High Volume TSP Sampler Bias Shootout in SCAQMD

2014 NAAMC, Quality Assurance
South Coast Air Quality Management District
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Background

- In 2008, U.S. EPA Adopted new Pb Rule
  - Strengthened Standard to 0.15 ug/m3
  - Report in local conditions
  - Air regulation agencies needed to deploy monitors
- Assessment of Samplers (PEP program)
  - Motors with brushes vs. Brushless motors in pump
  - Volumetric control vs. Mass flow controller
  - Inlet design and sampler placement
  - Altitude
  - Temperature
- U.S EPA / SCAQMD Collaboration to Conduct a Pb Sampler Shootout in 2012 through 2013

Pb Shootout Design

- Collocation of multiple samplers from different vendors
- Two Sites
  - High elevation – Big Bear
  - Low elevation – Compton
- Varied Seasons
- Analysis Conducted by U.S. EPA Region 9 Lab
  - FEM ICP-MS Method

USEPA REGION 9 LABORATORY
RICHMOND, CALIFORNIA

STANDARD OPERATING PROCEDURE 509
DETERMINATION OF LEAD ON FILTERS BY ICP/MS

Revision 1
Effective Date: November 15, 2011

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Periodic Review:

Signature	Title	Date

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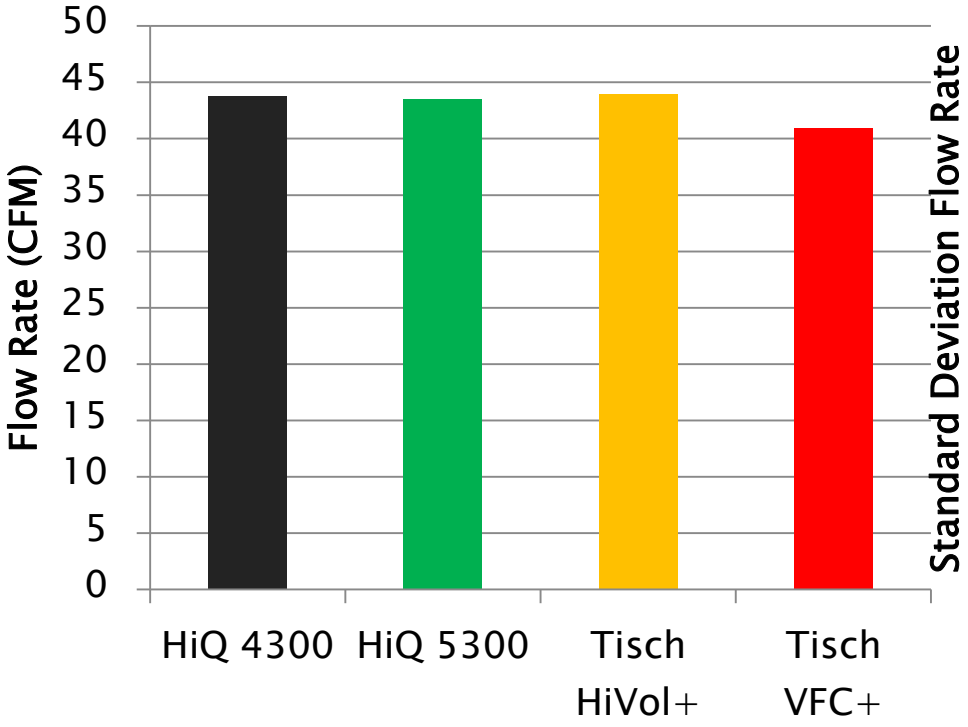
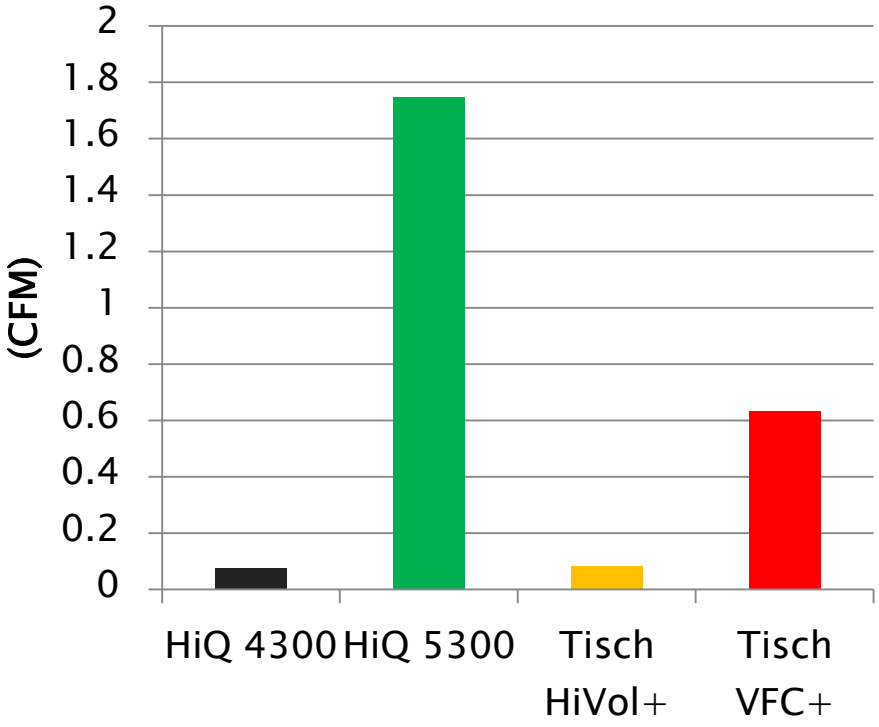
Sampling Instruments

Manufacturer	Model	Motor	Flow Type	Other Comments
HiQ	4300	Brushless	Mass Flow	Modified temperature sensor w solar shield; micro SD card
HiQ	5300	Brushless	Mass Flow	Modified temperature sensor w solar shield; micro SD card
Tisch	5170	Brushless	Mass Flow	USB or SD card
Tisch	5170 HV	Brush	Volumetric	USB or SD card

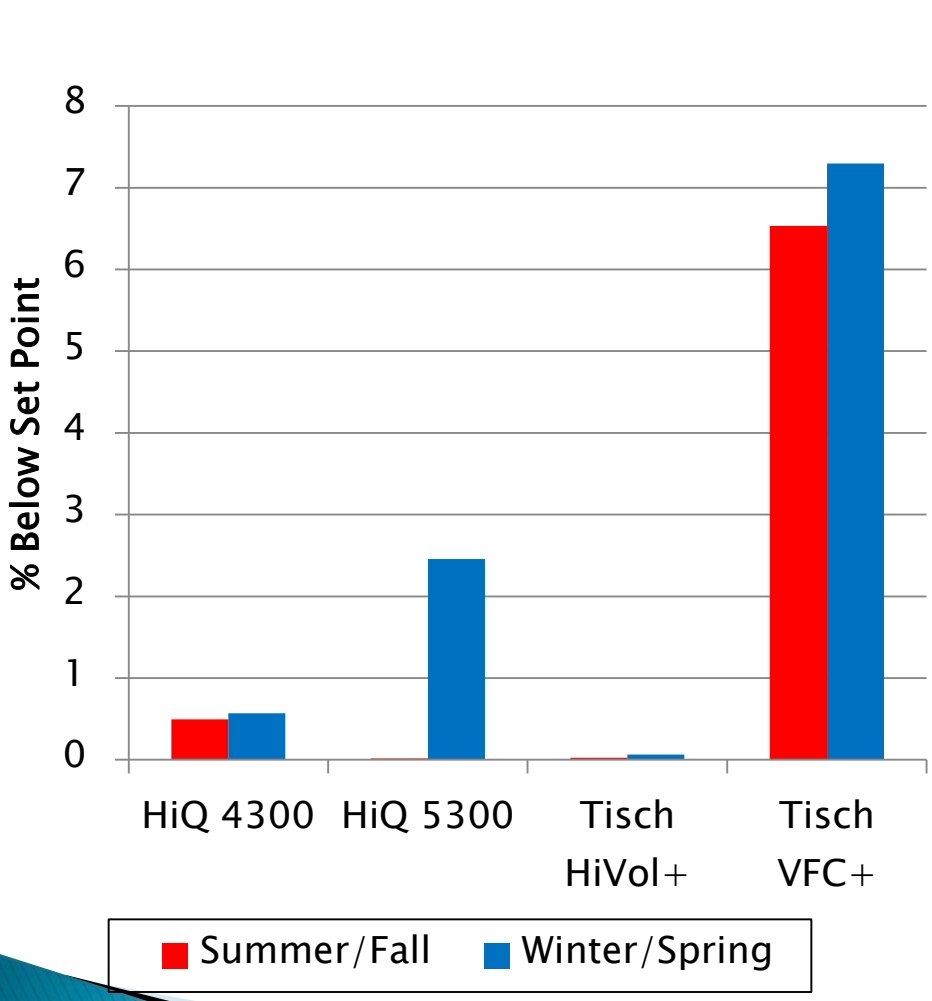
Configuration

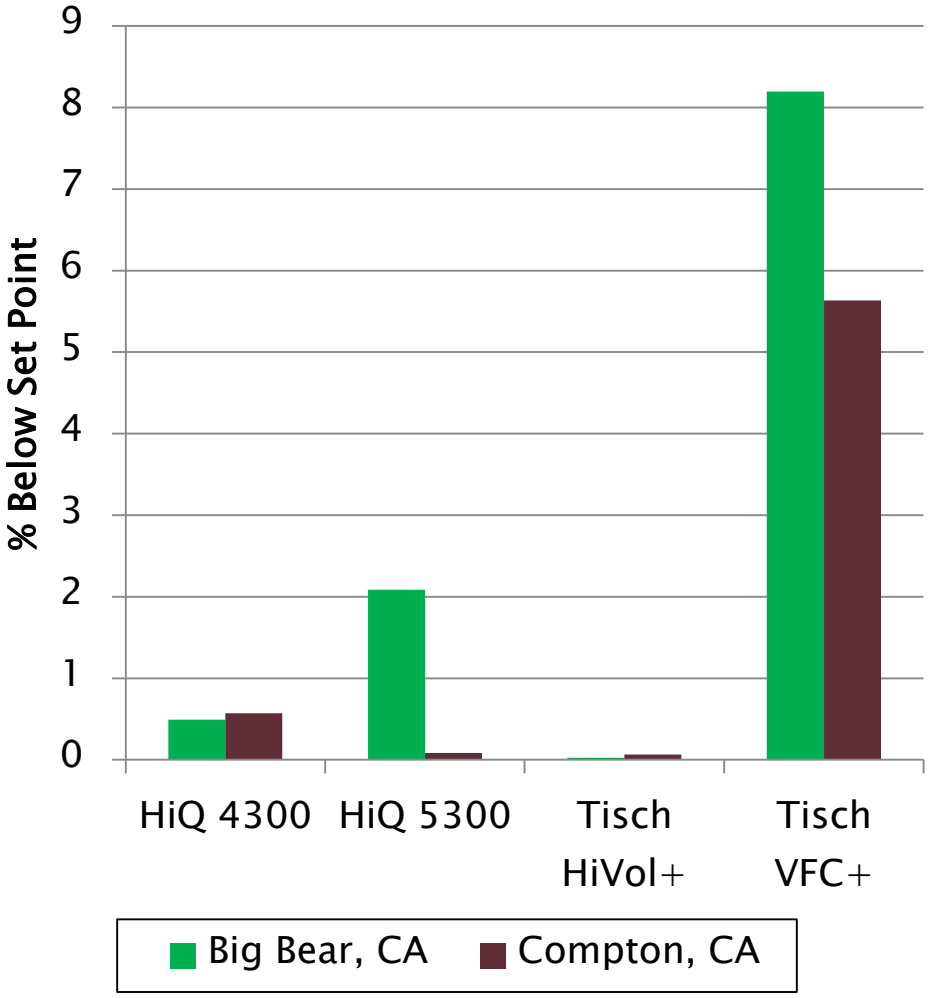
Results: Flow Precision



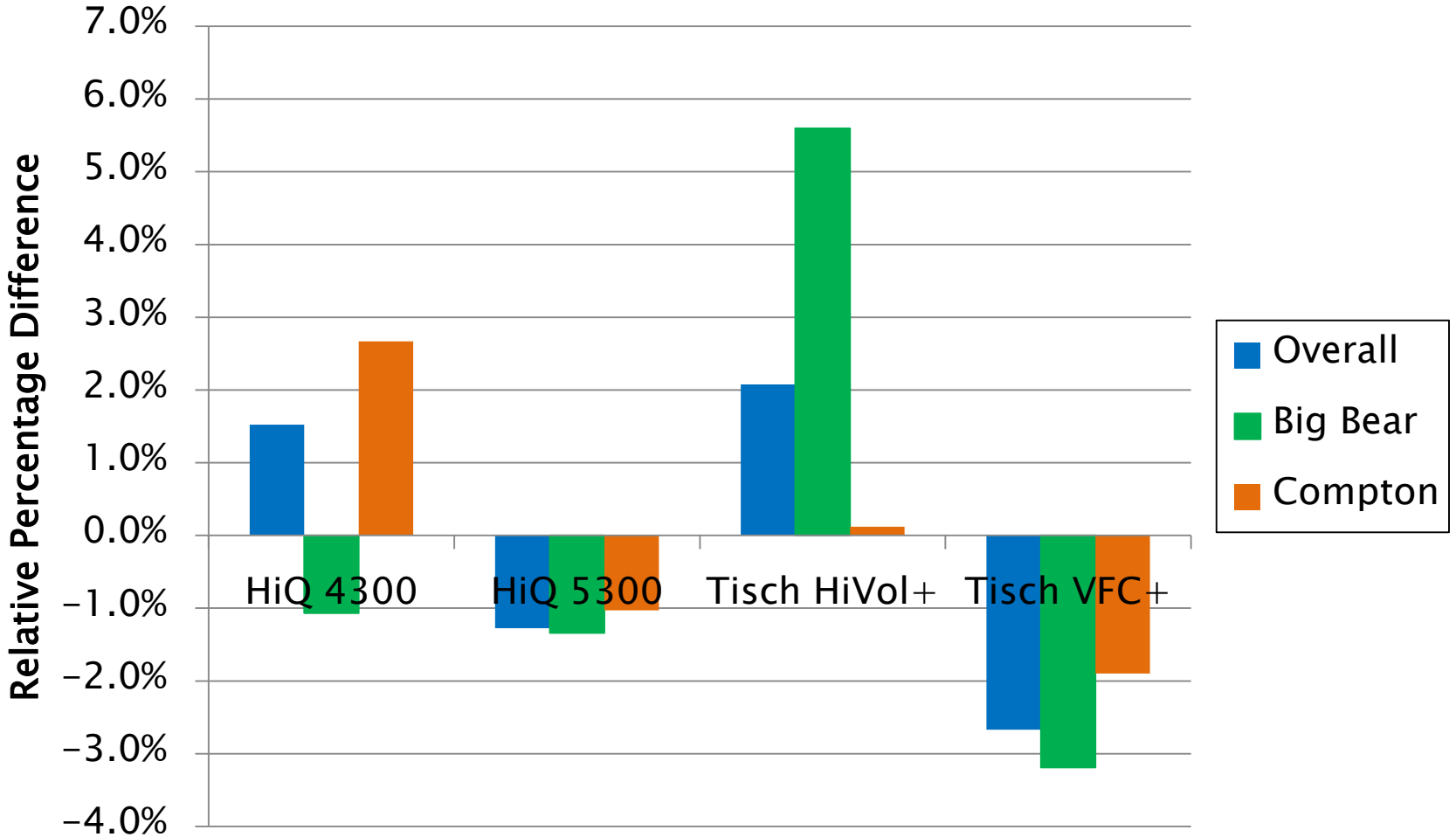


Results: Flow Rate Set Point





Results: Pb Concentration



Summary

- Altitude and season conditions tested had minimal impact on sampler performance
- Mass flow controlled units were able to sustain closer to the 44 cfm setpoint than the volumetric flow controlled units
- Orientation of the sampler had some impact relative to where the temperature probe is located relative to sampler heating from the sun
- Overall Pb results were consistent between the 4 samplers

Questions?

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