QC Advances in the Pharma ICP Laboratory

Jerry Dulude, Glass Expansion,
jdulude@geicp.com

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21CFR Part 11 Compliant

- That all experimental protocols are clearly documented and identified.
- That the system has been validated to operate correctly.

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Control of Parameters in ICP-OES

Parameter	Accuracy
Wavelength:	0.001-0.002nm
Forward RF power:	1-2 watts
Gas flows:	0.01%
Detector temp:	0.1 degree Celsius
Spray chamber temp:	?????
Sample uptake:	?????

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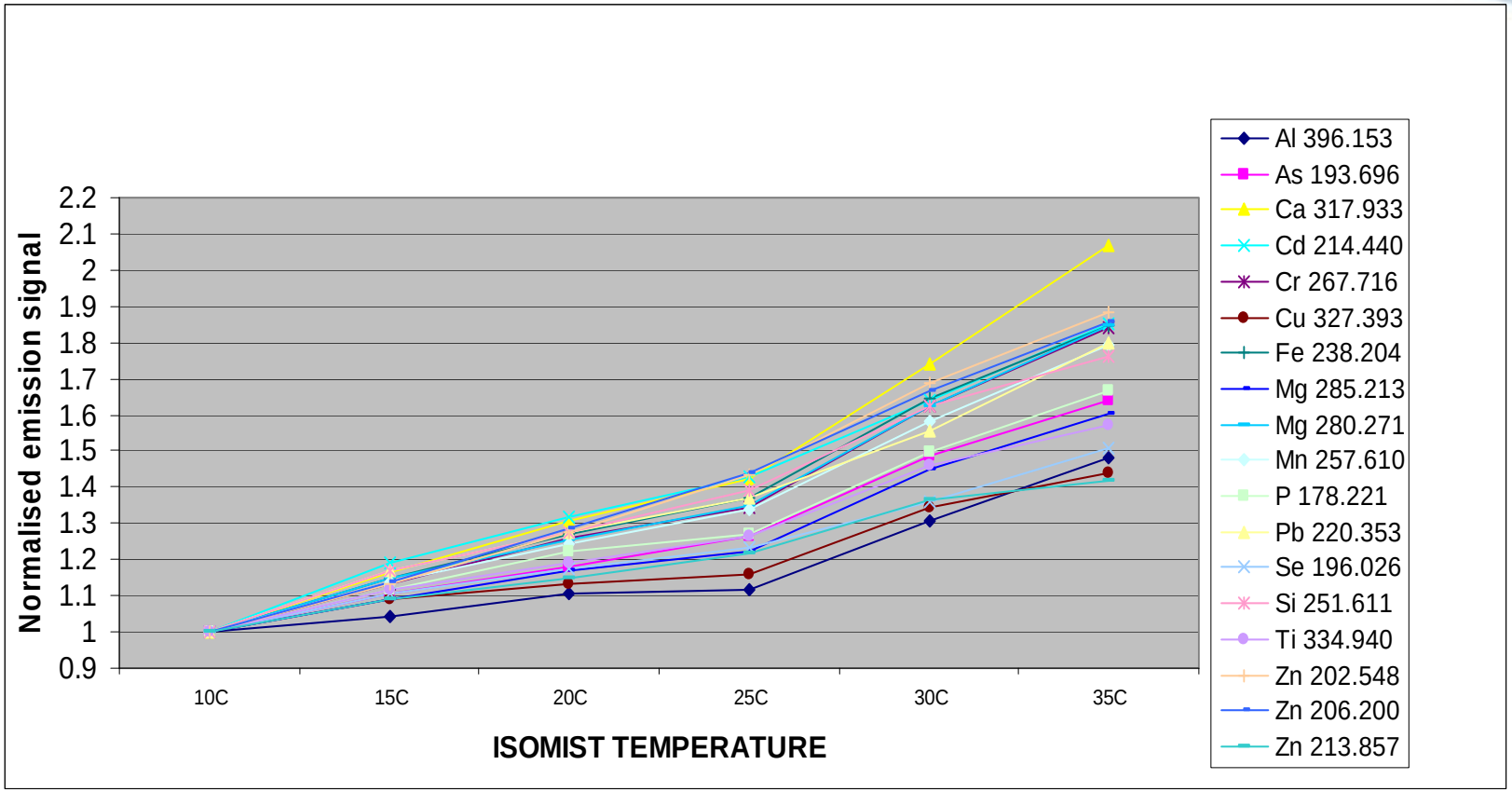
Intensity vs. Chamber Temperature

PE 2100DV (1.0ml/min uptake)



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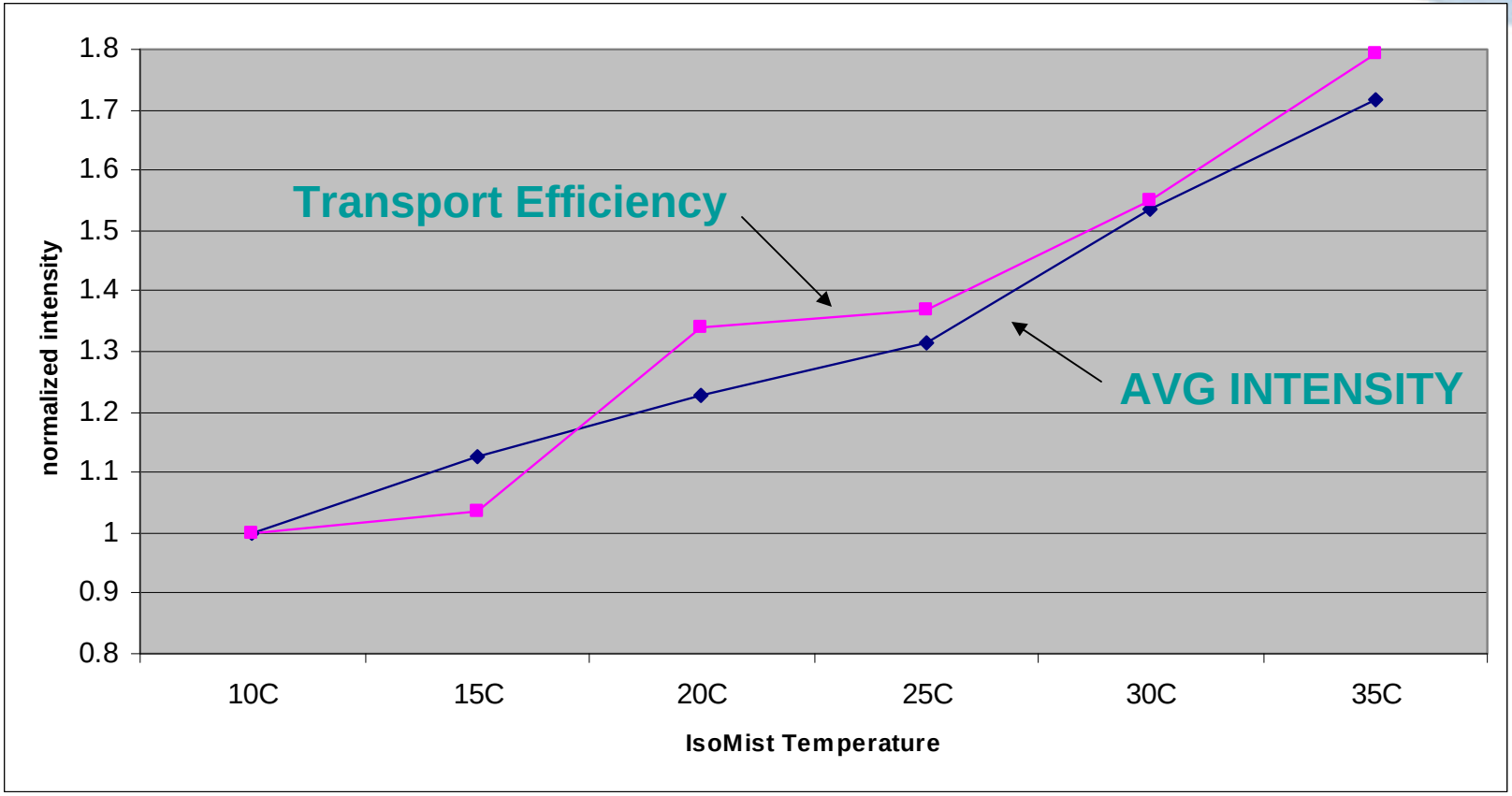
Temperature Plots on PE 2100DV



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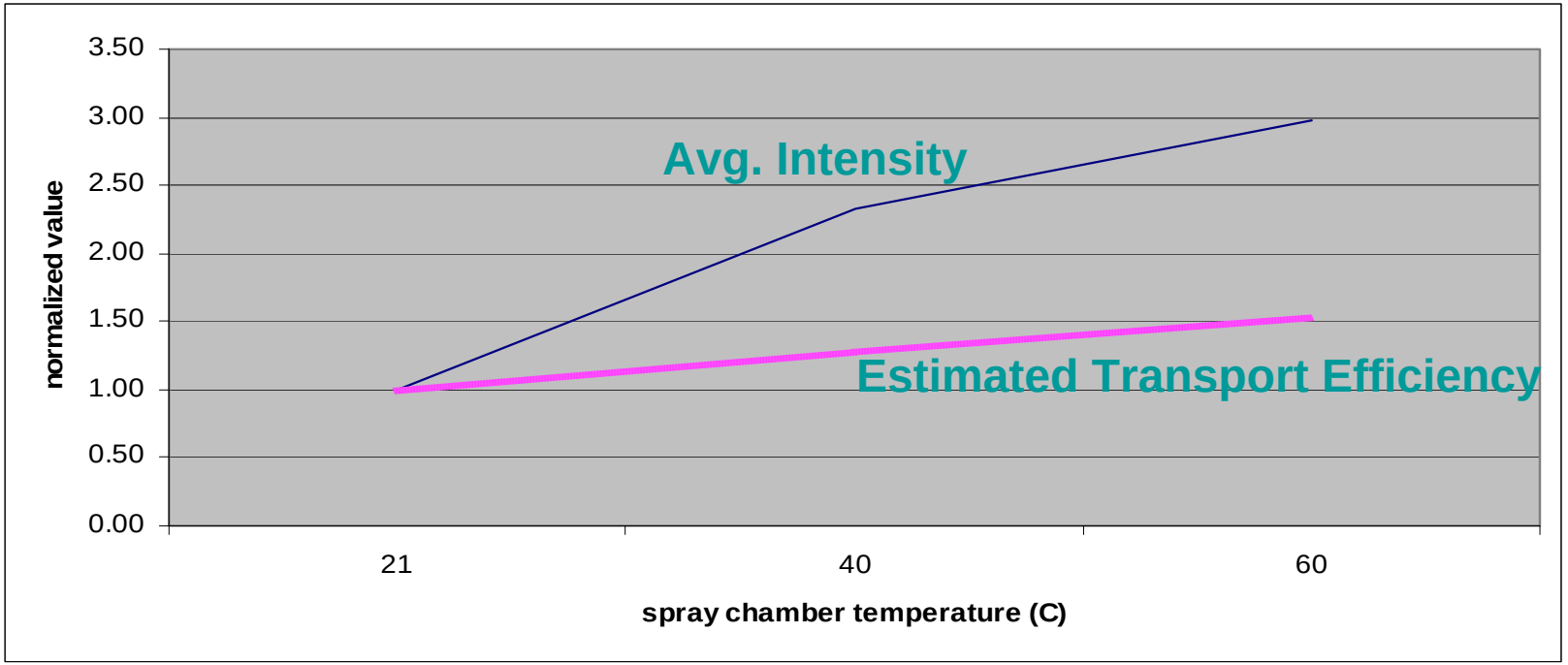
Effect of Temperature on Intensity

20ul/min uptake rate



133% increase from 21 to 40C or 7% per degree C

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IsoMist™ Programmable Temperature Spray Chamber (PTSC)

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IsoMist on Optima 2100DV

Customization
- Position of SC
- Torch interface
- Mounting bracket

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IsoMist Characteristics

- Programmable from -10 to 60C in 1 degree increments
- Maintains temperature to within 0.1 degree
- Built-in Peltier device
- No external plumbing
- Temperature measured near the chamber surface
- Permanent electronic record of temp. vs. time

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PC Screen showing IsoMist Software

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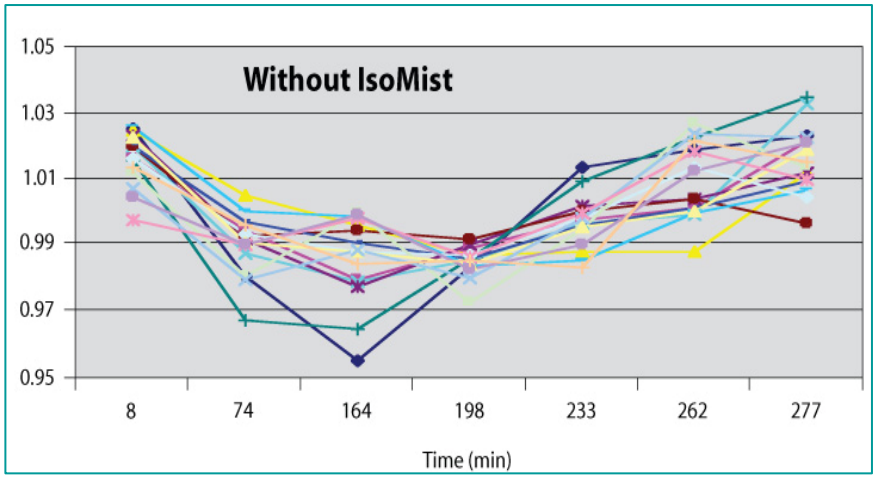
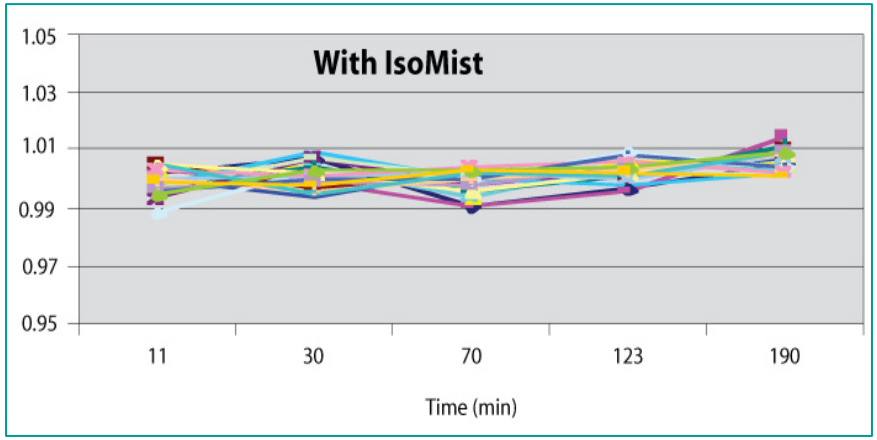
Constant temperature benefits
(1ml/min sample uptake)





- Higher accuracy
- Higher productivity
- Greater reproducibility
- Better experiments

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Current record of sample flow rate

- ID of peristaltic pump tubing used
- Speed of pump
- Make and model of ICP

Flow rate is estimated from above parameters

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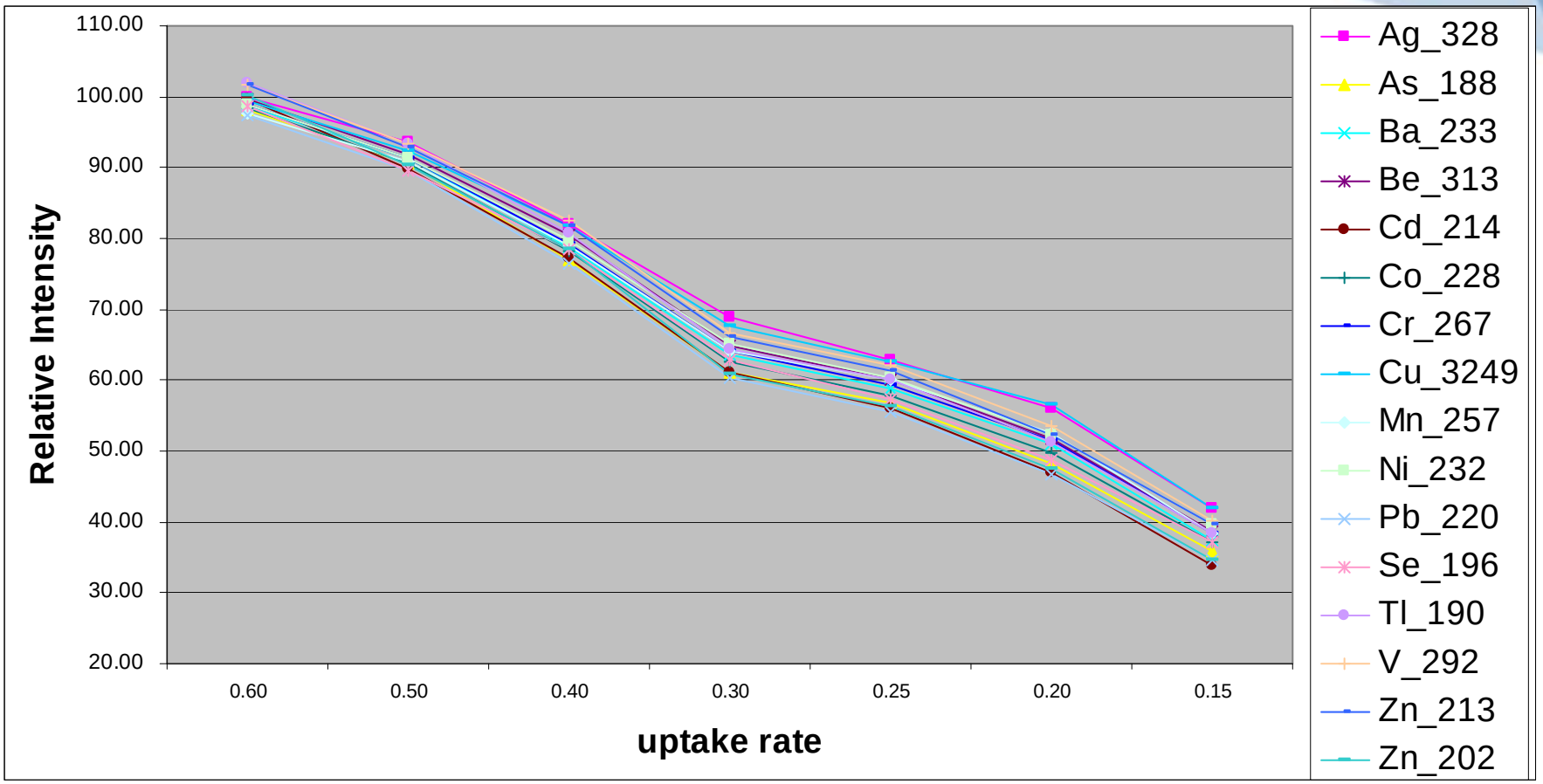
Effect of sample flow rate on signal



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What can affect Sample Uptake?

- Clogged nebulizer
- Worn pump tubing
- Kinked sample capillary
- Worn pump rollers
- Incorrect pressure of pump tubing clamp
- Faulty peri pump

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TruFlo Sample Uptake Monitor

- Adjustable damping
- Settable alarm limits
- Digital display
- Recordable graph
- Range: 0 to 4ml/min

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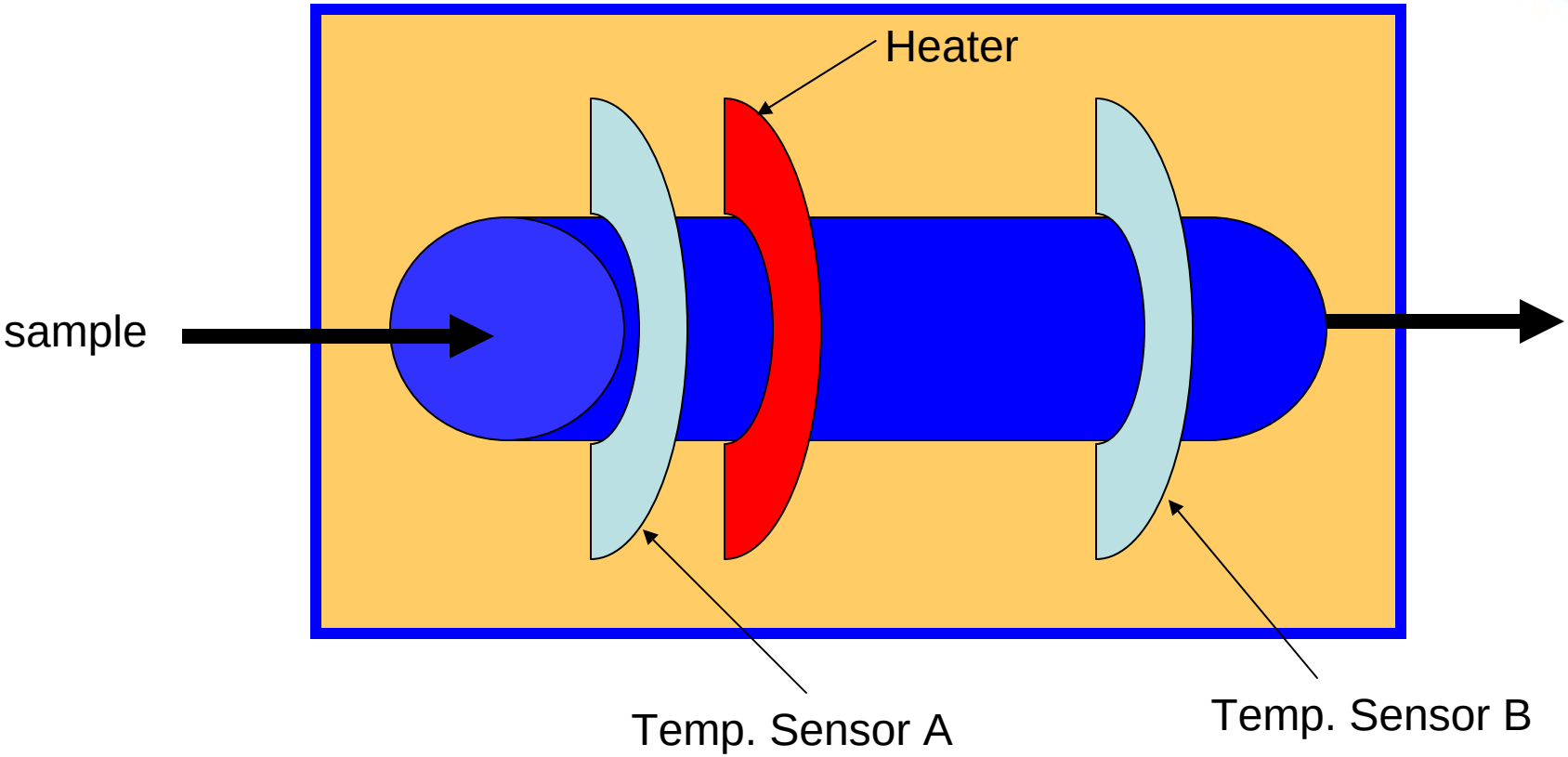
How it works

Thermal Flow Measurement



Flow Rate is related to ($Temp_A$ – $Temp_B$)

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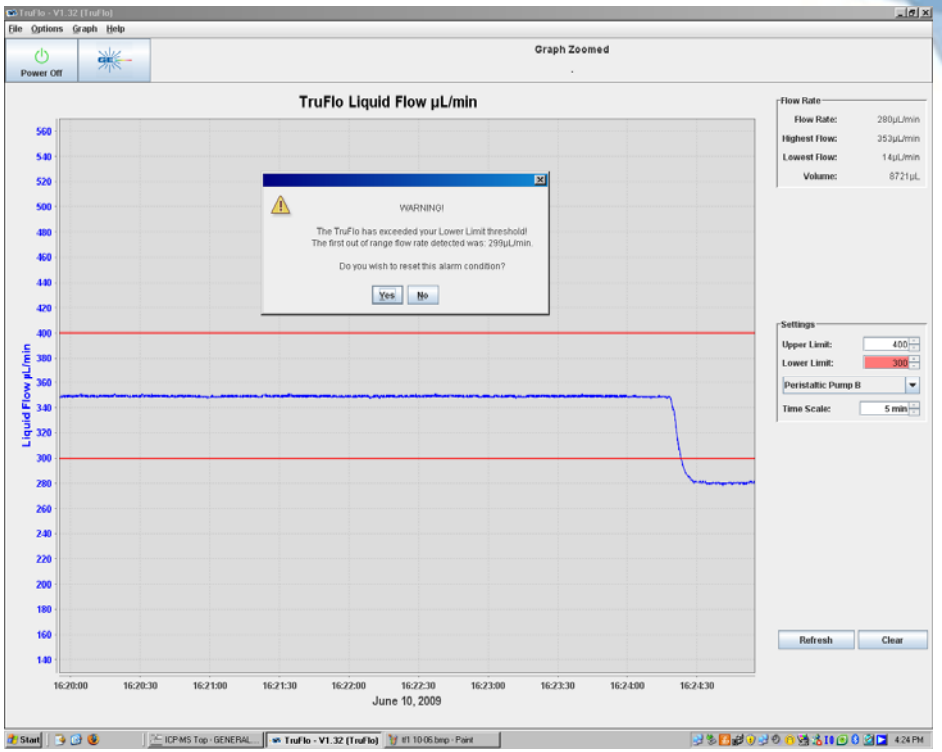
Features of TruFlo

- Adjustable damping
- Settable alarm limits
- Digital display
- Recordable graph
- Range: 0.05 to 4ml/min



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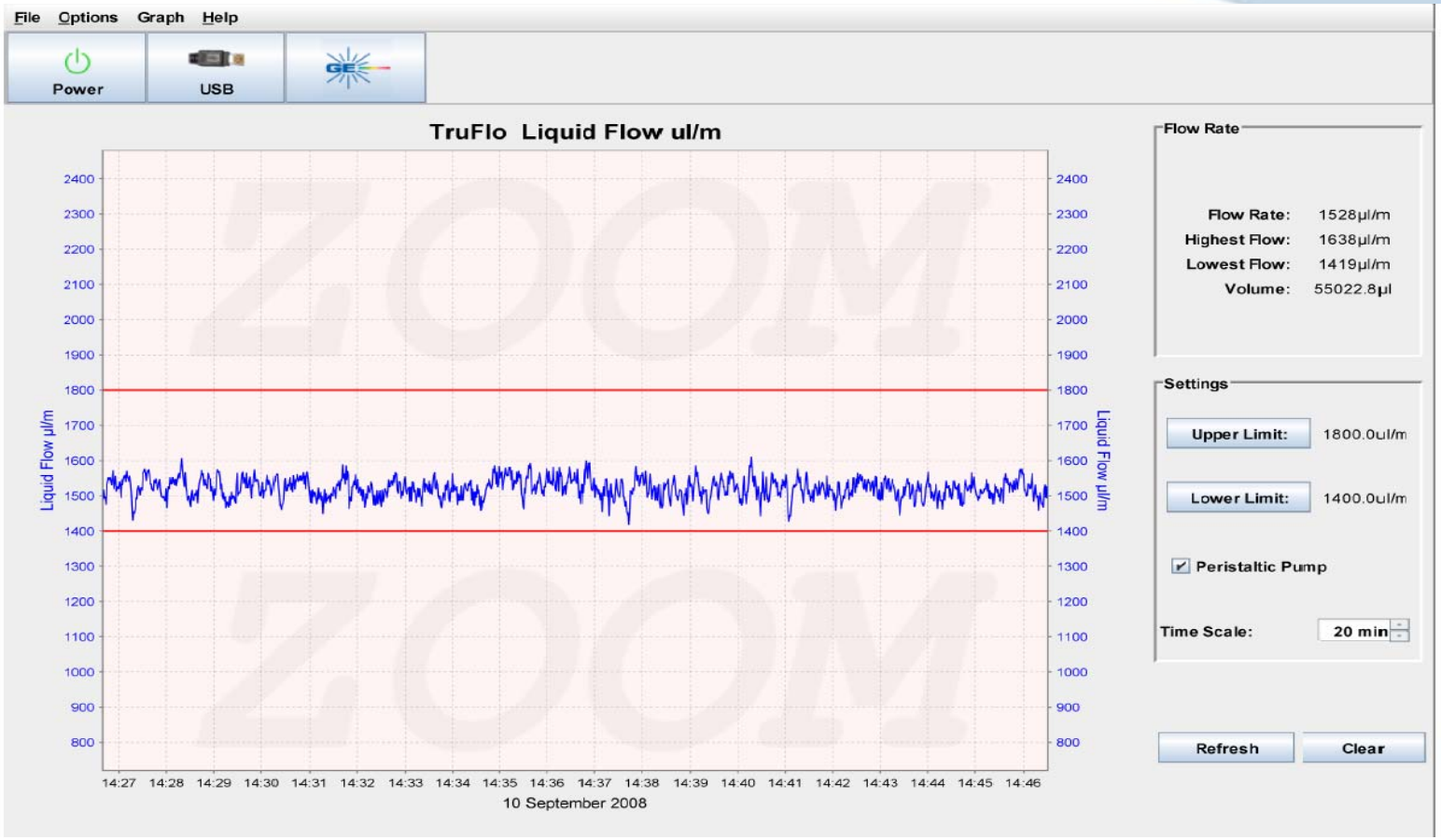
Adjustable damping



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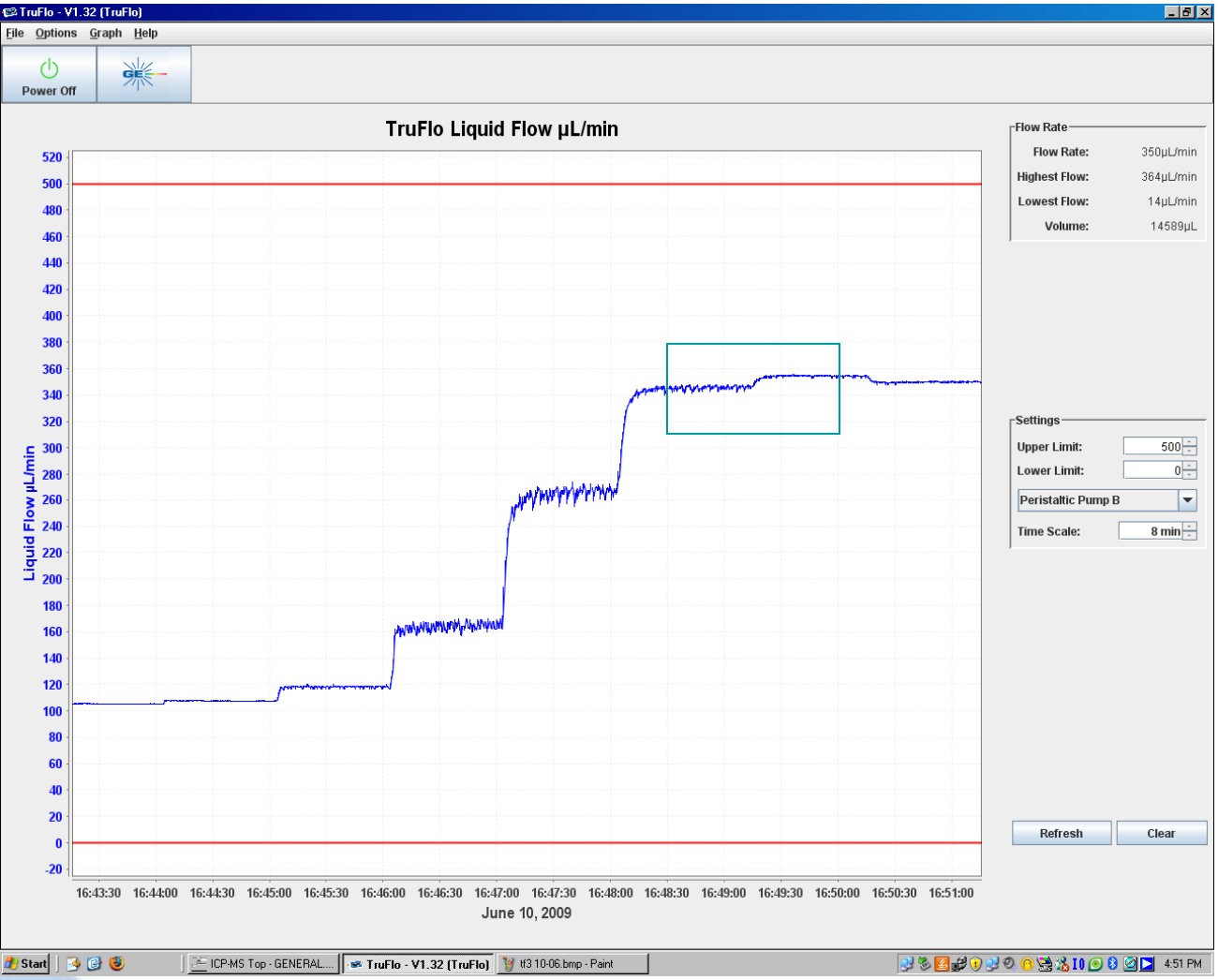
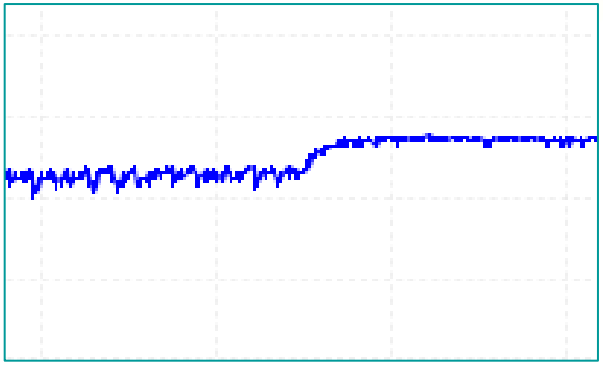
Effect of Clamp Position





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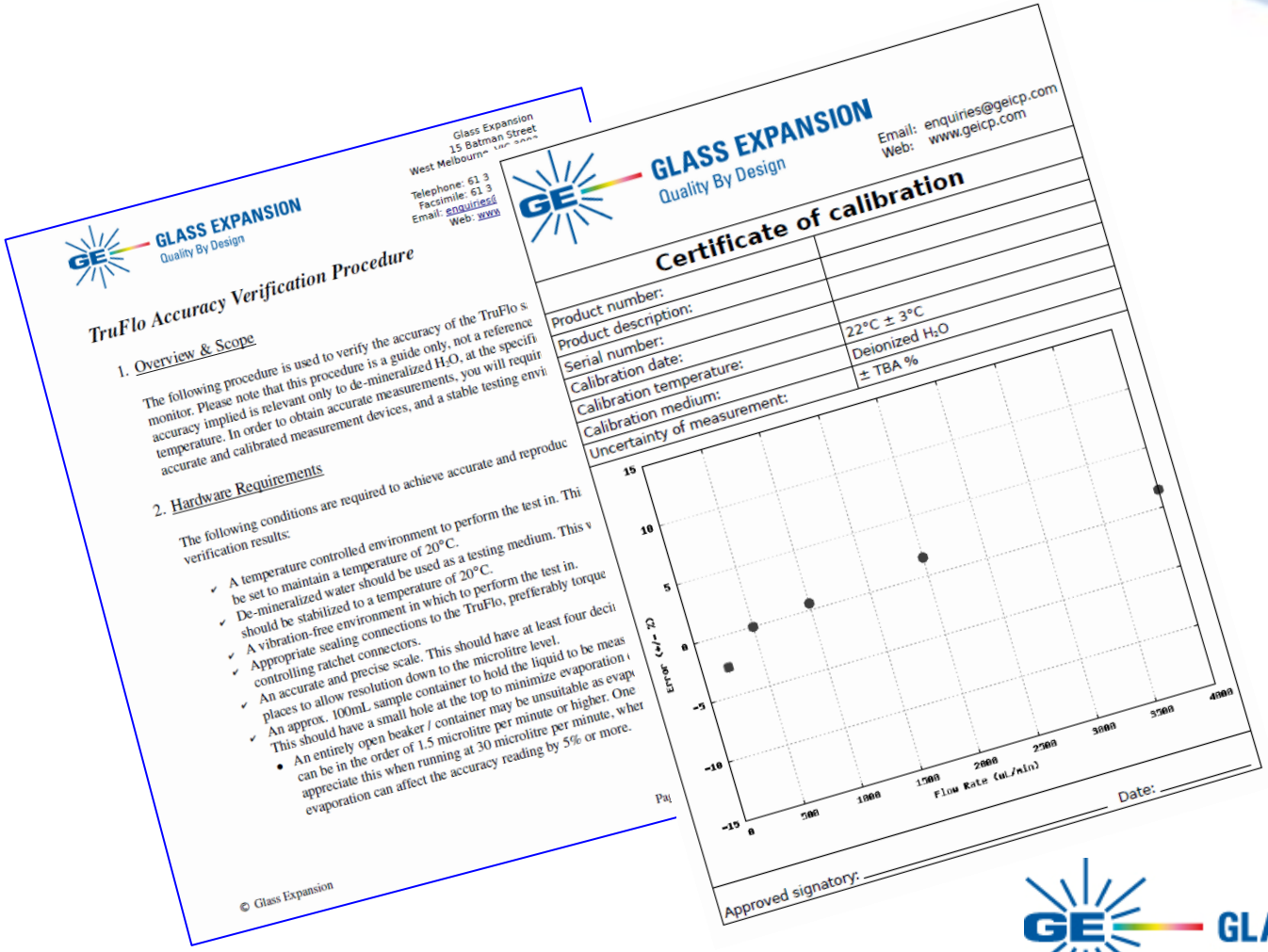
Validation for TruFlo



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TruFlo Accuracy Verification Procedure

1. Overview & Scope

The following procedure is used to verify the accuracy of the TruFlo s monitor. Please note that this procedure is a guide only, not a reference accuracy implied is relevant only to de-mineralized H_2O, at the specifi temperature. In order to obtain accurate measurements, you will requir accurate and calibrated measurement devices, and a stable testing envi

2. Hardware Requirements

The following conditions are required to achieve accurate and reproduc verification results:

- A temperature controlled environment to perform the test in. Thi be set to maintain a temperature of 20°C.
- De-mineralized water should be used as a testing medium. This v should be stabilized to a temperature of 20°C.
- A vibration-free environment in which to perform the test in.
- Appropriate sealing connections to the TruFlo, prefferably torque controlling ratchet connectors.
- An accurate and precise scale. This should have at least four deci places to allow resolution down to the microlitre level.
- An approx. 100mL sample container to hold the liquid to be meas This should have a small hole at the top to minimize evaporation
- An entirely open beaker / container may be unsuitable as evapo can be in the order of 1.5 microlitre per minute or higher. One appreciate this when running at 30 microlitre per minute, whe evaporation can affect the accuracy reading by 5% or more.

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Email: enquiries@geicp.com
Web: www.geicp.com

Certificate of calibration

Product number:	
Product description:	
Serial number:	
Calibration date:	
Calibration temperature:	22°C ± 3°C
Calibration medium:	Deionized H_2O
Uncertainty of measurement:	± TBA %

Approved signatory: _____ Date: _____

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Applications of TruFlo

- ICP-OES
- ICP-MS

Potential Applications of TruFlo

- HPLC
- UV-Vis
- FTIR
- Any technique where sample flow rate is important

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