

HORIZON – Halo Labs

INTRODUCTION

The Lumetics LINK™ software platform scans network locations for new measurement data files, copies data directly to a centralized database, and provides a powerful user interface for rapid multi-measurement multi-technique data aggregation, visualization, analysis, and reporting. LINK employs a client/server-based architecture where the LINK server hardware is provided by the end user and resides on the end user's network. The LINK client is a portable web-based application that may be placed on any computer with network connectivity to the LINK server. For successful import, the LINK webserver requires read access to the folders where user data resides.

HORIZON system provides quantitative subvisible particle analysis. The HORIZON system is powered by a highly sensitive Backgrounded Membrane Imaging (BMI) technology.

DETAILS

LINK requires a CSV Experiment Summary File OR an XLS Experiment Summary file, as well as at least one associated particle CSV (typically named "<Well>-particles.csv"), together in a single folder. Particle thumbnail images via the PNG membrane image file is optional. The membrane image file is typically named "<Experiment Name>_<Plate>_<Well>_differenceImageBrightfield.png".

The following raw curve data may be imported, in addition to all available instrument/analysis settings and parameters calculated by the instrument software:

- Particle count or concentration vs. morphology

Particle count/concentration for each supported morphological parameter occurs at a pre-defined bin spacing and measurement range as per the table in the Users manual (section 4.17).

Particle Volume % for the number of particles in each 0.25um bin is calculated automatically and imported to LINK. (Particle Volume % = volume of particles in a given size range bin divided by the volume of particles in all bins, assuming particles are spherical in volume).

Import Method options can be defined and calculated each measurement during import if it is first created/defined and then requested within an Import Method. The following is the default MFI-specific import method settings:

- Default Sub-Populations: **None**
- Custom Particle Parameters: **None**
- Container Fill Volume: **None**
- Number of Thumbnails to Crop: **250**
- Ignore Thumbnails less than: **5 µm**
- Import Images in order of Largest-to-Smallest: **Yes**
- Dilution Factor: **1 (no dilution)**

Subpopulations

In addition to the total particle population data set, sub-populations based morphological parameter filters may be generated at the point of measurement import. An unlimited number of sub-populations may be specified for each measurement. For each sub-population, the particle count/concentration vs. morphological parameter will be available, as well as representative particle thumbnail images. The sub-populations do not count towards the measurement limit per project. Additional Sub-Populations will affect import speeds.



When creating a sub-population, select a Morphological Parameter from the pre-defined list and specify the filter criteria. Select the + to add the filter term to the Live Expression View. The Live Expression View can be edited directly. Brackets, mathematical operators/values, logical ANDs or ORs are valid operators. Syntax must be exact, for successful application

Custom Particle Parameters

Select from the available user-defined Custom Particle Parameters, those that shall be calculated for each individual particle within each measurement. This selection applies to the total particle population and all defined sub-populations.

Container Fill Volume

Specify the Container Fill Volume, permitting LINK to calculate and report Particles per Container (in addition to Particle Count, and Particle Concentration). This selection applies to the total particle population and all defined sub-populations.

Stuck/Repeating Particles

Ignore particles images which remain, or move slowly, in successive image frames. This selection applies to the total particle population and all defined sub-populations.

Thumbnail Images

Specify the maximum number of particle thumbnail images to be imported to the LINKdb for each measurement population. Apply a size threshold (the default is 5 microns). Choose whether particles should be first sorted from largest to smallest (based on ECD) or imported in their order of appearance during the analysis. These selections apply to the total particle population and all defined sub-populations.

Automated Metadata Extraction

Specify criteria for automated metadata extraction from measurement file fields (e.g. Comments, File Name, Import Path etc...) utilizing specified delimiters. Both metadata name and value may be extracted or only the value only.

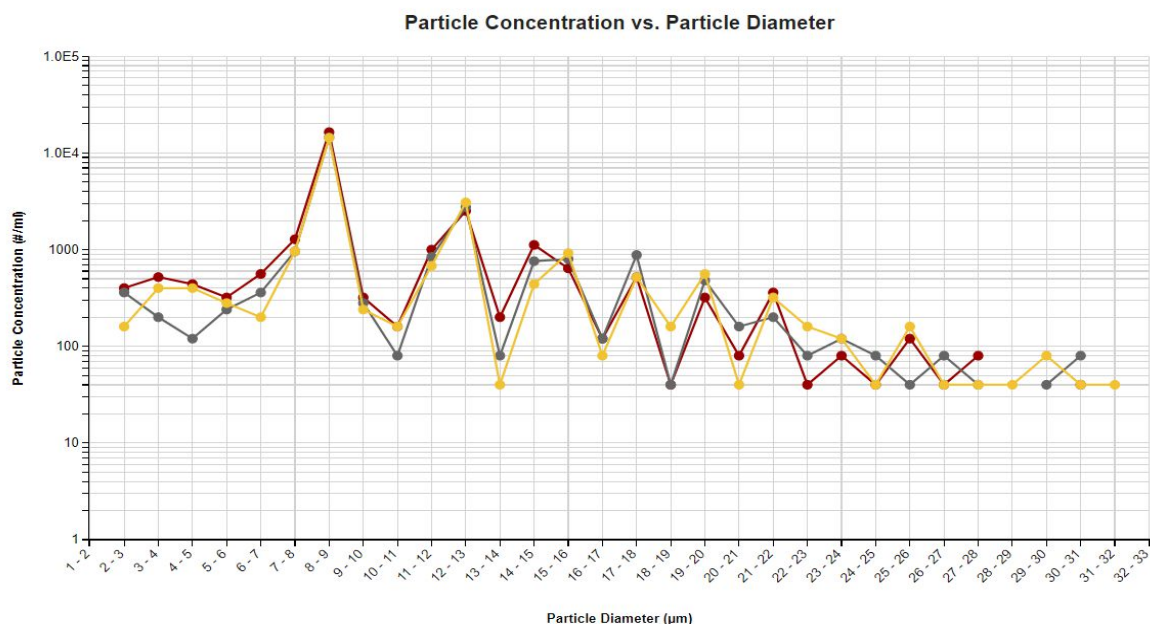
Dilution Factor

Specify a dilution factor for automated particle count/concentration data adjustment. This selection applies to the total particle population and all defined sub-populations. A LNK_Dilution_Factor may also be applied after import, utilizing the Add/Edit LINKdb Fields feature.

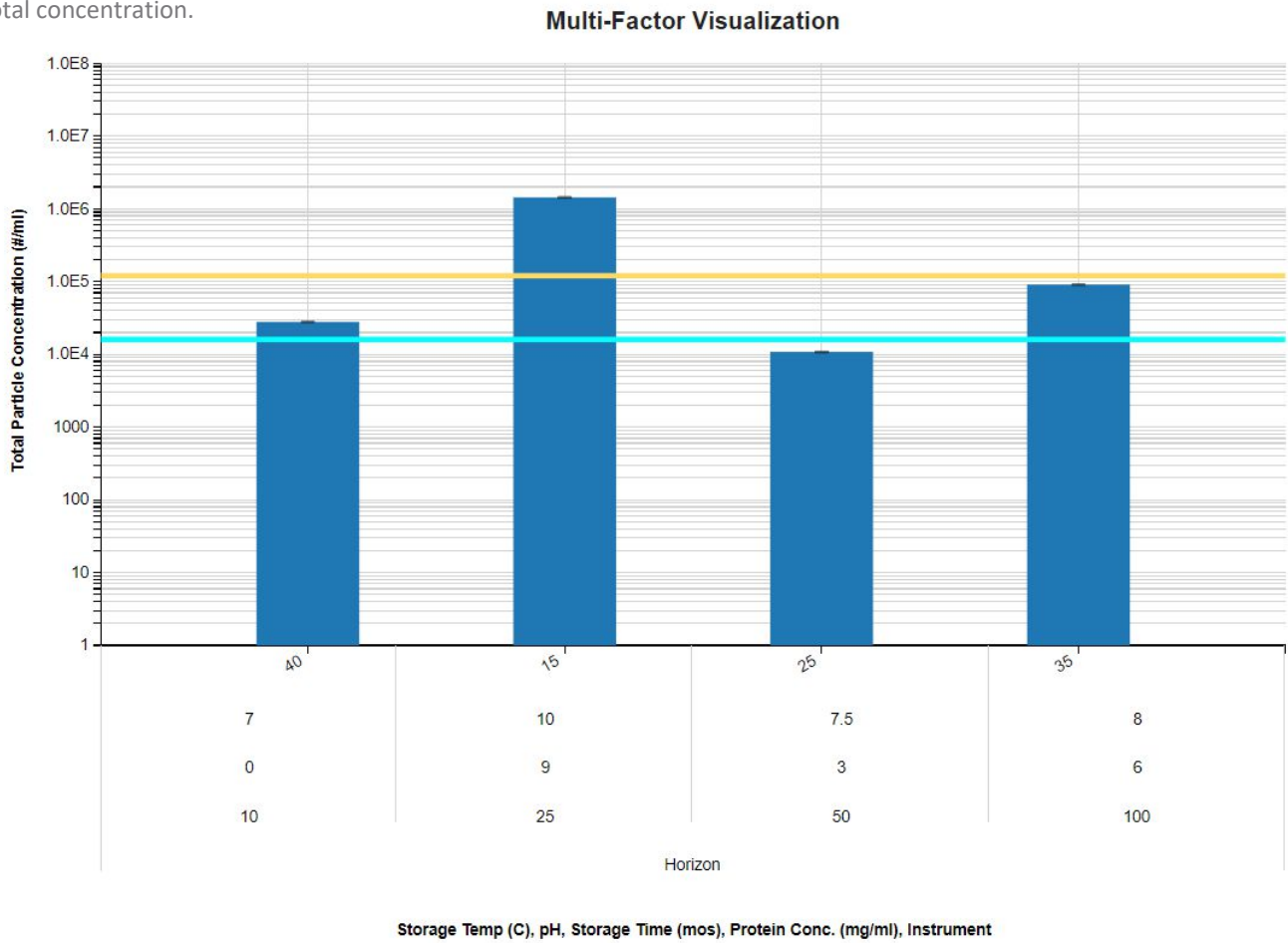
EXAMPLES

Included below are sample dashboards from HORIZON measurement files:

1. Histogram plotting binned raw data for Particle Concentration vs. Particle Diameter

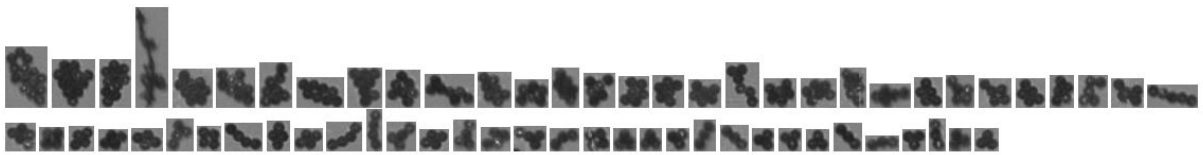


2. Column chart plotting multiple metadata parameters including; storage temp, pH, storage time, protein concentration vs. Total concentration.

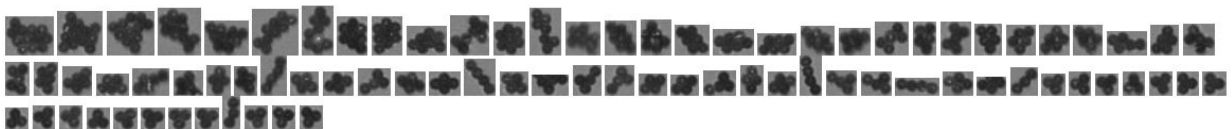


3. Particle Images organized by chart metadata parameters and ECD >=15

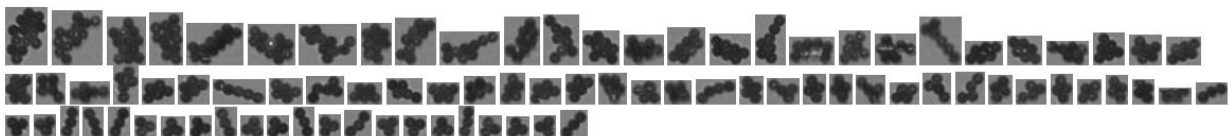
0, 10, 40, 7, ECD ≥ 15



3, 50, 25, 7.5, ECD ≥ 15



6, 100, 35, 8, ECD ≥ 15



4. Tabular Summary examples

Measurement Summary Table – Instrument Settings

LINK Record ID #	Sample Name	Dilution Factor - AVG	Volume Analyzed (ml) - AVG	Well Row - AVG	Well Col - AVG	Well
1	Sample A	1	0.03	1	1	A1
2	Sample B	1	0.03	1	2	A2
3	Sample C	1	0.03	1	3	A3
4	Lumetics 4	100	0.03	6	12	F12

Measurement Summary Table – Measurement Settings

LINK Record ID #	Sample Name	Particle Count (#) (Aspect Ratio >=1) - AVG	Particle Conc. (#/ml) (Circularity >=0.1) - AVG	Particle Conc. (#/ml) (Max Feret Diam. (µm) >=0.1) - AVG	Particle Conc. (#/ml) (Area (µm) >=0.1) - AVG	Volume Analyzed (ml) - AVG	Total Particle Count (#) - AVG	Total Particle Concentration (#/ml) - AVG
1	Sample A	201	27800	27800	7360	0.03	695	27800
2	Sample B	166	24800	24800	7640	0.03	620	10800
3	Sample C	155	24760	24760	7480	0.03	619	90760
4	Lumetics 4	2852	1432960	1432960	100120	0.03	35824	1432960

DASHBOARD DOWNLOADS

Included below is a link to downloadable dashboards for HORIZON measurement files:

<http://lumetics.com/dashboards/HORIZON/HORIZON.zip>

CONTACT LUMETICS

For direct assistance, please contact Lumetics LINK™ Support:

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