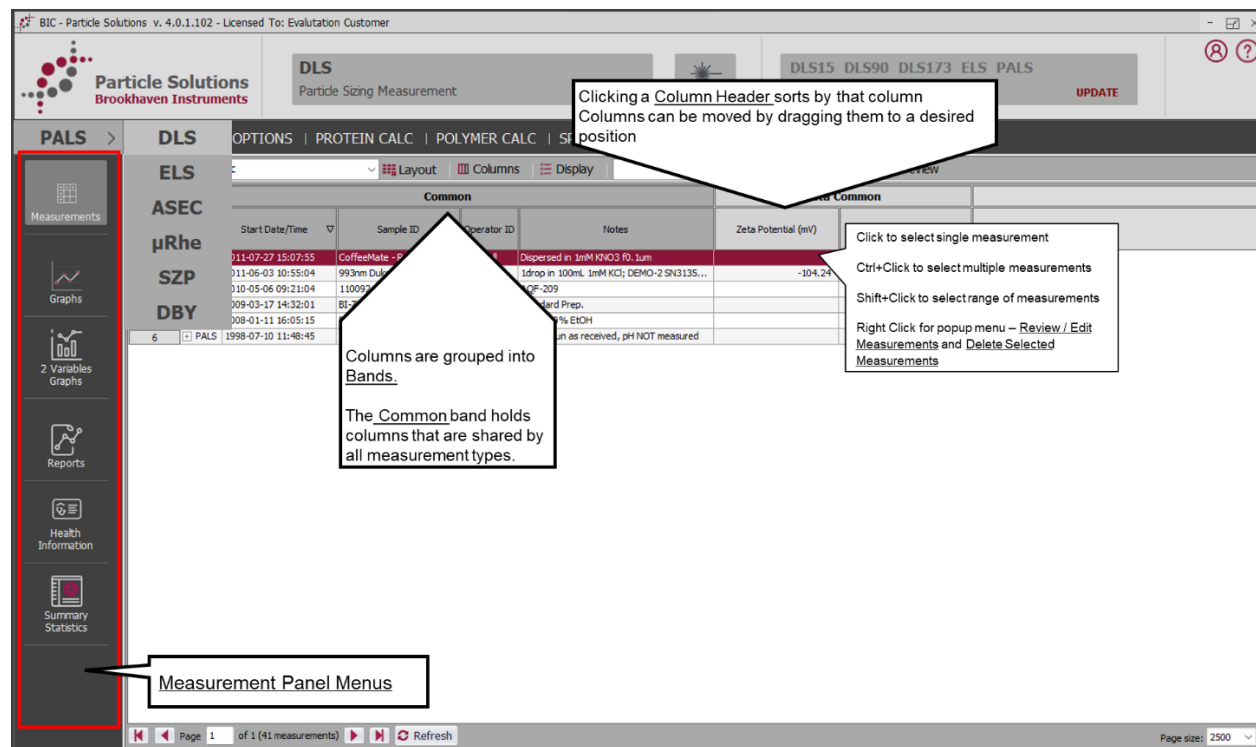
Imported Run #	Sample ID	Rev #	Revision Date/Time	SOP ID	Project ID	Group ID	Operator ID	Notes
1	DLS		7/12/2018 11:43:54 AM	2018-07-12 11:43:54	ParticleSizeSta...		Imported Skipped...	Val Val New from pre-made vials
2	DLS		10/16/2023 4:34:08 PM	2023-10-16 16:34:08	test correlator		test correlator	Unknown Operator
3	DLS							
4	DLS							
5	DLS							
6	DLS							
7	DLS							
8	DLS							
9	DLS							
10	DLS							
11	DLS							
12	DLS							
13	DLS							

Page 1 of 1 (81 measurements) Refresh Page size: 2500

MEASUREMENTS PANE

Overview

Note: The PALS Data Grid is shown here to highlight basic navigation features shared by all measurements.



Menus

DATABASE | OPTIONS | PROTEIN CALC | POLYMER CALC | SPC |

Refresh

Basic

Layout

Columns

Display

Filter

[OFF]

Preview

	Common					DLS				
	Type	Start Date/Time		Sample ID	Operator ID	Notes	Eff. Diam. (nm)	Polydispersity	Dur. (hh:mm:ss)	Baseline Index

Layout Menu

The Layout Menu is used to manage column layouts in the Measurements Pane.

Resize All Columns	Resizes all columns so all text in visible columns and rows is fully displayed
Restore Default Sorting	If sort order of measurements has been changed by clicking on column headers, restores to default – by Start Date/Time, most recent first
Add / Remove Columns...	Shows the <u>Add / Remove Columns (ARC)</u> window.

Show All Columns	Shows all the columns defined for selected measurements
Save Current Layout As...	Saves the current column layout to a file
Delete Layout File...	Deletes a saved layout file. Standard layouts (Basic, Advanced, etc) cannot be deleted

Adding / Removing Columns

The screenshot displays the Particle Solutions software interface. The 'Add/Remove Columns' widget is highlighted with a red border on the right side. Several callout boxes provide instructions:

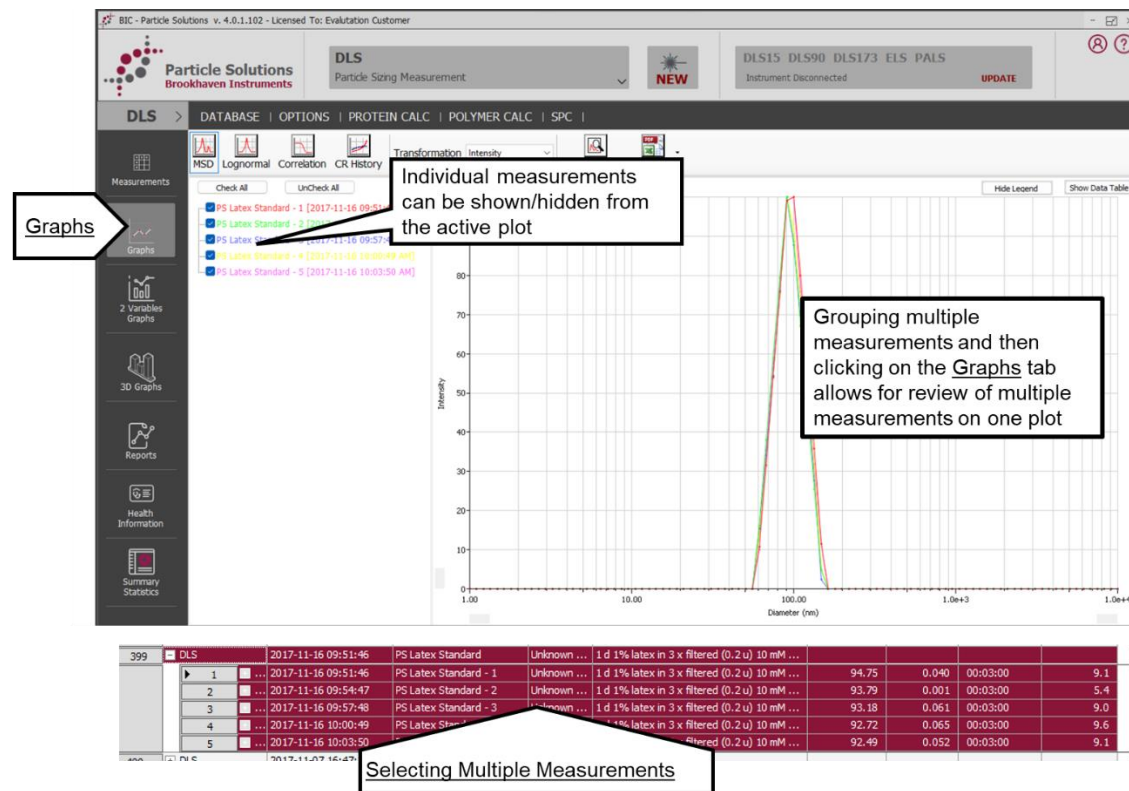
- From Layout Menu, select Add / Remove Columns to show the Add / Remove Columns (ARC) widget**: Points to the 'Columns' menu item in the top toolbar.
- To remove a column, drag it from it's current position to the ARC widget**: Points to a column header in the main data grid.
- Add/Remove Columns widget is flush with the edge of the active data grid**: Points to the top edge of the ARC widget.
- Can be hidden when not in use**: Points to a small 'x' icon at the top of the ARC widget.
- To add a column, drag it from the ARC widget to the desired column position**: Points to a column in the ARC widget.
- Custom Column Layouts**: A box containing the text 'New column layouts can be saved and recalled'.

The ARC widget contains a list of columns including: Additive Titration, Additive Titration Concentration, Additive Titration Vol. Added (μL), Batch #, Cell Description, Concentration (mg/mL), Correlator Layout, Count Rate (kcps), Data Retained (%), Diam. 10 (nm), Diam. 50 (nm), Diam. 90 (nm), and Diffusion Coeff. (cm²/s).

Display Menu

All Measurements	Displays all measurements in the database
Selected Measurements Only	Only displays measurements that were previously selected by the user
Group Panel	Shows or hides the <u>Group Panel</u> , which can be used to group measurements that have the same values in one or more columns

Grouping Measurements



Reviewing Multiple Measurements

Can toggle through different active measurements

Selecting multiple measurements in the Data Grid and then Right-Clicking and selecting **Review/Edit Measurement** brings up the measurement review window

Start Date/Time	Sample ID	Notes
11/16/2017 09:51:46	PS Latex Standard - 1	1 d 1% latex in 3 x filtered (0.2 µ) 10 mM KNO3 solution 20 m...
11/16/2017 09:54:47	PS Latex Standard - 2	1 d 1% latex in 3 x filtered (0.2 µ) 10 mM KNO3 solution 20 m...
11/16/2017 09:57:48	PS Latex Standard - 3	1 d 1% latex in 3 x filtered (0.2 µ) 10 mM KNO3 solution 20 m...
11/16/2017 10:00:49	PS Latex Standard - 4	1 d 1% latex in 3 x filtered (0.2 µ) 10 mM KNO3 solution 20 m...
11/16/2017 10:03:50	PS Latex Standard - 5	1 d 1% latex in 3 x filtered (0.2 µ) 10 mM KNO3 solution 20 m...

Reviewing Multiple Measurements

Sample ID	Start Date/Time	Effective Diameter (nm)	Polydispersity	Elapsed Time	Angle	Baseline Index	Data Retention
1	2017-11-16 09:51:46	94.75	0.040	00:03:00	90.0	9.1	100.00
2	2017-11-16 09:54:47	93.79	0.001	00:03:00	90.0	5.4	100.00
3	2017-11-16 09:57:48	93.18	0.061	00:03:00	90.0	9.0	100.00
4	2017-11-16 10:00:49	92.72	0.065	00:03:00	90.0	9.6	100.00
5	2017-11-16 10:03:50	92.49	0.052	00:03:00	90.0	9.1	100.00

Filter Menu

Basic Filter	Shows a filter window designed for basic filtering of measurements – by type, by date, and by column
Advanced Filter	Shows a filter window designed for advanced filtering of measurements. Complex filters can be created using any columns, ranges of column values, and logical operators
Remove	Removes all filtering – both basic and advanced

Basic Filter

Click one or more Enabled checkboxes

Change settings to values desired

Click to only show measurements that match filter settings

Click to show all measurements again

Apply Filter

Remove Filter

Advanced Filter

Close

By Date

☐ Enabled

Start Date: 1/22/2023

End Date: 1/22/2024

By Column

☐ Enabled

Column: [Dropdown]

Filter Type: Begins With

Filter Text: layout

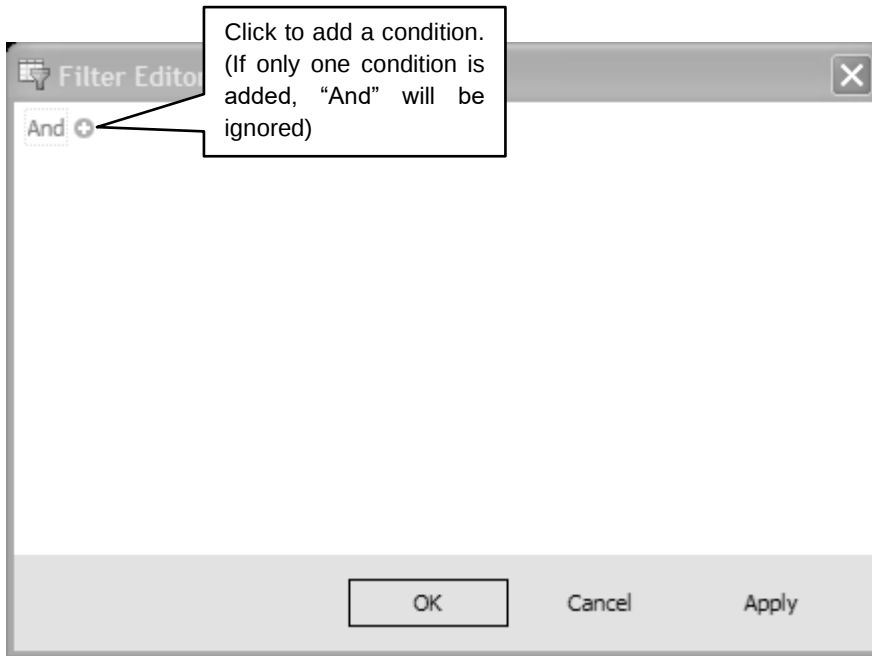
By Label Tag

☐ Enabled

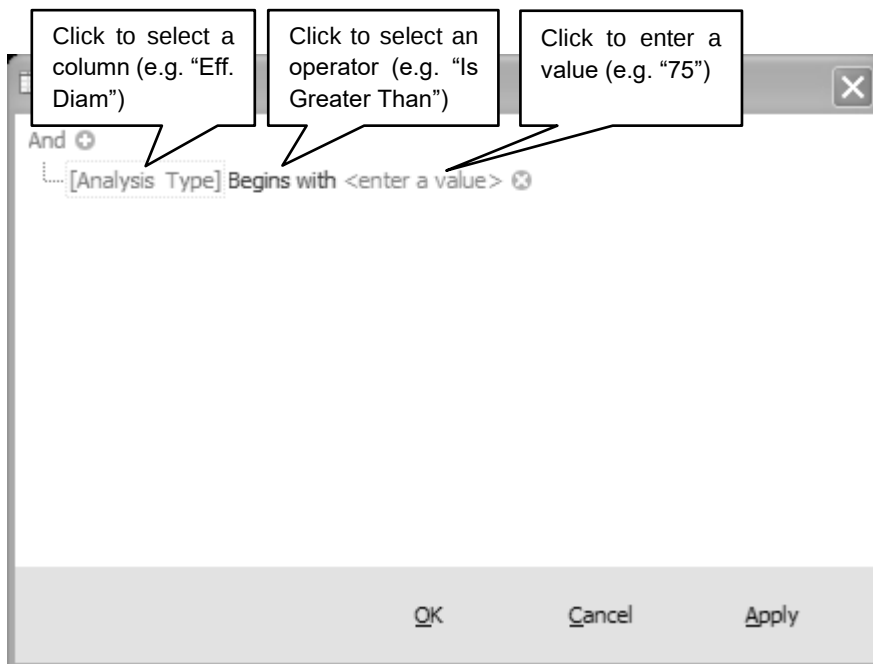
Label Tag: [Dropdown]

Advanced Filter

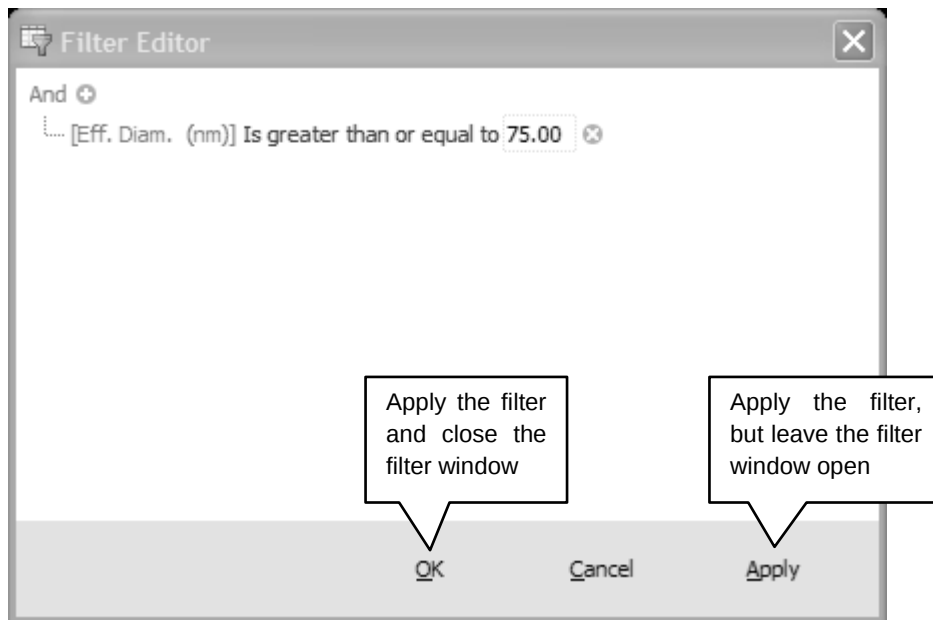
Step 1



Step 2



Step 3



MEASUREMENT TABS & HEADERS

Overview

The screenshot displays the PALS software interface. The top navigation bar includes 'PALS', 'DATABASE', 'OPTIONS', 'PROTEIN CALC', and 'POLYMER CALC'. Below this, a toolbar contains 'Refresh', a dropdown menu set to 'Basic', and icons for 'Layout', 'Columns', and another menu. The left sidebar, highlighted with a red box, contains icons for 'Measurements', 'Graphs', '2 Variables Graphs', 'Reports', 'Health Information', and 'Summary Statistics'. The main area shows a table of measurements with columns for 'Type', 'Start Date/Time', 'Sample ID', and 'Operator'. A callout box labeled 'Measurement Tabs and Headers' points to the table's header section.

Common				
	Type	Start Date/Time	Sample ID	Operator
202	+ PALS	2020-02-27 09:34:50	NIST SRM 1980 1:25 dilut...	Unknown
203	+ PALS	2020-02-27 09:24:55	NIST SRM 1980 1:25 dilut...	Unknown
204	+ PALS	2020-02-27 09:18:48	NIST SRM 1980 1:25 dilut...	Unknown
205	+ PALS	2020-02-27 09:12:18	NIST SRM 1980 1:25 dilut...	Unknown
206	+ PALS	2020-02-27 09:03:58	ZR5	Unknown
207	+ PALS	2020-02-27 08:58:49	Zeta Potential Reference ...	Unknown
208	+ PALS	2019-12-29 14:57:59	BI ZR5	Unknown
209	+ PALS	2019-12-29 14:24:18	BI ZR5	admin
210	+ PALS	2019-11-20 16:16:30	Std	Unknown
211	+ PALS	2019-11-20 15:50:53	Std	Unknown
212	+ PALS	2019-11-20 15:23:36	Std	Unknown
213	+ PALS	2019-11-04 11:45:23	CNC(new) - 1	Unknown
214	+ PALS	2019-11-01 14:10:57	CNC(new)-Maine	Unknown
215	+ PALS	2019-10-31 11:08:06	cal. 10-31-2019	Unknown
216	+ PALS	2019-10-30 16:11:02	CNC(new)	Unknown
217	+ PALS	2019-09-12 12:11:56	Zeta Potential Reference ...	Unknown
218	+ PALS	2019-09-12 12:02:18	Zeta Potential Reference ...	Unknown
219	+ PALS	2019-09-12 11:49:16	Zeta Potential Reference ...	Unknown
220	+ PALS	2019-09-12 11:38:14	Zeta Potential Reference ...	Unknown
221	+ PALS	2019-09-12 11:28:22	Zeta Potential Reference ...	Unknown
222	+ PALS	2019-07-25 17:29:14	PDADMAC (((1:5) > 1:10...	jjjjj
223	+ PALS	2019-07-25 17:17:25	PDADMAC 5mL of 1:5 in 5...	jjjjj
224	+ PALS	2019-07-25 17:12:33	PDADMAC 1:5 (too high)	jjjjj
225	+ PALS	2019-07-25 16:55:02	Ludox TM50 Silica particles	jjjjj
226	+ PALS	2019-07-25 16:48:10	Ludox TM50 Silica particles	jjjjj
227	+ PALS	2019-04-15 13:47:28	30 micron PSL	Unknown
231	+ PALS	2019-04-15 13:12:27	30 micron PSL	Unknown

Page 1 of 2 (2500 measurements) Refresh

Reports Tab

Particle Solutions
Brookhaven Instruments

DLS Particle Sizing Measurement

DLS15 DLS90 DLS173 ELS PALS
Instrument Disconnected

PALS > DATABASE | OPTIONS | PROTEIN CALC | POLYMER CALC | SPC |

Report: Basic | Print Preview... | Export To PDF... | Report Designer...

Types: PALS Sample: ZR5 SR0154 - 1

Results:
Zeta Potential (mV): -45.77
Mobility (μh)/(V/cm): -3.58
Cycles Collected: 20

Reports Tab

Select report style – Basic, Advanced, etc.

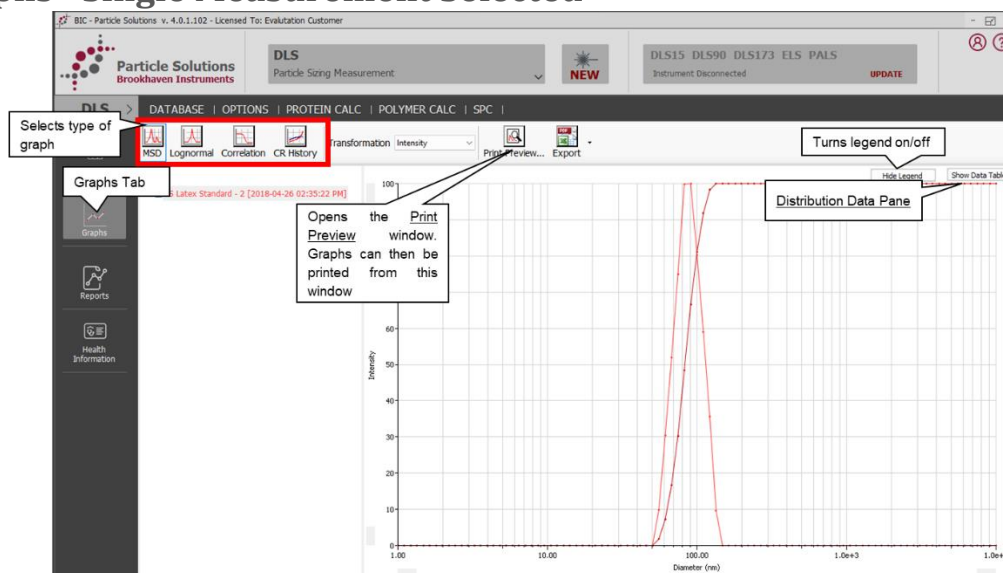
When multiple measurements selected, use Scroll Bar or Mouse Wheel to cycle through report pages

134	PALS	2021-11-04 14:02:16	ZR5 SR0154	Unknown ...	ZR3/ZR4/ZR5:		
1	...	2021-11-04 14:02:16	ZR5 SR0154 - 1	Unknown ...	ZR3/ZR4/ZR5:	-45.77	-3.58
2	...	2021-11-04 14:03:24	ZR5 SR0154 - 2	Unknown ...	ZR3/ZR4/ZR5:	-46.57	-3.64
3	...	2021-11-04 14:04:32	ZR5 SR0154 - 3	Unknown ...	ZR3/ZR4/ZR5:	-42.41	-3.31
4	...	2021-11-04 14:05:40	ZR5 SR0154 - 4	Unknown ...	ZR3/ZR4/ZR5:	-44.71	-3.49
5	...	2021-11-04 14:06:48	ZR5 SR0154 - 5	Unknown ...	ZR3/ZR4/ZR5:	-44.65	-3.49

Reports Tab Menu

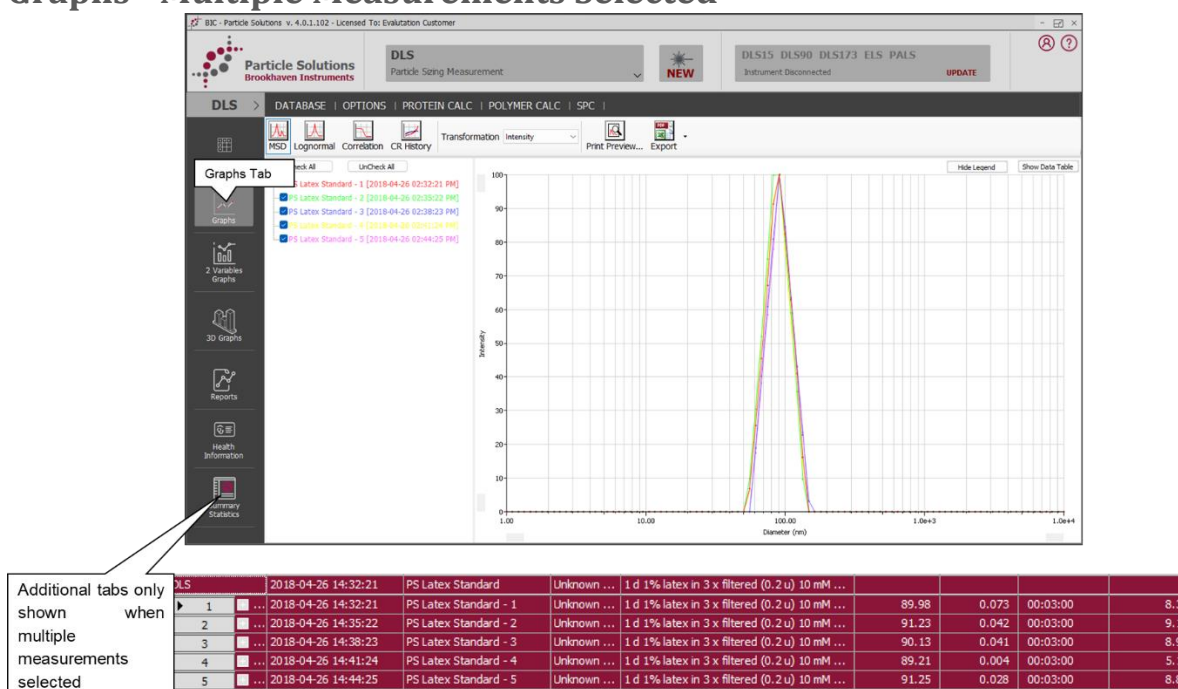
Print Preview...	Opens the Print Preview window. Reports can then be printed from this window
Export to PDF...	Exports the reports to a file, in PDF format
Report Designer...	Opens the Report Designer window

Graphs - Single Measurement Selected



368	DLS	2018-04-26 14:32:21	PS Latex Standard	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...				
1	...	2018-04-26 14:32:21	PS Latex Standard - 1	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	89.98	0.073	00:03:00	8.3
2	...	2018-04-26 14:35:22	PS Latex Standard - 2	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	91.23	0.042	00:03:00	9.1
3	...	2018-04-26 14:38:23	PS Latex Standard - 3	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	90.13	0.041	00:03:00	8.9
4	...	2018-04-26 14:41:24	PS Latex Standard - 4	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	89.21	0.004	00:03:00	5.1
5	...	2018-04-26 14:44:25	PS Latex Standard - 5	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	91.25	0.028	00:03:00	8.8

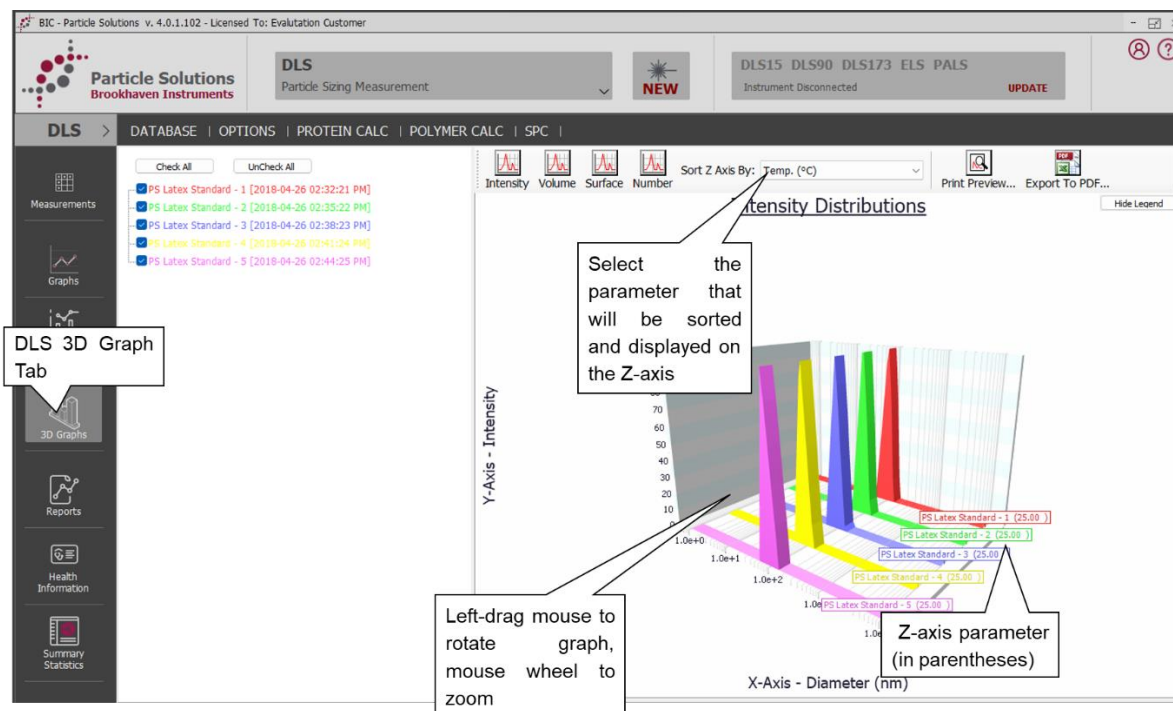
Graphs - Multiple Measurements Selected



DLS	2018-04-26 14:32:21	PS Latex Standard	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...					
1	...	2018-04-26 14:32:21	PS Latex Standard - 1	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	89.98	0.073	00:03:00	8.3
2	...	2018-04-26 14:35:22	PS Latex Standard - 2	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	91.23	0.042	00:03:00	9.1
3	...	2018-04-26 14:38:23	PS Latex Standard - 3	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	90.13	0.041	00:03:00	8.9
4	...	2018-04-26 14:41:24	PS Latex Standard - 4	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	89.21	0.004	00:03:00	5.1
5	...	2018-04-26 14:44:25	PS Latex Standard - 5	Unknown ...	1 d 1% latex in 3 x filtered (0.2 u) 10 mM ...	91.25	0.028	00:03:00	8.8

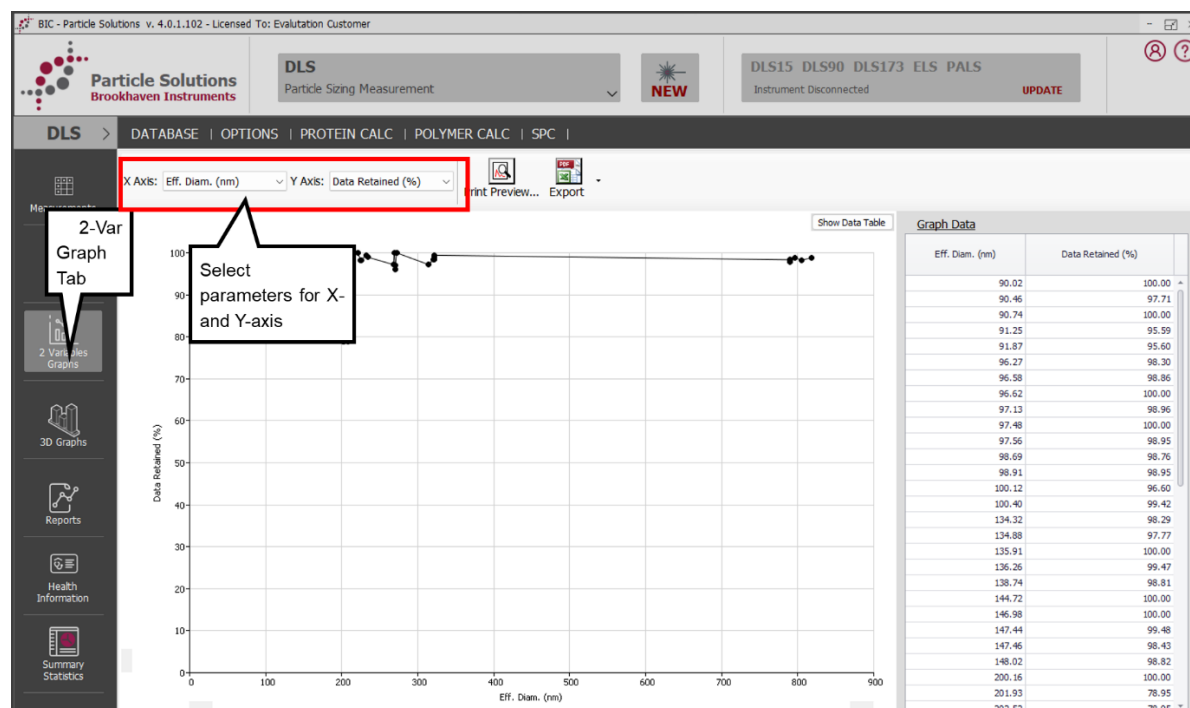
DLS 3D Graph Tab

Note: Only shown when multiple DLS measurements selected



2-Var Graph Tab

Note: Only shown when multiple measurements are selected



Summary Statistics Tab

Note: Only shown when multiple measurements are selected

The Add / Remove Columns (ARC) widget can also be launched from the Summary Statistics tab

Can also be used to summarize individual peak centers from MSD

Summary Statistics Tab

Mean, Standard Error, and Standard Deviation of selected measurements

Date/Time	Sample ID	Eff. Diam. (nm)	Polydispersity	Baseline Index	Count Rate (kcps)	Data Retained (%)	Diffusion Coeff. (cm²/s)	Peak 1 Diam. by Int. (nm)	Peak 2 Diam. by Int. (nm)	Peak 3 Diam. by Int. (nm)
26 14:32:21	PS Latex Standard - 1	89.98	0.073	8.3	9.3	95.33	5.454e-08	80.67	0.00	0.00
26 14:35:22	PS Latex Standard - 2	91.23	0.042	9.1	8.9	100.00	5.379e-08	80.67	0.00	0.00
26 14:38:23	PS Latex Standard - 3	90.13	0.041	8.9	8.9	98.43	5.445e-08	80.67	0.00	0.00
26 14:41:24	PS Latex Standard - 4	89.21	0.004	5.1	9.0	98.43	5.301e-08	80.67	0.00	0.00
26 14:44:25	PS Latex Standard - 5	91.25	0.028	8.8	9.1	100.00				
03 10:39:24	PS Latex Standard - 1	88.73	0.100	8.6	483.5	97.77				
03 10:42:25	PS Latex Standard - 2	90.71	0.011	8.9	479.9	98.95				
03 10:45:26	PS Latex Standard - 3	89.49	0.029	9.9	473.9	99.48				
03 10:48:27	PS Latex Standard - 4	90.07	0.027	9.3	469.5	97.90				
03 10:51:28	PS Latex Standard - 5	90.30	0.028	9.5	468.8	97.24				
11 DLS 2018-05-04 11:52:48	latex 92 nm - Run 1	94.43	0.047	8.3	290.8	80.58				
12 DLS 2018-05-04 11:52:48	latex 92 nm - Run 2	96.30	0.045	8.0	291.8	88.45				
13 DLS 2018-05-04 11:52:48	latex 92 nm - Run 3	98.55	0.036	9.1	290.1	84.89				
14 DLS 2018-05-04 11:59:03	92nm_Standard_Fre...	88.28	0.095	9.7	455.8	94.65	5.559e-08	85.57	0.00	0.00
15 DLS 2018-05-04 12:01:04	92nm_Standard_Fre...	86.84	0.054	8.3	453.9	94.34	5.651e-08	82.24	0.00	0.00
16 DLS 2018-05-04 12:03:06	92nm_Standard_Fre...	85.79	0.086	9.6	455.1	94.14	5.720e-08	78.24	229.74	0.00
17 DLS 2018-05-04 12:05:08	92nm_Standard_Fre...	84.36	0.082	8.9	453.5	94.34	5.817e-08	86.25	0.00	0.00
18 DLS 2018-05-04 12:07:10	92nm_Standard_Fre...	84.17	0.080	9.6	450.1	93.93	5.831e-08	80.32	0.00	0.00

Mean:	Std Err:	Std Dev:
89.99	0.050	8.8
0.007	0.3	47.6
0.029	1.1	202.0
94.94	1.26	5.224e-10
5.462e-08	1.59	12.76
89.55	6.73	54.15
0.00	0.00	0.00

File Menu

Import Database...	Legacy	Imports measurements made with earlier versions of Brookhaven software into the Particle Solutions database
Export		Exports the selected measurements to Excel or CSV text files
Save Archive File...		Saves selected measurements to an archive file, using a proprietary binary format
Load Archive File...		Load a saved archive file, and add it's measurements to the database
Rebuild Database...		Rebuild and re-index the Particle Solutions database
Options...		Show the Options window
License...		Show the License window

Options Menus

When checked, all size values in DLS measurements are shown as radius values.

When unchecked, all sizes are shown as diameters.

When checked, the program will show a Log On screen when it is first run.

Operators must enter an ID string before they can continue using the program.

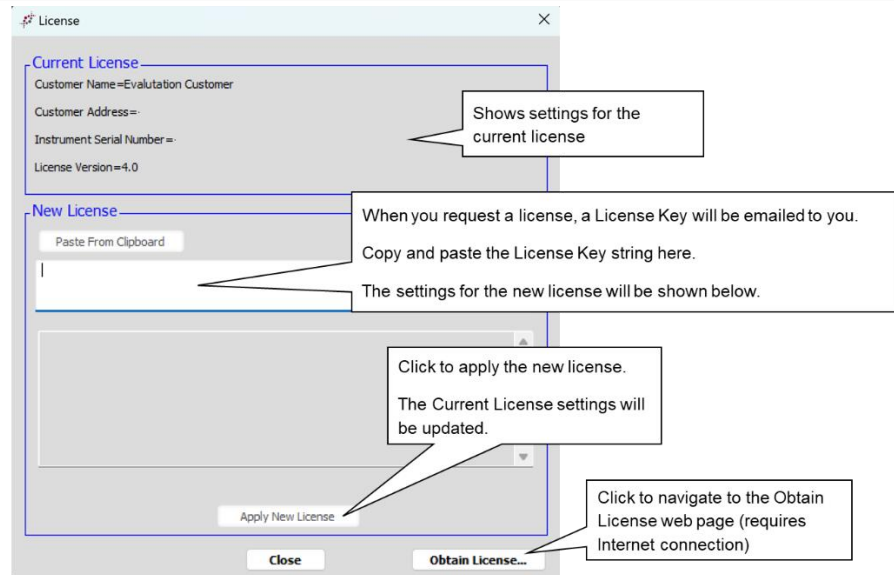
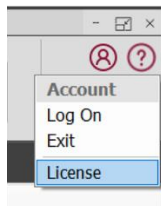
When unchecked, automatically logged on as "Unknown Operator."

Use this to select an image file that will be used as the logo on all printed reports.

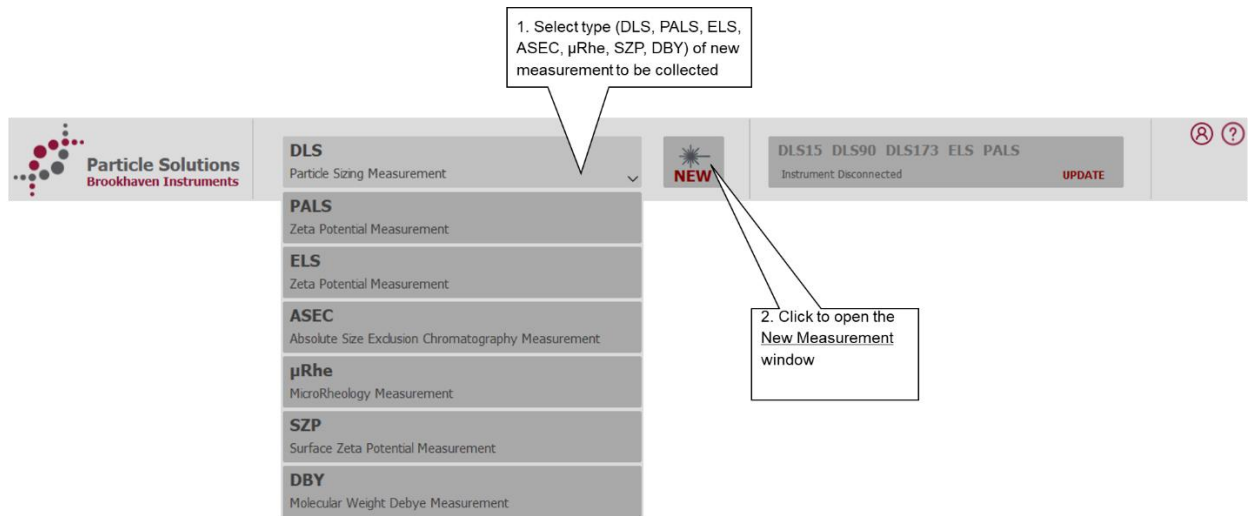
Note: Higher resolution images (i.e. 200H x 200V or greater) will produce better results when printed.

The image shows two overlapping screenshots of the 'Options' dialog box. The left screenshot shows the 'Startup' tab with two checkboxes: 'Show DLS Size As Radius' and 'Show Legacy ISDA distributions'. The right screenshot shows the 'Measurements' tab with a 'Report List Size' dropdown set to 5, a 'Report Logo File' field with a 'Browse...' button, and an 'Image export scale modifier' dropdown set to 3. Callout boxes with arrows point to these specific elements, providing detailed instructions on their function.

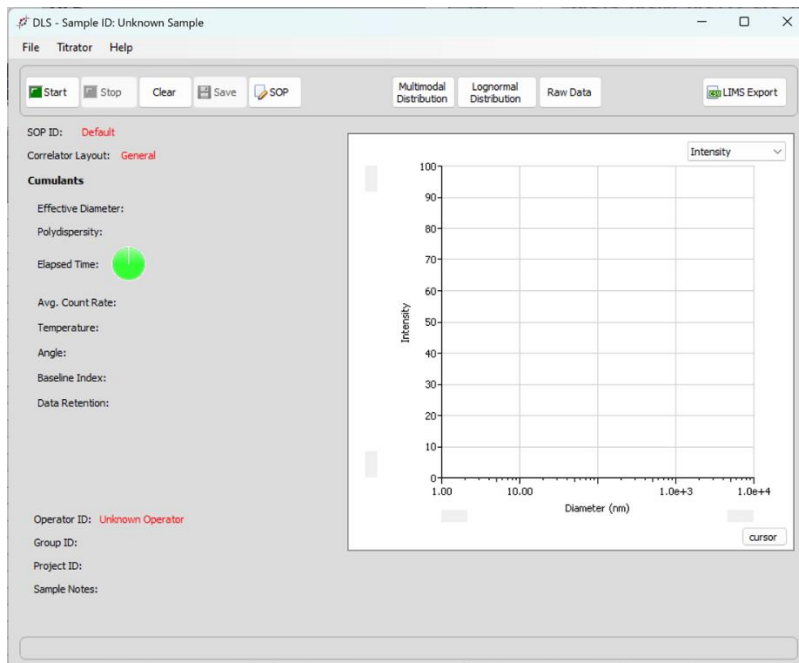
License



NEW MEASUREMENTS



New Measurement Window



Note: For details on collecting new measurements, please refer to:

- DLS Measurement Quick Start
- PALS Measurement Quick Start
- ELS Measurement Quick Start

These can be opened from the Help -> Quick Start Guide... menus in the respective New Measurement windows. Additional Quick Start Guides exist for other measurement types.