

## xSight – Spheryx

### 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.

The xSight system is a total holographic characterization technology that non-invasively yields a wealth of information with precise, reliable, and accurate quantitative measurements of suspended particles in complex samples. This technology has the unique ability to distinguish different distributions in multi-component suspensions – even when they are the same size.

### DETAILS

LINK requires a CSV import for xSight (Spheryx) data. The data files are generated automatically by the xSight software.

#### Automatic Export in xSight Software

To enable or disable automatic data export at the end of the run, select one of the following options in the file export menu at the bottom of the Measurement tab:

- “Do not export” - the data will not be exported at the end of the run.
- “Export as .csv” - the data will be exported as a .csv file at the end of the run.
- “Export as .json” - the data will be exported as a .json file at the end of the run.

The exported data will be saved to the Output Folder.

The xSight CSV data file example is as follows:

|    | A                       | B                      | C           | D           | E      | F           | G          | H         | I        | J          | K            | L |
|----|-------------------------|------------------------|-------------|-------------|--------|-------------|------------|-----------|----------|------------|--------------|---|
| 1  | Name                    | s2022_05_04run002_test |             |             |        |             |            |           |          |            |              |   |
| 2  | Time                    | 5/4/2022 10:31         |             |             |        |             |            |           |          |            |              |   |
| 3  | Notes                   |                        |             |             |        |             |            |           |          |            |              |   |
| 4  | User                    | Lumetics               |             |             |        |             |            |           |          |            |              |   |
| 5  | Sample                  | beads                  |             |             |        |             |            |           |          |            |              |   |
| 6  | Sample notes            |                        |             |             |        |             |            |           |          |            |              |   |
| 7  | Medium refractive index | 1.34                   |             |             |        |             |            |           |          |            |              |   |
| 8  | Measured volume         | 0.11 mL                |             |             |        |             |            |           |          |            |              |   |
| 9  | Viscosity               | 1-2 cP                 |             |             |        |             |            |           |          |            |              |   |
| 10 | Laser                   | 0.445 mm (Blue)        |             |             |        |             |            |           |          |            |              |   |
| 11 | Temperature             | 30.0 °C                |             |             |        |             |            |           |          |            |              |   |
| 12 | Channel                 | 1                      |             |             |        |             |            |           |          |            |              |   |
| 13 | Software version        | v2.6.0                 |             |             |        |             |            |           |          |            |              |   |
| 14 |                         |                        |             |             |        |             |            |           |          |            |              |   |
| 15 |                         |                        |             |             |        |             |            |           |          |            |              |   |
| 16 |                         | d [um]                 | d uncertain | n uncertain | z [um] | z uncertain | v [um / s] | timestamp | symmetry | morphology |              |   |
| 17 | 1                       | 5.1402                 | 0.2113      | 1.3425      | 0.0002 | 65.6605     | 1.6192     | 1223.881  | 0        | Non-sphe   | Undetermined |   |
| 18 | 2                       | 2.1025                 | 0.2519      | 1.343       | 0.0006 | 63.5858     | 5.2544     | 2512.529  | 0.1379   | Non-sphe   | Undetermined |   |
| 19 | 3                       | 1.9144                 | 0.1197      | 1.3435      | 0.0005 | 42.2589     | 0.1869     | 717.3777  | 0.1626   | Non-sphe   | Rod-like     |   |

If an optional PDF report is found with the same root name as the CSV file but ending with "\_report.PDF", this report will be parsed for additional metadata from the "All Data" section. The PDF file will also be included as a series attachment.

If an optional HTML report is found with the same root name as the CSV file but ending with "\_report.html", this report will be parsed for additional metadata from the "All Data" section. The HTML file will also be included as a series attachment.

Particle count/concentration for each supported morphological parameter occurs at a pre-defined bin spacing and measurement range as per the following table. High resolution binning options are available in LINK settings, LINK configuration, configure measurement ranges.

| Parameter Name                            | Bin Spacing | Meas. Start | Meas. End |
|-------------------------------------------|-------------|-------------|-----------|
| ECD / Particle Diameter ( $\mu\text{m}$ ) | 0.0001      | 0           | 100       |
| Refractive Index                          | 0.0001      | 0           | 10        |
| Time (s)                                  | 0.0001      | 0           | 100       |
| z ( $\mu\text{m}$ )                       | 0.0001      | 0           | 1000      |

## IMPORT METHOD

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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 default xSight specific import method settings are:

- Default Sub-Populations: **None**
- Container Fill Volume: **None**
- Automated Metadata Extraction: **None**
- Dilution Factor: **1 (no dilution)**

### Notes:

- Sub-population parameters for ECD, Refractive Index, Height, and Time Stamp are available upon import method creation for the xSight instrument.
- New subpopulation category support for “morphology” & “symmetry”. If there is no morphology data within the xSight measurements, the data will not import with a subpopulation dependant on morphology.
- CPP currently not available for custom formulas on a per particle basis

### Sub-Populations

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 as 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.

### 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.

### 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.

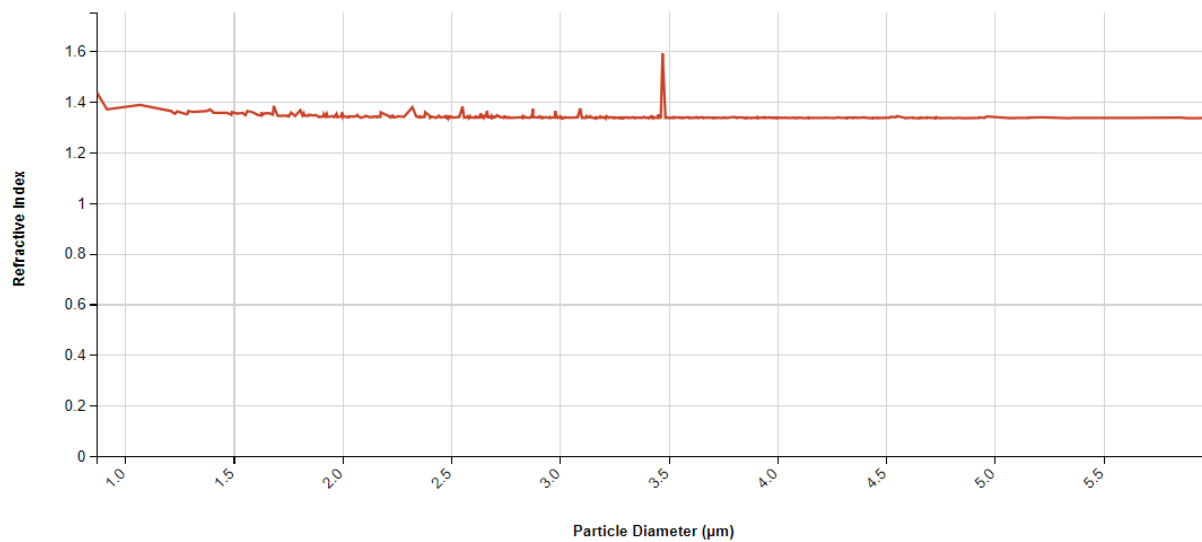


## EXAMPLES

Included below are example dashboards from xSight measurement files:

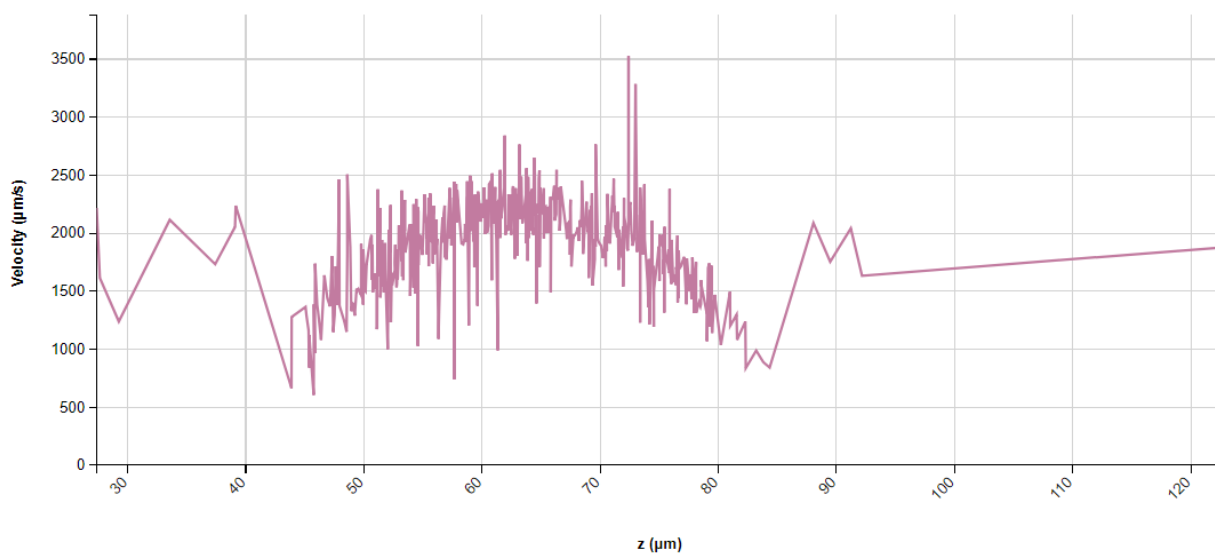
### 1. Line Chart plotting raw data curves for Refractive Index vs. Particle Diameter

**Refractive Index vs. Particle Diameter**

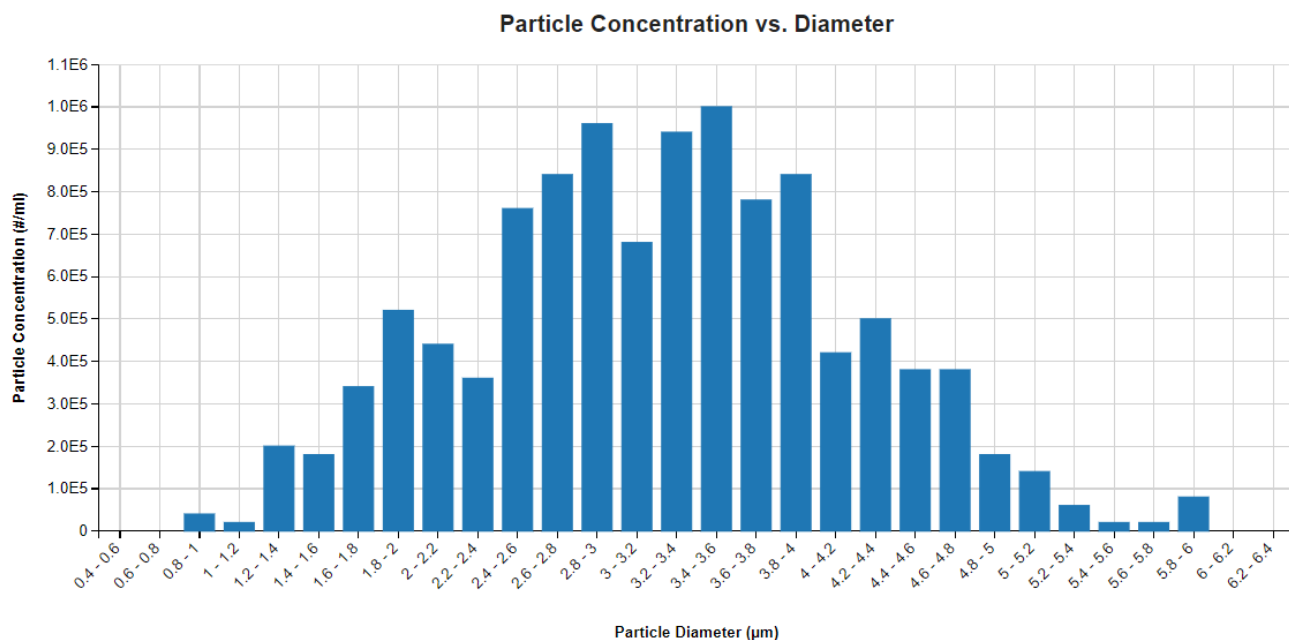


### 2. Line Chart plotting raw data curves for Velocity vs. Z

**Velocity vs. Z**



### 3. Histogram plotting binned raw data for Particle Concentration vs. Diameter



### 4. Tabular Summary examples

#### Measurement Summary Table – Measurement Results

| Sample Name        | Sub-Population   | Particle Count (#)<br>(Particle Diam.<br>(µm) >=0) - AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) >=0) - AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) 0-0.5) -<br>AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) 0.5-1) -<br>AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) 1-2) - AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) 2-10) - AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) >=10) -<br>AVG | Particle Conc.<br>(#/ml)<br>(Particle Diam.<br>(µm) >=25) -<br>AVG | Total Particle<br>Count (#) - AVG | Total Particle<br>Concentration<br>(#/ml) - AVG |
|--------------------|------------------|----------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------|-------------------------------------------------|
| 1.0mg/mL IgG in... | Total Population | 554                                                      | 11080000                                                       | 0                                                                   | 40000                                                               | 1260000                                                        | 9780000                                                         | 0                                                                  | 0                                                                  | 554                               | 11080000                                        |

#### Measurement Summary Table – Instrument Settings

| LINK Record ID # | Sample Name                       | File Name             | Sample refractive index - AVG | Volume Analyzed (ml) - AVG | Channel |
|------------------|-----------------------------------|-----------------------|-------------------------------|----------------------------|---------|
| 1                | 1.0mg/mL IgG in filtered DI water | spheryxExportData.csv | 1.34                          | 0.00                       | unknown |

## CONTACT LUMETICS

For direct assistance, please contact Lumetics LINK™ Support:

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