

# The Mercury Memo

*A forum for questions, answers and discussion of CAMR related issues and developments.*

## TECHNICAL NOTES

### NIST-traceable mercury calibration standards making progress

The U.S. EPA and NIST continue their collaboration on providing NIST traceability for elemental and oxidized mercury calibration standards. Following qualification and certification tests to establish traceability, the two organizations expect to have NIST traceability protocol documents available this year in certifying CEMS and sorbent trap monitoring systems.

In May 2007, the U.S. EPA released a working draft of the elemental mercury gas generator traceability protocol. As of the same date, NIST had developed draft certification procedures for both elemental and oxidized mercury gas generators (Vendor Prime) and had invited generator vendors to begin certifying the former.

Thermo Fisher Scientific has provided NIST with four elemental calibrators and is waiting for an update on these. NIST has indicated that the calibrators would be certified in July. After the company receives three Vendor Prime units, additional units will be shipped to NIST. Up to five additional Vendor Prime units may be required depending upon how field certification is ultimately defined by the U.S. EPA.

Thermo Fisher Scientific has also provided NIST with multiple (6-8) Hg concentration points that are required to have units certified on ranges from 10 to 40  $\mu\text{m}^3$ . The company has also shipped more than 30 HgCl<sub>2</sub> generators, primarily to existing Mercury Freedom System customers. The generator shipments will accelerate in the second half of 2007, as Thermo Fisher Scientific moves forward and first field testing is completed.

### Alternative reference methods to be published in the Federal Register

In a meeting on July 10, 2007, sponsored by the Institute of Clean Air Companies, EPA outlined proposed alternative reference methods 30A and 30B as RATA tests for mercury sources. Participants in CAMR acknowledge that the OH Method is not desirable due to its complexity, wet chemistry, long waits for results, and questionable accuracy and precision at low Hg concentrations. If promulgated, Methods 30A and 30B will be a faster, simpler approach that will allow utilities to certify mercury CEMS systems in less time and at a lower cost with no compromise of accuracy.

The instrumental reference method, known as Method 30A, has been modified from its latest version by simplifying and relaxing some the requirements. The stratification testing requirement has been waived until 1/1/09 while manufacturers continue to modify the systems. Other changes include simplification of the system integrity check from a three point test to a one point test, making the interference test optional, and relaxing calibration and drift criteria.

EPA has successfully demonstrated the timeliness and efficacy of method 30B during recent demonstration tests and in conjunction with EPRI, is undertaking a comparison study of the sorbent traps with a modified EPA Method 301. Overall, the method has yielded good spike recoveries and reduced sampling time.

The methods are slated to be published in the Federal Register in late August 2007. The methods are being fast tracked as "direct-final" meaning that the methods will become final in October barring any adverse comments. Thermo Fisher Scientific is supporting its strategic partner, ADA-ES, in the development and validation of mercury sampling and analytical methods.

A publication of Thermo Scientific  
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## MERCURY FREEDOM SYSTEM FREQUENTLY ASKED QUESTIONS

### HOW LOW CAN YOU GO?

Thermo's Model 80*i* mercury analyzer reports mercury concentrations at detection levels down to 0.001  $\mu\text{g}/\text{m}^3$  (0.1 ppt) directly on a wet basis without the need for costly and troublesome flue gas moisture analyzers. At a typical system dilution ratio of 30:1, this equates to about 0.03  $\mu\text{g}/\text{m}^3$  (3.0 ppt) at the stack. A lower detectable limit of 0.006  $\mu\text{g}/\text{m}^3$  can be achieved by using nitrogen (supplied by a nitrogen generator) as diluent instead of cleaned ambient air.

### WHAT ARE THE POWER REQUIREMENTS TO THE PROBE?

No power, air, or other connections are needed at the probe end. All items are contained inside the umbilical. The entire system can run on power from 200-250 volts, and can be 120/240 or 2 legs of 3 phase power. A complete set of power requirements are listed in section 2.5 of the Hg CEMS Specification which can be accessed at [www.thermo.com/mercury](http://www.thermo.com/mercury) <<http://www.thermo.com/mercury>>.

### WHAT ARE THE EXACT POWER AND UTILITY REQUIREMENTS OF THE MERCURY FREEDOM SYSTEM COMPONENTS?

There is a 110 volt feed that comes into the rack and powers the 80*i*, 81*i*, and some components inside the 82*i* probe controller. There is also a small Ethernet Hub, air dryer, and a pump.

Typical power consumption for 120 vAC equipment is as follows:

80 <i>i</i> Mercury analyzer:	1.4 amps
82 <i>i</i> Probe controller:	1.3 amps
82 <i>i</i> Probe controller:	3.0 amps with converter and actuator on
83 <i>i</i> Probe/converter:	2.0 amps of 120 vAC
Pump:	3.5 amps

Air dryer and hub:	0.3 amps
Total 120 volt current:	11.5 amps of 120 vAC.
Air Flow Requirements:	6 cfm@90 psig (contaminant free) 12cfm with a nitrogen generator
HVAC:	Site specific
Operating temperature range for instrument rack:	From 5° to 40°C
Estimated heat dissipation:	Approximately 1,200 watts

### WHAT ARE COMMON FORMS OF COMMUNICATION & DATA ACQUISITION?

The Mercury Freedom™ System is designed for easy integration into your existing or new data acquisition, handling and reporting system and to communicate simultaneously in a wide variety of methods and protocols.

- Ethernet via TCP/IP or Modbus
- RS-232 and RS-485 via DB9 pin connectors
- Analog 0 – 10 V or user-definable voltages within range
- Analog 4 – 20 mA

### WHAT ARE TYPICAL EQUIPMENT/COMPONENT MOUNTING LOCATIONS?

- Probe mounted at stack
- $\text{HgCl}_2$  generator inside probe
- Converter inside probe
- For the Standard Rack, typically analyzers and most other components mounted inside of the rack. Primary air filters usually located on side of rack or on shelter wall.
- Sample vacuum pump typically located in base of Standard Rack. Pump, heatless air dryer and accumulator will not fit within confines of Mini Rack.
- Nitrogen generator typically mounted on side of rack or on shelter wall (for mercury concentrations of less than  $1\mu\text{g}/\text{m}^3$ ).

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