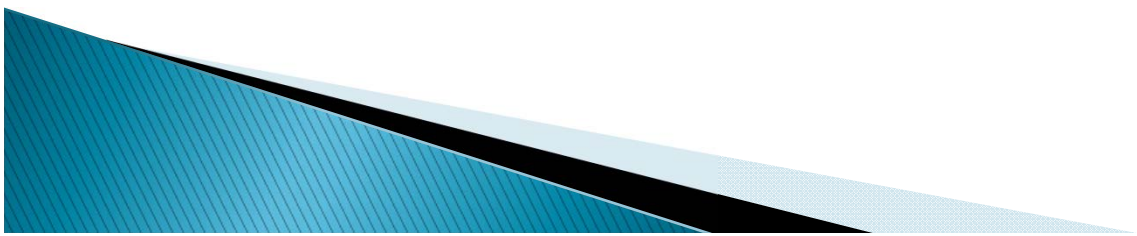
Overview of EPA-recognized Total Mercury (Hg) Test Methods

Bill Grimley — OAQPS
grimley.william@epa.gov
(919) 541-1065

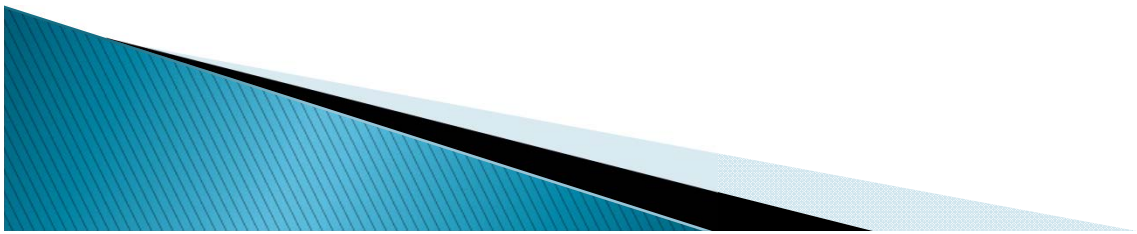
Robin Segall — OAQPS
segall.robin@epa.gov
(919) 541-0893

Jeff Ryan — ORD
ryan.jeff@epa.gov
(919) 541-1437



Topics

- EPA total Hg test methods
  - Method 101A
  - http://www.epa.gov/ttn/emc/promgate/m-101a.pdf
  - Method 29
  - http://www.epa.gov/ttn/emc/promgate/m-29.pdf
  -
- Other recognized total Hg method(s)
  - ASTM D 6784-02 Also known as Ontario Hydro Method
  - http://www.astm.org/Standards/D6784.htm
- Potentially useable method
  - Method 30B
  - http://www.epa.gov/ttn/emc/promgate/Meth30B.pdf
- Measurement considerations
  - Traversing
  - Paired trains



What is Total Hg ?

Sum of speciation fractions, defined as follows:

- Hg^P : Particulate-bound Hg
- Hg^{+2} : Oxidized forms of gaseous Hg ($HgCl_2$, HgO, $Hg(NO_3)_2$?, $HgSO_4$?)

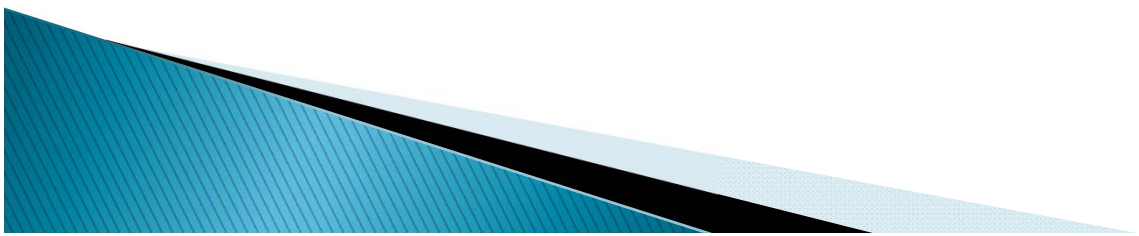
Hg^0 : Elemental gaseous Hg

- $Hg^{T\ (Total)} = Hg^P + Hg^{+2} + Hg^0$
  - Generally, what is measured by Methods 101A, 29, and ASTM D6784-02
- $Hg^{TG\ (Total\ Gaseous)} = Hg^{+2} + Hg^0$
  - Generally ,what is measured by Hg CEMS and PS-12B (sorbent trap)

Why We Want to Measure Total Hg …

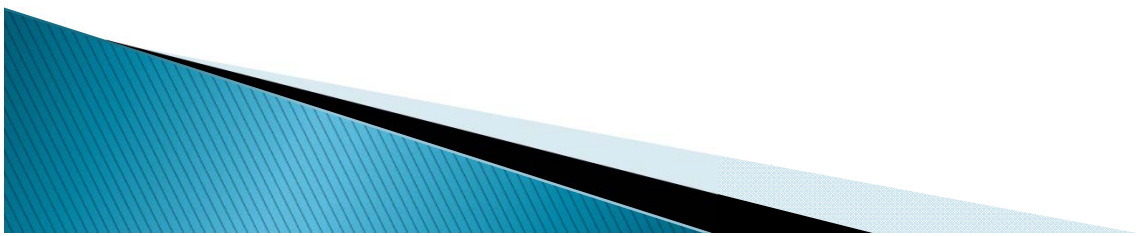
- Determine compliance with total Hg emission limits

- Also:
  - Characterize a source's emissions
  - Evaluate control technology performance
  - Process control

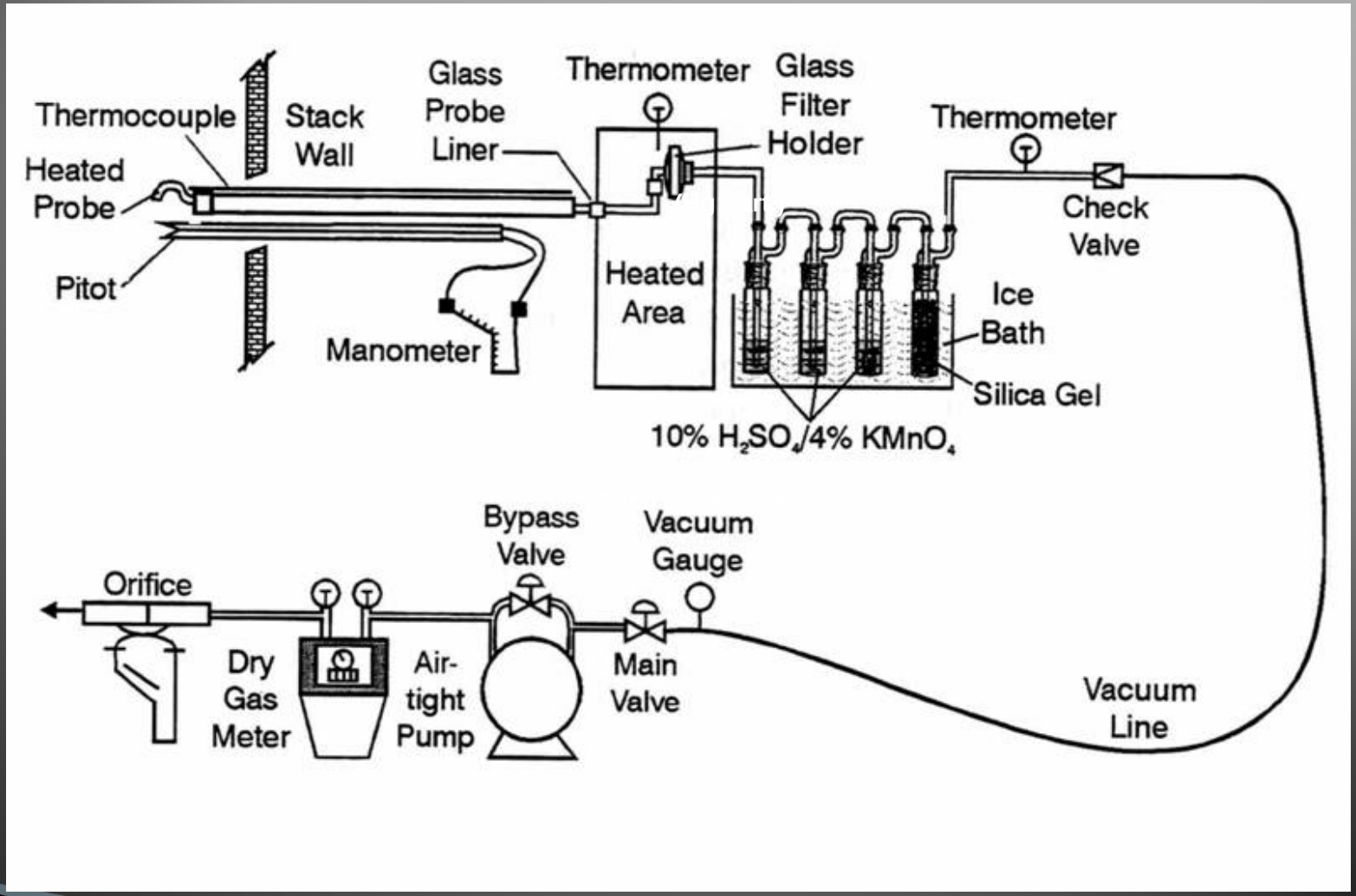


Manual Total Hg Methods …

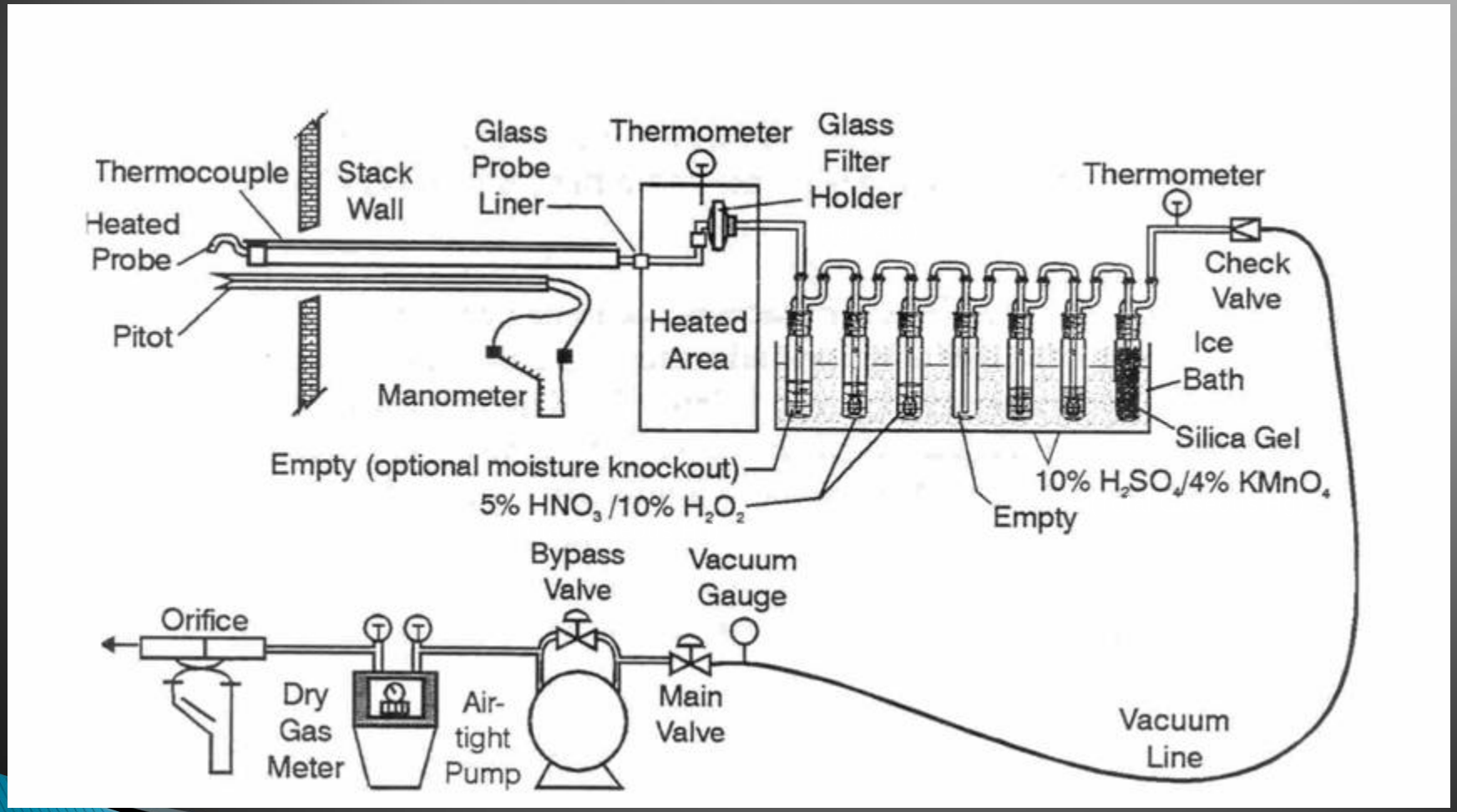
- Normally used for periodic determinations of source category emission compliance
- Typically 1-2 hour long “snap shots”
- Must be traversed
- Expensive, labor intensive, delayed results



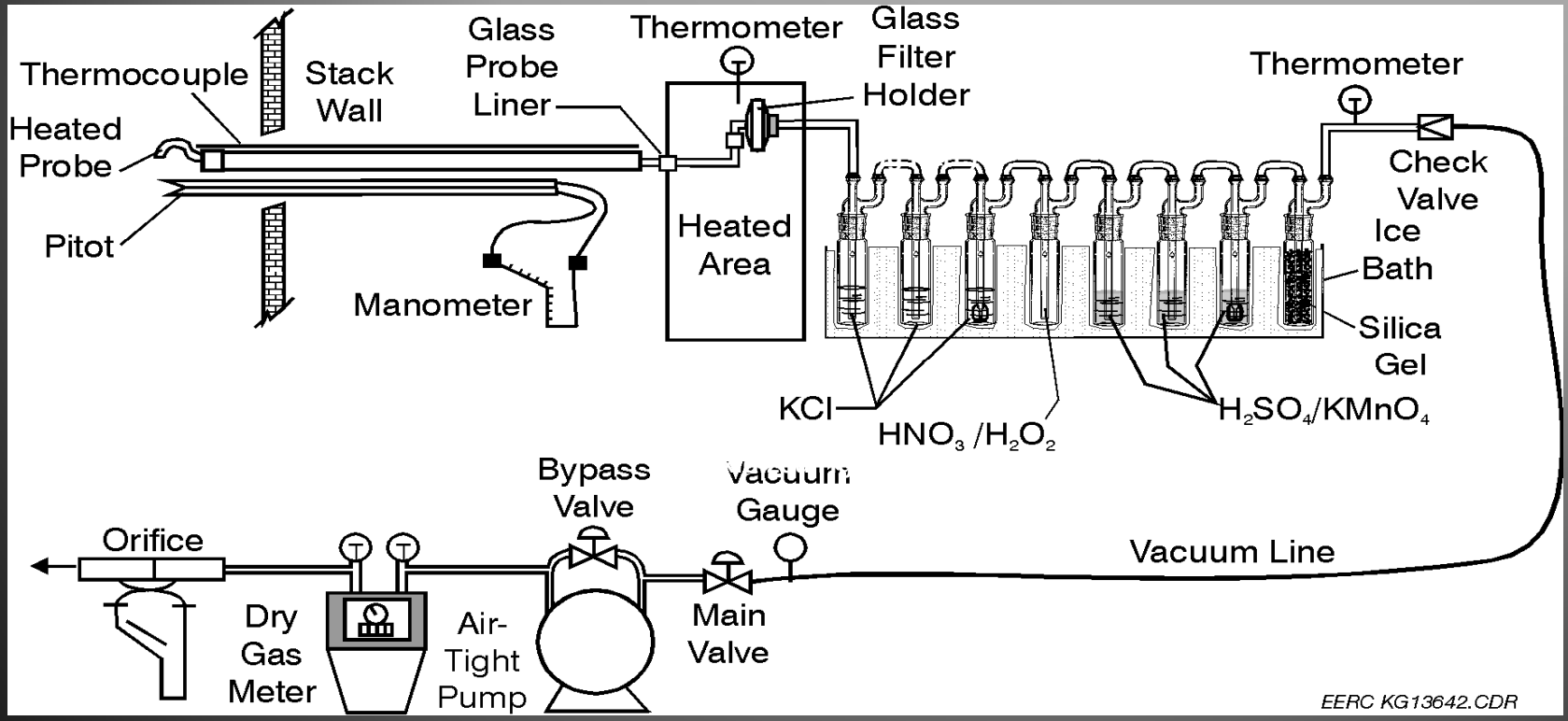
EPA Method 101A



EPA Method 29



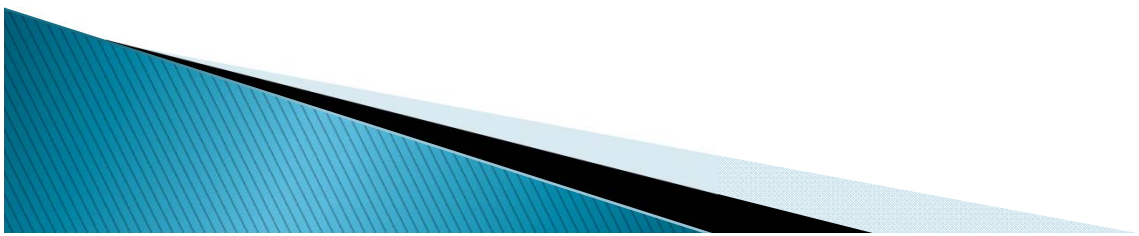
ASTM D6784-02 (Total and Speciated Hg)



ASTM D6784-02
Total Hg Speciation Method

- Has been used in previous EPA efforts (ICR) to characterize Hg emissions from US coal-fired electric utilities

- Optimum characterization requires speciated Hg measurements at Pollution Control Device (PCD) inlet and outlet locations



QA/QC Differences

EPA Method 29

- Replacements needed:
- Sections 7.5.33 and 11.1.3

  (Prep of stds; sample analysis)
- Section 9.2.3

  (QA/QC procedures)

- Optional replacements:

- 8.2.8 & 8.2.9.1
- 8.2.9.2 & 8.2.9.3
- 8.3.4
- 8.3.5

ASTM D6784-02

- Use instead:
- Sections 13.4.1.1 thru 13.4.1.3
- Section 13.4.2

---

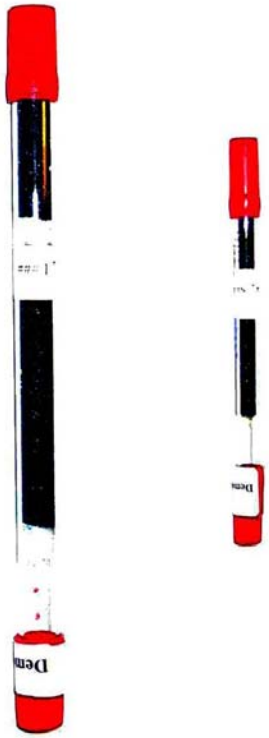
may replace with

- 13.2.9.1 thru 13.2.9.3
- 13.2.10.1 thru 13.2.10.4
- either 13.3.4 or 13.3.6
- either 13.3.5 or 13.3.6

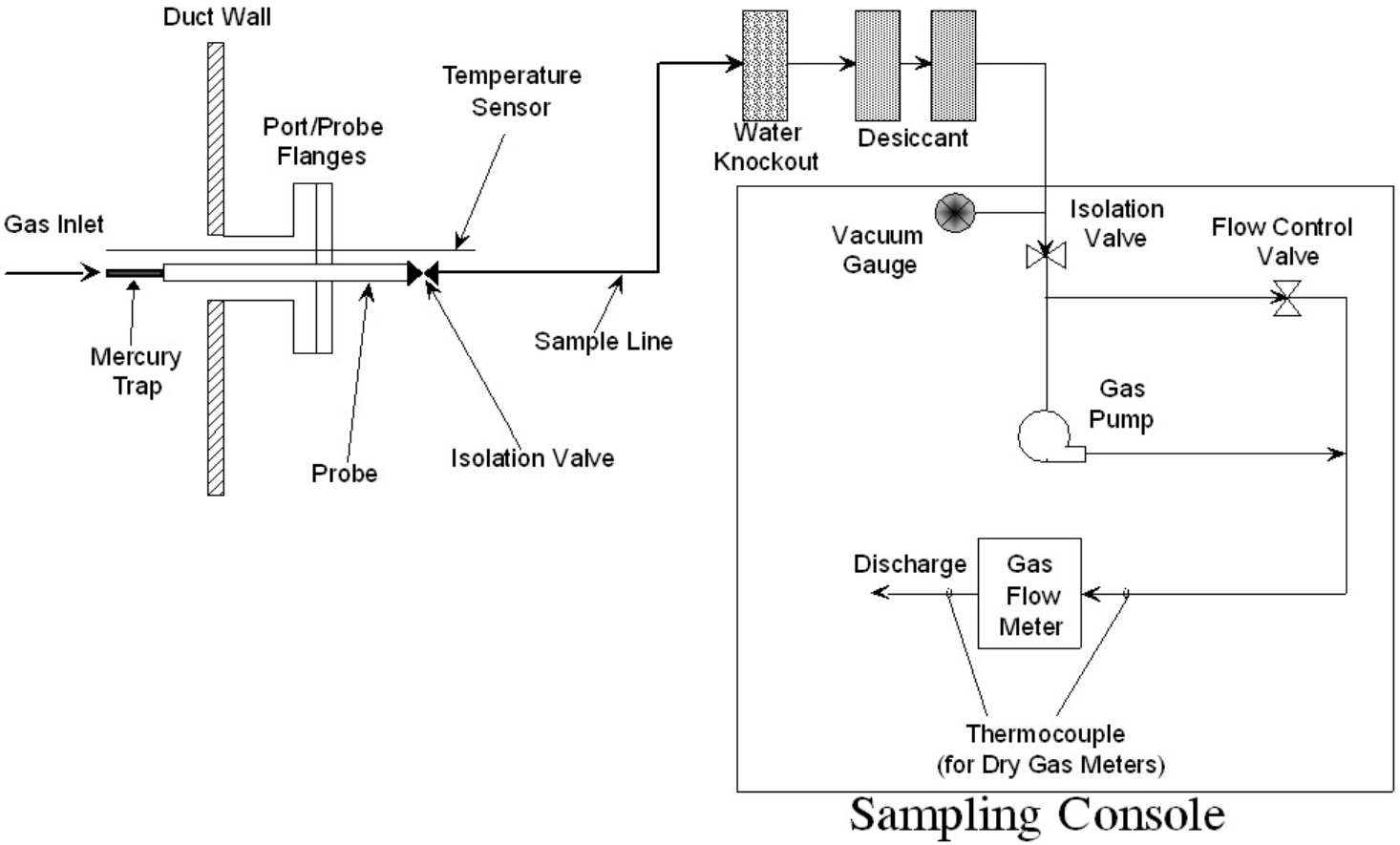
Other Sampling Techniques

- EPA Method 30B: The "Sorbent Trap Reference Method" : $Hg^{(TG)}$ +?

  Potential for non-isokinetic biases, but method might be included as regulatory option, with conditions/modifications Capable of both speciated and total gaseous Hg measurements



Sorbent Trap Sampling Train



Sample Console

Summary

- All Mercury methods:
  - Added detail (vs. Method 5)
  - Added effort (ditto)
  - Produce results of demonstrated accuracy and precision