

The Tech Reporter

Technical updates from Thermo Scientific on Emissions and Process monitoring issues.

TESTING & VERIFICATION

To users of Thermo Scientific Mercury Freedom System™

Verifying 81*i* Mercury Calibrator output using paired sorbent traps

While the NIST traceability protocol is currently under review by multiple parties, the best method for verification of correct operation of a Thermo Scientific Model 81*i* Mercury Calibrator is via sorbent trap testing.

There have been several methods used in the past to connect sorbent traps to the output of the 81*i* calibrator, and some of these methods may cause variability in the readings. The research and development team here at Thermo Fisher Scientific in Franklin, MA has developed a consistent method/procedure for connecting the traps to the back of the calibrator.

Relative Accuracy Test Audits are happening every week across the country and accurate 81*i* Hg output concentrations are of great concern. Therefore, if your organization is conducting any reference method tests on a source for Hg CEM comparison, Thermo Fisher recommends collecting some sample traps directly from the 81*i* calibrator. We recommend pulling 3 sets of pairs at 30%, 60%, and 90% of scale of the range. If time and funding are of great concern, Thermo Fisher suggests a minimum of a single pair of traps at 10 micrograms/m³ concentration. This will verify the proper operation of the 81*i* calibrator. Use the following procedure to perform this operation, and good luck with your relative accuracy test audits.



Pretest:

1. Ensure the 81*i* has adequate air or nitrogen pressure delivered to the "ZERO AIR IN" bulkhead (>40 psig).
2. Ensure that the 81*i* has been powered up and has had air running through it for at least 2 hours.

Setup:

1. Disconnect "CAL GAS OUT" tube from the rear of the 81*i*.
2. Switch 81*i* to "INSTRUMENT ZERO" mode from the front panel.
3. Put 81*i* in "SERVICE MODE" via "INSTRUMENT CONTROLS" so that it does not switch to an automated mode (from Modbus or the Model 80*i* Analyzer) during the test.
4. Plumb manifold as shown in Figure 1
 - a. Ensure all manifold materials are virgin, PFA Teflon.
 - b. Ensure all connections are gas tight.
 - c. Only use fittings with integrated ferrules.
5. Connect 3/8" tubing to vent (keep 3/8" tube less than 30 feet)
6. Connect the pair of sorbent traps as shown in Figure 1 (note flow arrows on trap).

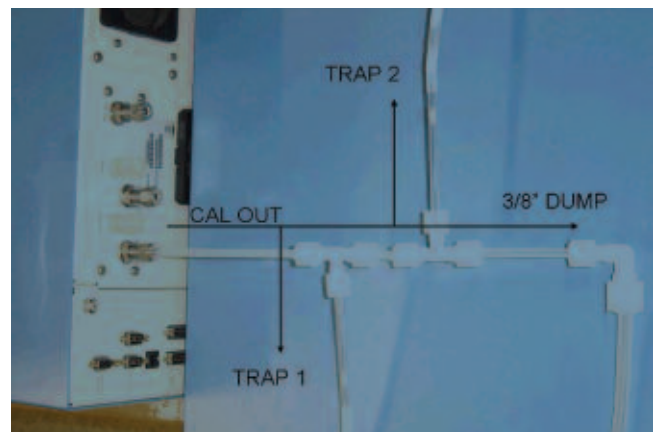


Figure 1: Connecting the traps

(Continued on page 2)

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To users of Thermo Scientific Mercury Freedom System™

Procedure for verifying 81i output using paired sorbent traps

(Continued from page 1)

Testing:

1. Switch 81i to "INSTRUMENT CAL" mode.
2. Ensure that there is flow out of the atmospheric dump.
3. Ensure that the "Hg OUT" value, as seen in Figure 2, matches the requested output within 5%.
4. Start pulling span gas through sorbent traps 5 minutes after entering "INSTRUMENT CAL" mode.
5. While in "INSTRUMENT CAL" ensure that the pressure does not exceed 950 mmHg as shown in Figure 2. Pressure can be found in the "DIAGNOSTICS" menu. If it does exceed 950 mmHg, ensure the atmospheric dump is not blocked.

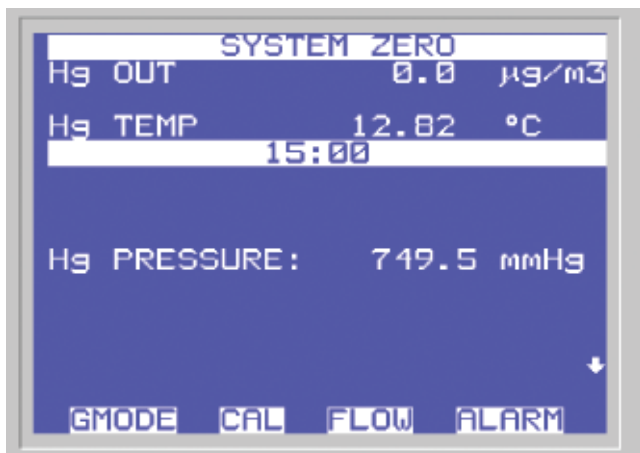


Figure 2: Pressure

Breakdown:

1. Take the 81i out of "SERVICE MODE" via "INSTRUMENT CONTROLS".
2. Disconnect the manifold and reconnect the "CAL GAS OUT" bulkhead to the line removed during set-up.
3. Switch 81i to "STANDBY".
4. Verify that the 80i and 81i are communicating.



NEWS UPDATE

Mercury Freedom System broadens market, passes performance testing

As of December 2007, more than 325 Thermo Scientific Mercury CEMS have been shipped to customers, with 85 of those systems installed and operational – not to mention the 25 systems that have successfully passed performance testing thus far.



If you have questions or concerns you would like to see addressed in future issues, e-mail abbie.henderson@thermofisher.com

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The Tech Reporter is published monthly by:
Thermo Fisher Scientific
27 Forge Parkway, Franklin, MA, USA 02038
Contact: Abbie Henderson
508-553-6855
abbie.henderson@thermofisher.com
www.thermo.com/air

Thermo
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