# LyoStar – SP Scientific

## 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 LyoStar is an R&D and process development freeze-dryer that provides Type T thermocouple-controlled shelf temperature accuracy of +/- 0.5°C or better and vacuum control within 0.1% of set-point. Its robust 5.5 hp cascade refrigeration system enables shelf pull down from ambient to –40°C in less than 25 minutes, and the ultra-reliable scroll compressors feature just 3 moving parts.

## DETAILS

LINK will import results from the LyoStar 2/3 using the CSV data file. LINK will also import TDLAS module data from TXT or LOG files, FLIR module data from CSV sensor data files, RGA Quantum data using XLSX files, and RGA V2000P data using TXT data files. Within the LINK analysis UI, the LyoStar instrument/module subtype will be noted in the Instruments field as LyoStar, LyoStar (FLIR), LyoStar (RGA Quantum), LyoStar (V2000P), and LyoStar (TDLAS) respectively, allowing one to easily select specific results as required.

**Helpful Notes:**

- Temperature and Pressure curves from various sensors are noted in the Measurement Type field in the dashboard filter panel, allowing one to easily select/overlay the results from multiple sensors.
- Pressure is assumed to be in mTorr, and rough vacuum is assumed to be Torr and converted to mTorr, unless otherwise specified in the LyoStar import method.
- Temperature is imported with no associated units as these differ depending on LyoStar export method
- FLIR data points with temperature values outside of 0-100°C are excluded.
- LINK will ignore curved data points with pressure values of zero values.
- Due to high curve datapoint density, data point averaging is applied during import. Settings may be adjusted within the LyoStar Import Method.
- LINK will also support foam pressure datasets

The LyoStar CSV data file example is as follows:

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ; | | | | | | | | | | | | | | |
| 2 | ; Data Export | | | | | | | | | | | | | | |
| 3 | ; Generated: 09/13/2019 11:18:05 AM | | | | | | | | | | | | | | |
| 4 | ; Start Time: 09/09/2019 12:00:00 PM | | | | | | | | | | | | | | |
| 5 | ; End Time: 09/14/2019 12:00:00 PM | | | | | | | | | | | | | | |
| 6 | ; Interval: 60000 milliseconds | | | | | | | | | | | | | | |
| 7 | ; Records Returned: 7200 | | | | | | | | | | | | | | |
| 8 | ; | | | | | | | | | | | | | | |
| 9 | Timestam | SPLYO.CO | SPLYO.SHI | SPLYO.SHI | SPLYO.SHI | SPLYO.TC_ | SPLYO.VA | SPLYO.CH | SPLYO.RO | SPLYO.CH | SPLYO.CO | SPLYO.CH | SPLYO.CHAMBER_PRESSURE.F_CV | | |
| 10 | 09/09/20 | 21.5 | 21.8 | 22.4 | 0 | 0 | 0 | 1050 | 765 | 1043 | 2100 | 21000 | 0 | | |

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 LyoStar-specific import method settings:

- Data Reduction Options: **Averaged Timepoints**
- Pressure Units: **Default pressure units are mTorr, however rough vacuum units default are Torr**
- Automated Metadata Extraction: **None**

### Data Reduction

To reduce the number of data points per curve and improve dashboard rendering times, LINK offers various options for reducing the data residing in the LINK database.  Any options applied will in no way impact the original data files.

### Pressure Units

Specify the units for the pressure data. The default values are mTorr for all pressure data except Rough Vacuum, which defaults to Torr.

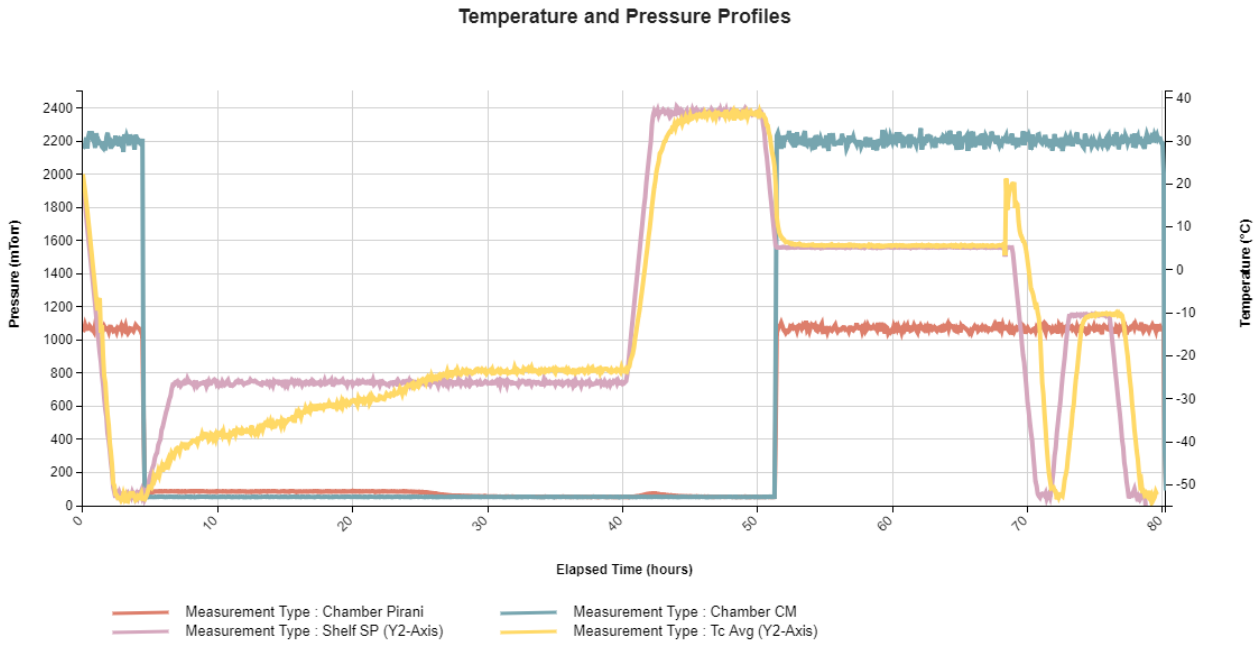
### Automated Metadata Extraction

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.

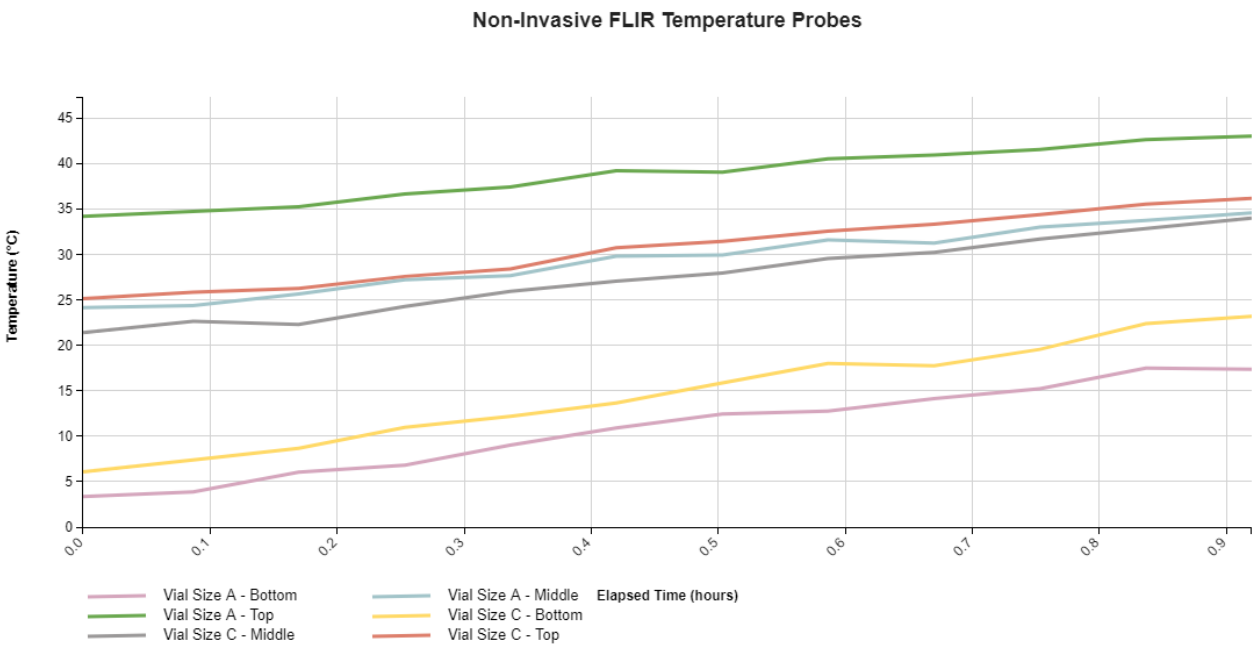
## EXAMPLES

Included below are sample dashboards from LyoStar measurement files:

1. Line Chart plotting raw data curves for Temperature & Pressure vs. Elapsed Time



**2.** Line Chart plotting raw data curves for Temperature vs Elapse d Time, specifically for temperature probes




**3.** Tabular Summary examples:

Measurement Summary Table – Measurement Results

| LINK Record ID # | Sample Name | Measurement Type | Start Time | Analysis Date | Temperature (°C) (Elapsed Time (hours) >=.01) - AVG | Temperature (°C) (Elapsed Time (hours) >=1) - AVG |
|---|---|---|---|---|---|---|
| 13 | Sample B | Tc Avg | 02/22/19 08:00:00 | 0019-02-22 08:00:00 | -13313.05 | -13407.95 |
| 21 | Sample C | Chamber CM | 02/22/19 08:00:00 | 0019-02-22 08:00:00 | 0.00 | 0.00 |
| 22 | Sample C | Chamber Pirani | 02/22/19 08:00:00 | 0019-02-22 08:00:00 | 0.00 | 0.00 |
| 28 | Sample C | Shelf SP | 02/22/19 08:00:00 | 0019-02-22 08:00:00 | -11858.88 | -11910.72 |
| 29 | Sample C | Tc Avg | 02/22/19 08:00:00 | 0019-02-22 08:00:00 | -12709.34 | -12798.88 |

## LYOSTAR 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

For direct assistance, please contact Lumetics LINK™ Support:

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