

## Sub-populations

### 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.

For some Particle Analysis techniques/instruments, LINK will allow calculation and reporting of particle sub-populations, based on particle characteristics that have been defined as part of the Import Method.

In addition to the total particle population data set, sub-populations based morphological parameter filters or buoyancy may be generated at the point of measurement import. An unlimited number of sub-populations may be specified for each measurement. The sub-populations do not count towards the measurement limit per project. Additional Sub-Populations will affect import speeds.

### DETAILS

#### Sub-population based on Morphological Parameters

For each sub-population, the particle count/concentration vs. morphological parameter will be available, as well as representative particle thumbnail images (if applicable).

When creating as sub-population follow these instructions:

- Select a Morphological Parameter from the pre-defined list
- 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.

Instruments compatible with sub-populations for morphological parameters are: FlowCAM, HORIZON, Hound, MFI, Morphologi G3 and xSight.

#### Sub-Population Definition

Sub-Population Name

Morphological Filter Builder

Morphological Parameter      Range

ECD      >                  ⊕

Live Expression View: Insert Brackets ( ) around expressions as required

Cancel      Ok

#### Sub Populations

1 Protein, AR : AspectRatio <=0.9  

2 Silicone Oil, AR : AspectRatio >0.9  

3 Protein, SFactor : ((ECD >=2.125 AND ECD <=4.375 AND SFMinusCutoff1 <0) OR (ECD >=4.625 AND ECD <=10.875 AND SFMinusCutoff2 <0) OR (ECD >=11.125 AND SFMinusCutoff3 <0))  

4 Silicone Oil, SFactor : ((ECD >=2.125 AND ECD <=4.375 AND SFMinusCutoff1 >=0) OR (ECD >=4.625 AND ECD <=10.875 AND SFMinusCutoff2 >=0) OR (ECD >=11.125 AND SFMinusCutoff3 >=0))  

[Add Sub-Population](#)

Cancel      Back      Next

## Sub-Populations based on Buoyancy

The Archimedes instrument permits a maximum of two material/density values to be defined in the measurement file. New values can be defined in LINK and applied to the measurements during import. LINK will re-calculate particle size based on these new values. This feature can harmonize inconsistencies with material names for different measurements (e.g. "Protein", "protein", "prot", etc) or to modify the density assumption from the original experiment.

LINK can create particle size distribution for multiple additional sub-populations based on different materials/densities. For example, creating three materials called "Protein1, Protein2, Protein3" with densities "1.2, 1.25, 1.3" will show the effect of these densities on the corresponding particle size distributions.

### Overwrite Original Material Name / Density ...

Optionally overwrite the original Archimedes file Particle Density / Material values with the values specified below

NOTE: These values will overwrite the default file values, and change the size distribution calculation for the total particle population and the default positive and negative buoyant particle sub-populations. Skip this screen if you want to keep the original values from the file.

Positive Buoyancy (leave blank to use the positive value found in the file)

pos	0.965
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Negative Buoyancy (leave blank to use the negative value found in the file)

neg	1.35
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Buttons: Cancel, Back, Next

### Create Additional Material Name / Density Sub-Pop...

Create sub-populations based on additional material and density value pairs. These populations are in addition to those found in the Archimedes file, and will not impact the default total population and any default positive/negative buoyancy values found in the Archimedes data file. This can be useful for specifying different buoyancy assumptions (e.g. air and silicone oil, for positively buoyant particles) to examine the effect on the population size distribution

Specify up to six additional particle material / density populations

pos 2	0.9
pos 3	0.965
neg 2	1.4
neg 3	1.35
Positive Buoyancy	0.965
Negative Buoyancy	1.35

Buttons: Cancel, Back, Next

## APPLICATION

### Database Management

The Sub-Population button in the LINKdb management panel provides the option to view, edit name and delete sub-populations.

### Filter Panel Options

The Filter Panel is utilized to isolate measurements in the project for inclusion in the dashboard's analyses (charts, tables, and images). It is also used to Split the pool of project measurements into separate series, which are then reflected within the chart, chart series stats table, and thumbnail image calculations/display. This is where the measurements can be split by sub-population created for the import method.

### Measurement Summary Table

The measurement summary table is a flexible tabular summary that will display any LINKdb Field (Instrument or User-defined) for all the measurements isolated in the dashboard's filter panel. Measurement summary table templates contain their own **Split** (measurement grouping) criteria that operate independently of a dashboard's Filter Panel. This feature is used to determine how the measurements isolated by a dashboard's filter panel should be grouped, including sub-population.

Quick Filter Add...

Filtered Measurements: 201 of 212  
Hold ALT key to make multiple selections

- Instrument Split
- MFI (MVSS PDF)
- MFI 4100HM
- MFI 4100LM/5100
- MFI 4200/5200
- Sub-Population Split
- Protein
- Silicon Oil
- Total Population
- LINK Record ID # Split
- Database Filters
- File Name Split
- Sample Name Split
- Operator Split



### Computed (Raw Data) LINKdb Fields

Specification of Sub-Population can be used in the calculation for Raw Data LINKdb Fields for applicable analytical techniques.

**Create/Edit LINKdb Fields based on Raw Data Calculation**

Field Name:  Instrument:  Sub-Population:

Calculation Type:  Parameter:

for

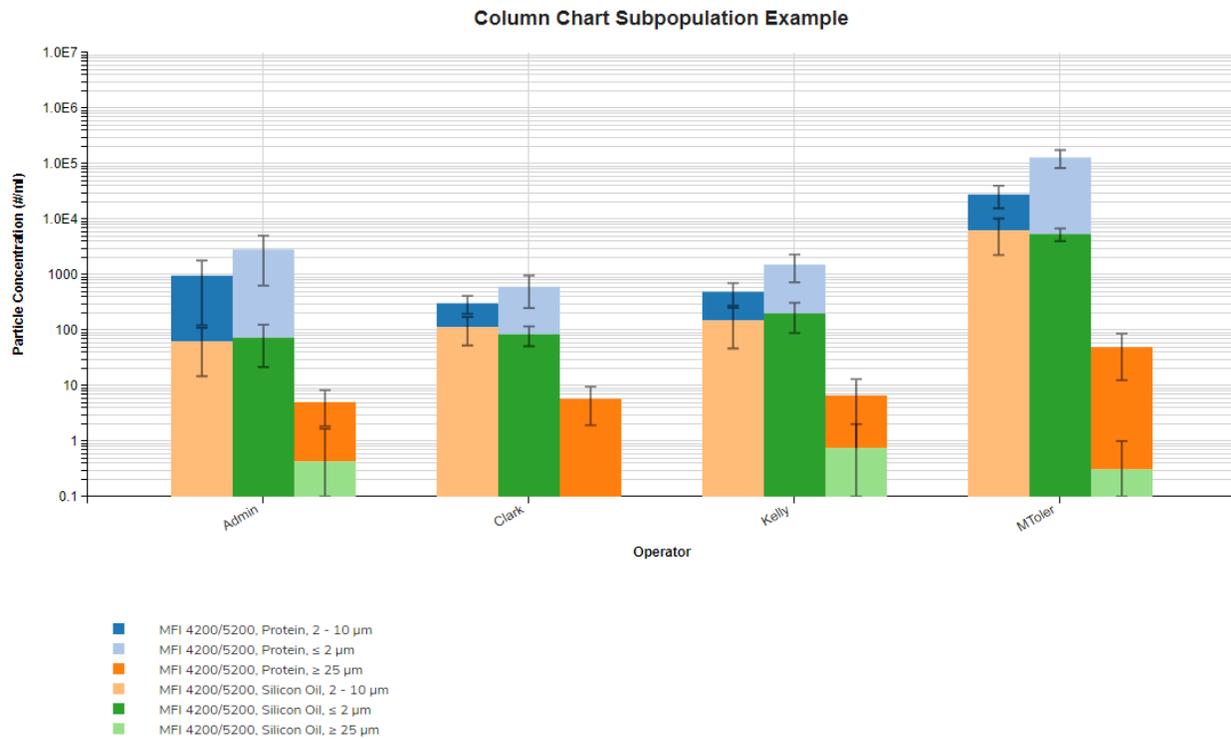
Parameter:  Range:

Eg. >=2", \*2-10", or >=2 AND <= 25"

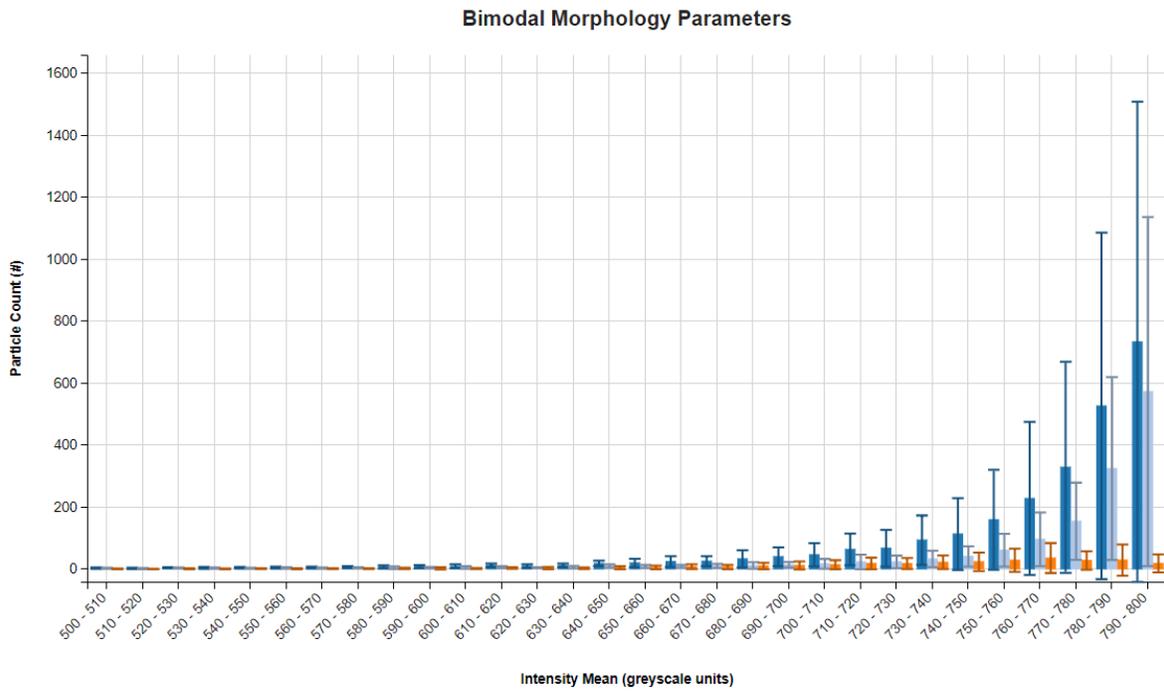
### EXAMPLE

Included below are sample dashboards from measurement files exemplifying sub-populations

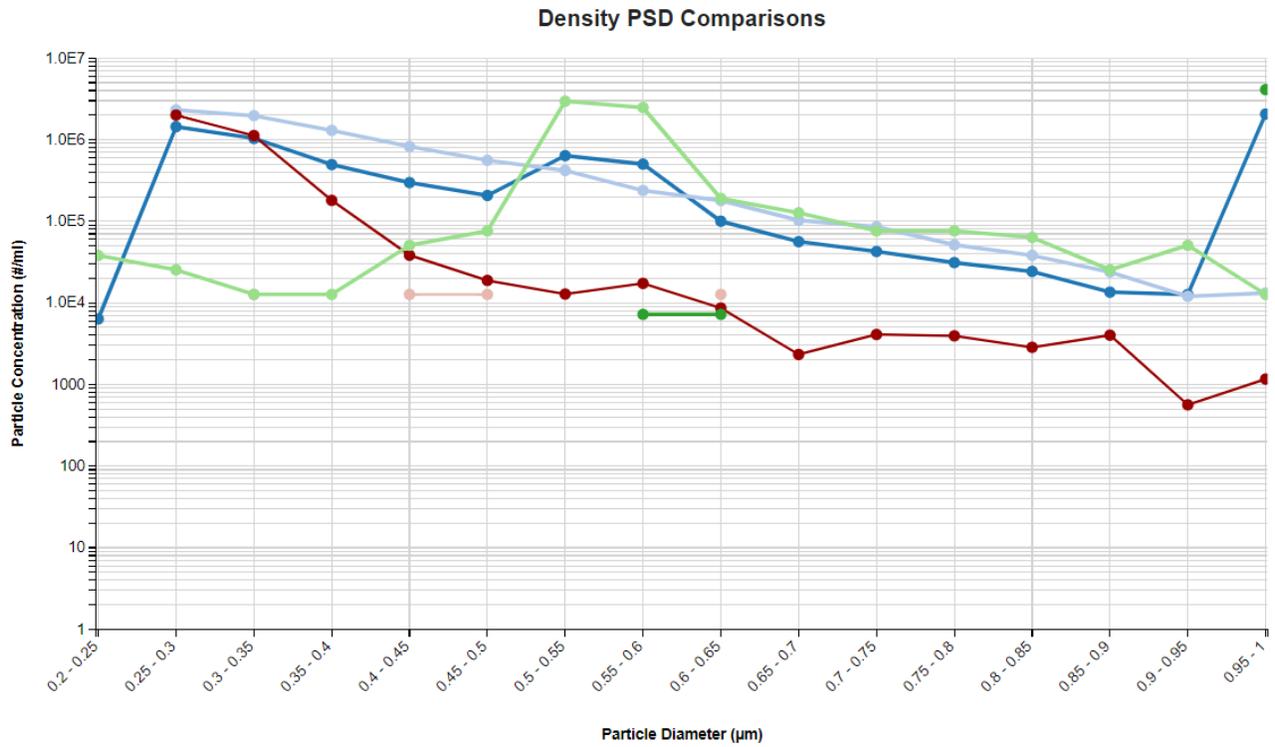
1. Stacked column chart plotting raw data from MFI based on sub-populations and particle concentration ranges



2. Histogram plotting raw binned data from MFI and split by sub-populations for Intensity Mean vs. Particle Count



3. Histogram plotting binned raw data from Archimedes for Particle Concentration vs. Diameter and split by sub-population



## CONTACT LUMETICS

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For direct assistance, please contact Lumetics LINK™ Support:

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