m-VROC - RheoSense

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.

VROC Technology took the standard principles of rheometry and created a dynamic micro-sample viscometer by adding microfluidics while reducing the size of the device with MEMS (micro-electrical mechanical systems) manufacturing.

DETAILS

LINK requires XLSX workbooks for importing m-VROC data. If no XLSX is available, LINK will import the table data from a PDF report. If both XLSX and PDF are available, the XLSX will be imported with associated raw data, and the PDF will be available as a measurement attachment within the LINK software.

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

- Chip Temp (°C) vs. Elapsed Time (s)
- Viscosity (mPa-s) vs. Elapsed Time (s)
- Pressure, S1 (Pa) vs. Elapsed Time (s)
- Pressure, S2 (Pa) vs. Elapsed Time (s)
- Pressure, S3 (Pa) vs. Elapsed Time (s)
- Pressure, S4 (Pa) vs. Elapsed Time (s)
- Average Pressure (Pa) vs. Sensor Position (mm)

Notes:
- The Average Pressure (Pa) is calculated for each sensor (S1-S4) from the raw data by ignoring all priming data (all points above the blank line in the Segment X tab and is available to be plotted as a function of Sensor position (mm).
- All available instrument/analysis setting information from the Summary tab will be imported to LINK, except for the Measurement Protocol table, and the Weissenberg-Rabinowitsch Correction Fit table.
- "Sensor Temp, C" raw data from the Segment X tab in the .xlsx workbook will appear in LINK as Chip Temp (°C). "Temp, C" data from the Summary tab in the .xlsx workbook will appear in LINK as Chip Temp (°C). This is done to harmonize with the VROC Initium nomenclature.

The m-VROC XLSX data file example is as follows:

|	A	B	C	D	E	F	G	H	I	J
1	Segment	5								
2	Elapsed Time, s	Sensor Temp, C	Shear Rate, 1/s	Shear Stress, Pa	Viscosity, mPa-s	Slope Fit Rsqrd	Press@2.025mm, Pa	Press@4.525mm, Pa	Press@8.325mm, Pa	Press@10.825mm, Pa
3	0.786	21.0005	11176.714	25.7082	2.3002	0.9999	11309.1297	8507.5732	4436.3454	1759.6264
4	1.174	20.9999	11176.714	25.8829	2.3158	0.9999	11347.5558	8552.8757	4432.9603	1742.2007
5	1.385	21.0016	11176.714	26.284	2.3517	0.9999	11498.237	8651.9895	4467.0469	1744.5489
6	1.581	20.9999	11176.714	26.2863	2.3519	1	11494.0084	8662.4004	4482.614	1737.1036
7	1.792	21.0033	11176.714	26.2008	2.3442	0.9999	11515.0851	8670.252	4509.5415	1787.5516
8	1.982	20.9999	11176.714	25.663	2.2961	1	11254.698	8513.0237	4408.5746	1739.4029

EXAMPLES

Included below are sample dashboards from m-VROC measurement files:

1. Line Chart plotting raw data curves for Viscosity (mPa-s) vs. Elapsed Time (s)
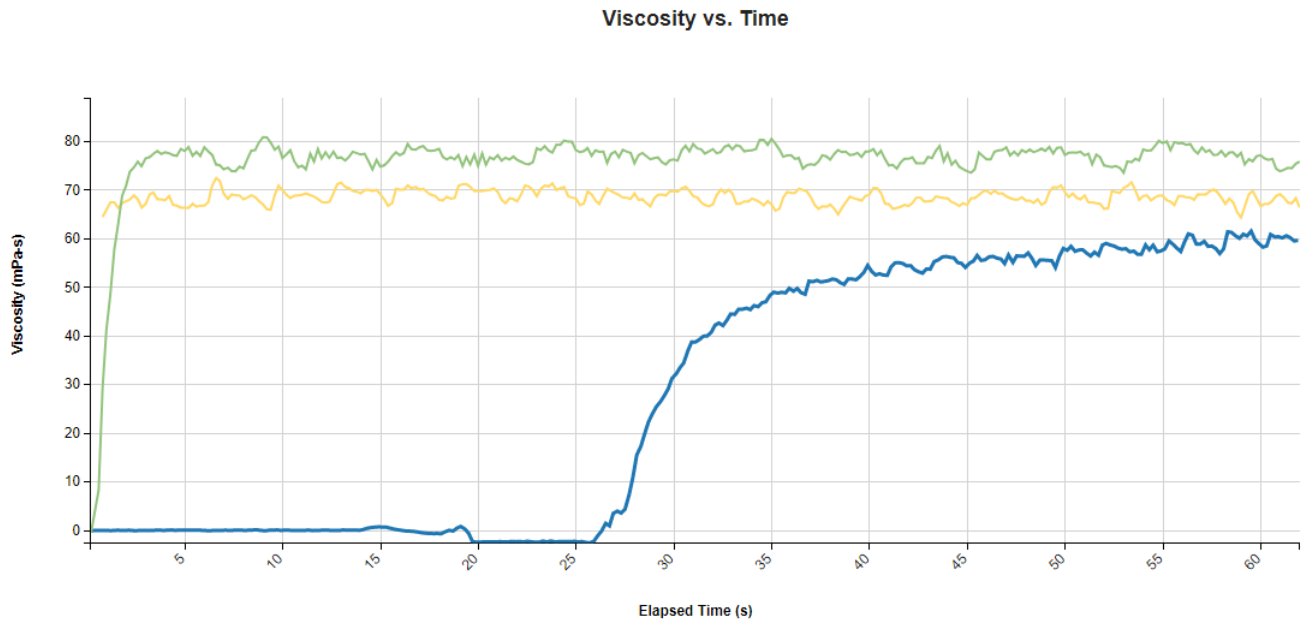
2. Column Chart plotting measurement results for Apparent Viscosity & True Viscosity vs. Sample Name
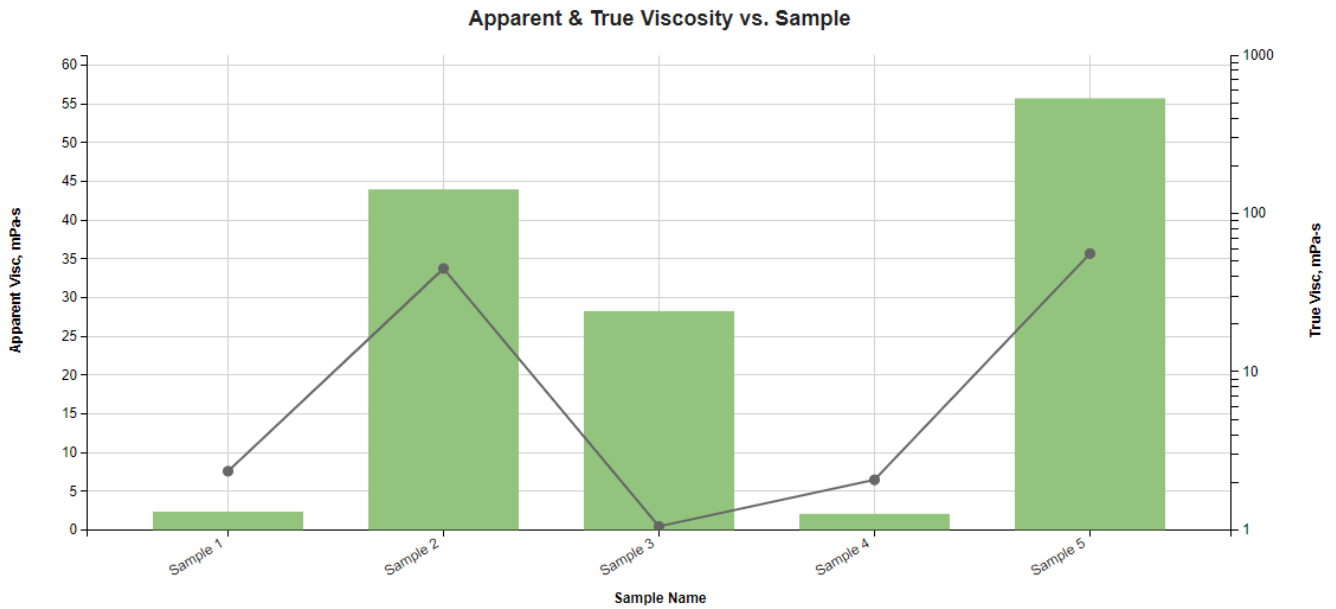
3. Tabular Summary examples

Measurement Summary Table – Measurement Results

Sample Name	Segment - AVG	Temp, C - AVG	Press Drop, Pa/mm - AVG	Shear Stress, Pa - AVG	% Full Scale - AVG	Apparent Shear Rate, 1/s - AVG	Apparent Visc, mPa-s - AVG	True Shear Rate, 1/s - AVG	True Visc, mPa-s - AVG	Slope Fit Rsqrd - AVG
Sample 1	3.00	21.01	592.40	14.06	51.34	6007.50	2.35	6007.50	2.35	1.00
Sample 2	2.45	21.89	4789.27	115.86	27.82	2874.42	43.96	2727.13	44.85	0.88
Sample 3	1.00	21.21	286.50	7.15	7.25	5043.10	28.24	5043.10	1.05	0.93
Sample 4	1.00	21.62	1652.00	40.70	47.50	18842.75	2.07	18842.75	2.07	0.98
Sample 5	2.88	21.70	1675.00	41.29	47.98	771.14	55.71	771.14	55.71	0.94

Measurement Summary Table – Instrument Settings

Sample Name	Analysis Date	Syringe Size, ml: - AVG	Sensor Temp, C - AVG	Flow Rate, ul/min - AVG	Flow Channel Depth, um: - AVG	Chip Temp (°C) - AVG	Segment - AVG
Sample 1	2017-12-14 14:02:20	1	21.01	429.62	48.20	21.01	3.00
Sample 2	Multiple (5 Values)	1	21.89	148.53	49.77	21.89	2.45
Sample 3	Multiple (2 Values)	1	21.21	349.70	74.35	21.21	1.00
Sample 4	Multiple (2 Values)	1	21.62	999.15	50.50	21.62	1.00
Sample 5	Multiple (3 Values)	1	21.70	40.91	50.50	21.70	2.88

M-VROC DASHBOARDS

LINK contains an extensive built-in dashboard library from LINK version 2.4.0.210401 and later. This function contains specific pre-created dashboards for all instruments and application groups.

CONTACT LUMETICS

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