

VHX-7000 & 6000 – Keyence

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.

Keyence VHX is a 4K Ultra-High Accuracy Microscope with a large depth-of-field and advanced measurement capabilities for inspection and failure analysis. High-definition capturing makes it possible to observe subtle contours and uneven surfaces or stains that were previously impossible to view, with a push of a button.

DETAILS

LINK requires a CSV file to import of Keyence VHX data generated automatically from the Keyence instrument. LINK supports both VHX-6000 and VHX-7000 models.

Particle count for each supported morphological parameter occurs at a pre-defined bin spacing and measurement range as per the following table.

Parameter Name	Bin Spacing	Meas. Start	Meas. End
ECD	0.1	0	5000
Area	10	0	42340
Perimeter	1	0	5000
Circularity	0.01	0	6.3

LINK requires the Keyence VHX-6000 CSV file to have the following:

- “Title” must be the first word in the first line of the file
- The raw data section column headers MUST start with "No.".
- Raw data imported includes:
 - Average brightness
 - Maximum/minimum diameter ratio
 - Minimum diameter
 - Maximum diameter
 - Area

The Keyence VHX-6000 CSV data file example is as follows:

	A	B	C	D	E	F	G	H	I
1	Title	Auto area measurement results data							
2	Date save	6/20/2019 1:28 PM							
3	Comment								
4	[Statistics]								
5		Circle equ Unit		Circularity Unit		Perimeter Unit		Area	Unit
6	Average	38.5 μm		1.3		145.5 μm		2226.8 μm ²	
7	Standard I	36.7 μm		1.4		169.1 μm		5003.5 μm ²	
8	Max	232.2 μm		6.3		1611.8 μm		42340.7 μm ²	
9	Min	5.6 μm		0.1		0 μm		24.7 μm ²	
10	Total	27986.7 μm		938.3		105647.8 μm		1616655 μm ²	
11	[Main]								
12	No.	Circle equ Unit		Circularity Unit		Perimeter Unit		Area	Unit
13	1	21.7 μm		0.5		94.8 μm		370.5 μm ²	



LINK requires the Keyence VHX-7000 CSV file to have the following:

- "Title" must be the first word in the first line of the file
- [Statistics] Must exist in the file (This captures the Statistics section)
- [Main] Must Exist in the file (This identifies the raw data section)
- Raw data section column headers MUST start with "No."
- Raw data imported includes:
 - Circle equivalent dia (ECD)
 - Circularity
 - Perimeter
 - Area

The Keyence VHX-7000 CSV data file example is as follows:

	A	B	C	D	E	F	G	H	I
1	Title	Auto area measurement results data							
2	Date save	6/20/2019	1:28 PM						
3	Comment								
4	[Statistics]								
5		Circle equ Unit		Circularity Unit		Perimeter Unit		Area	Unit
6	Average	38.5 μm		1.3		145.5 μm		2226.8	μm ²
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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 Keyence-specific import method settings are:

- Default Sub-Populations: **None**
- Custom Particle Parameters: **None**
- Automated Metadata Extraction: **None**

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.

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.

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.

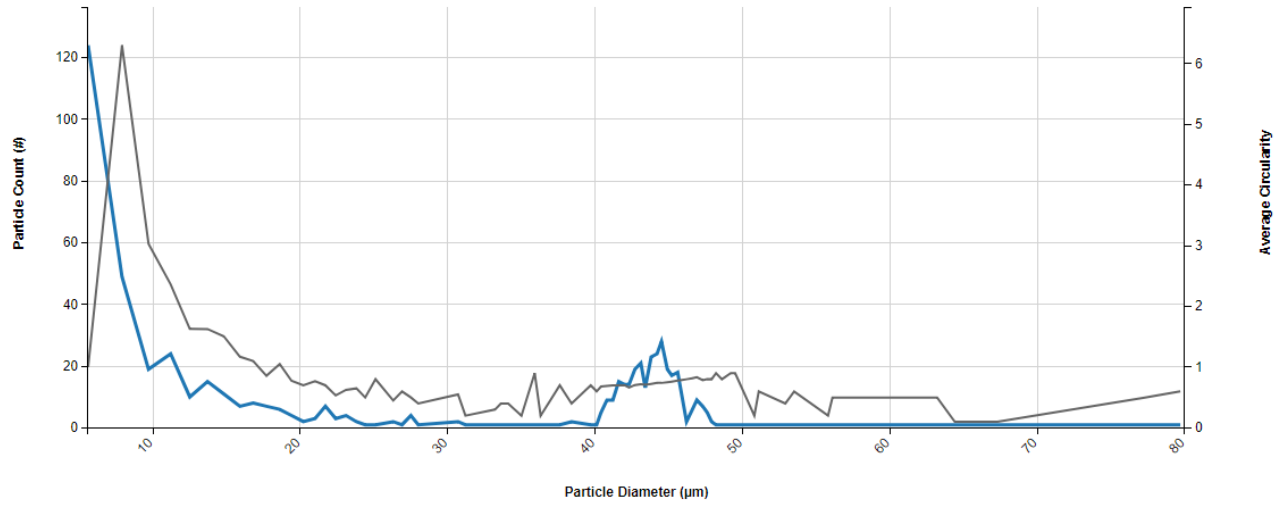


EXAMPLES

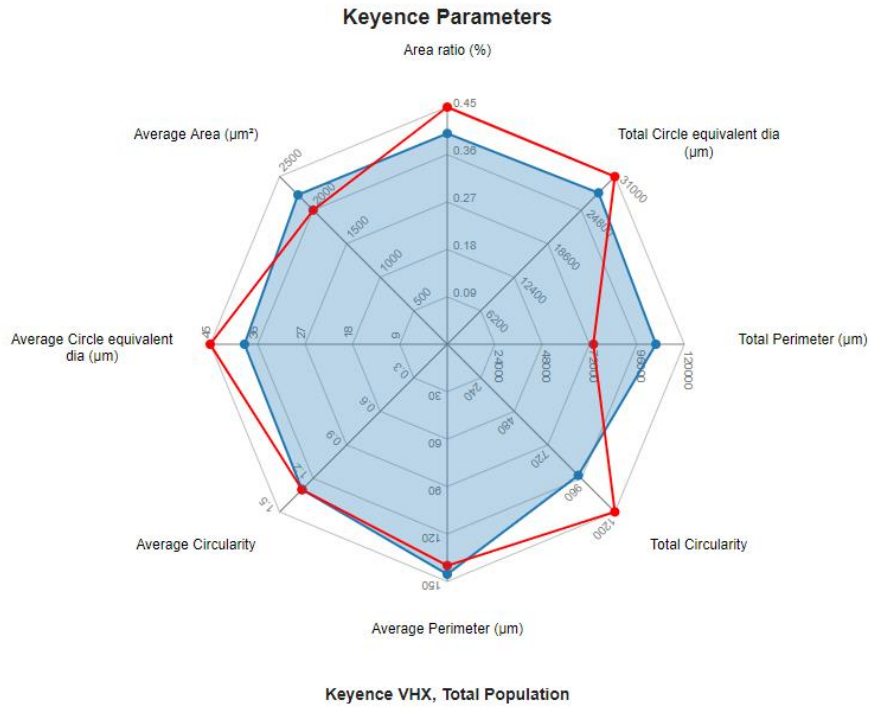
Included below are example dashboards from Keyence VHX measurement files:

1. Line Chart plotting raw data curves for Particle Count and Average Circularity vs. Diameter

Particle Count & Average Circularity vs. Particle Diameter



2. Radar Chart for multiple acidic 10 parameters



3. Tabular Summary examples

Measurement Summary Table – Measurement Results

LINK Record ID #	Sample Name	Analysis Date	Total Circularity - AVG	Total Area (μm^2) - AVG	Standard Deviation Perimeter (μm) - AVG	Standard Deviation Circularity - AVG	Standard Deviation Circle equivalent dia (μm) - AVG	Standard Deviation Area (μm^2) - AVG	Count (pcs) - AVG	Average Perimeter (μm) - AVG	Average Circularity - AVG	Area ratio (%) - AVG	Average Area (μm^2) - AVG
1	Output file	2019-06-20...	938.30	1616654.80	169.10	1.40	36.70	5003.50	726	145.50	1.30	0.40	2226.80

CONTACT LUMETICS

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