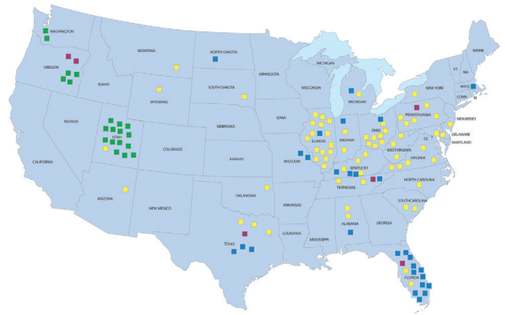
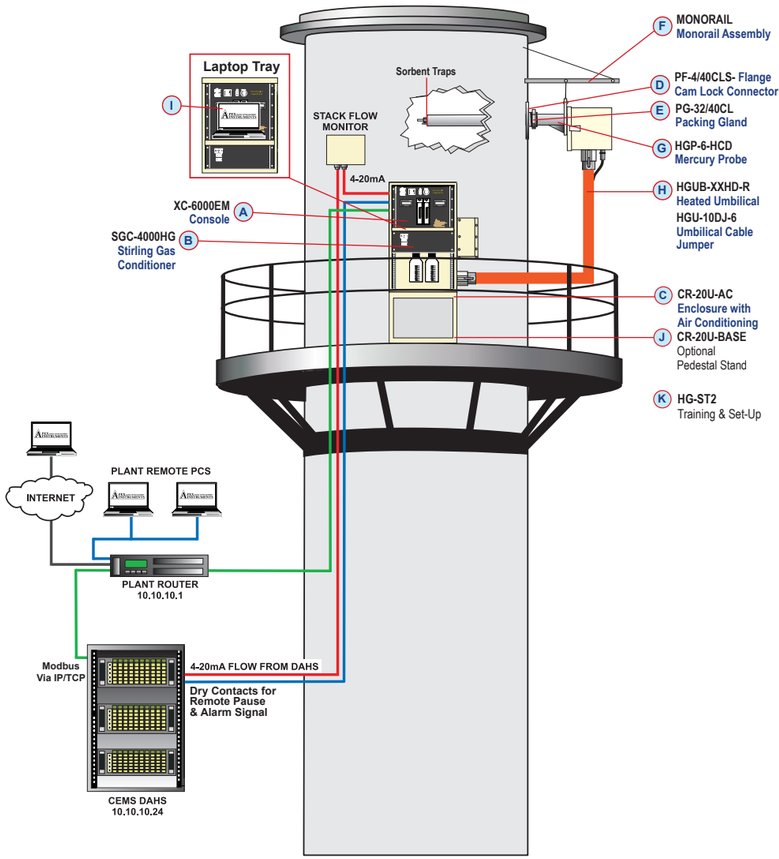
XC-6000EM MercSampler™

Installation Solutions

With over 25 years in the industry, 20 years in the sorbent trap sampling business and with over 300 sorbent trap systems currently in the market, Apex Instruments offers a range of equipment installation solutions to best suit your application.

Current Apex Sorbent Trap Monitoring System Installations





On December 16th, 2011 EPA finalized the Mercury Air Toxic Standards (MATS) Rule.

The First National Standards to reduce emissions of Mercury and other toxic pollutants from new and existing coal and oil fired power plants.

Approximately 1400 Power Plant Units will be effected by the MATS Rule.

The Date of Compliance is April 16, 2015.

Time is Running Out Will You Be Ready?

For more information on these Mercury and Air Toxics Standards go to: http://www.epa.gov/mats.

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800-882-3214 or 919-557-7300 Website: www.apexinst.com / **Contact:** info@apexinst.com

Publication: PTB-STM-12B
Date Issued: 1-21-2010
Date Revised: 6-17-2013

APEX SOURCE TESTING EQUIPMENT INSTRUMENTS

MERCURY

Compliance Monitoring Solutions for Mercury & Air Toxics Standards (MATS)

40 CFR Part 60 and 63

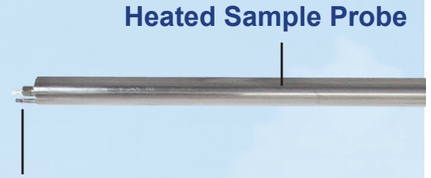
XC-6000EM MercSampler™

Sorbent Trap Monitoring System

APEX SOURCE TESTING EQUIPMENT INSTRUMENTS

XC-6000EM Automated MercSampler™ System

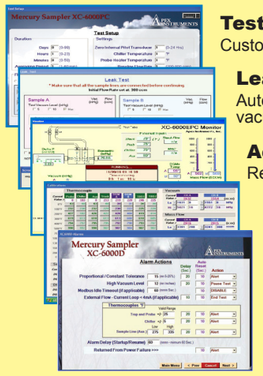
The automated XC-6000EM MercSampler™ for Sorbent Trap Monitoring Systems is designed for continuous dual sampling of vapor-phase mercury emissions from stationary combustion sources, in accordance with the U.S. EPA MATS published in 40 CFR, Part 60-63, Appendix A, Subpart UUUUU and Performance Specification 12B. (Specifications and Test Procedures for monitoring total vapor phase mercury emissions from stationary sources using a Sorbent Trap Monitoring System).



Advantages of Sorbent Trap Monitoring

- Simple to Install and Operate
- Highly Accurate
- Very Low Detection Levels <0.5 ng/m^3
- Sample Captured Directly in the Stack
- Long Term Sampling
- NIST Traceable SRM for QA/QC
- No Calibration Gas Requirements
- Traps are Non-Hazardous, Easy to Ship to Lab

MercSampler™ Software — Easy, Intuitive with Data Management



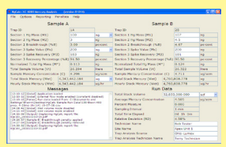
Test Profile/ Configuration Set-up
Customize test setup with the user defined profiles and configurations.

Leak Test:
Automated pre-test leak check with variable vacuum and an Automated post-test leak check.

Active Test Data:
Real-time Test Screen to see instantaneous data.

Calibration:
This application provides electronic documentation that is stored with each test run.

Alarm:
- Proportional Tolerance
- High Vacuum
- External Flow Signal Loss
- MODBUS Idle Time Out
- Thermocouple (Trap, Probe, Chiller)
- Return from Power Failure



The **HgCalc Software** uses sample run data and trap analysis. The sample run data from the MercSampler™ XC-6000 is imported into the application, where total mercury mass, hourly and total mercury emissions are calculated. The software insures the specifications in 40CFR, part 75 are met. The software will also verify QA/QC specifications regarding Section 2 breakthrough, relative deviation, and Section 3 in PS 12B.

Reliable and Easy To Use

Heated Umbilical Lines & Traps

Durable Heated Umbilical Lines for Mercury Sorbent Trap Sampling System

New improved heavy duty heated umbilicals with replaceable sample lines are designed to provide years of trouble free service.

The umbilical includes the self-regulating heater cable, flexible conduit with two replaceable ¼" PFA sample lines, pass through power and thermocouples for the probe heater and is protected by a tough high temperature silicone jacket.

The heated core is insulated with several layers of braided lightweight Pyron OPF yarn that will not burn or conduct electricity. Braided design provides extreme flexibility, strength, and protects the heater cable by minimizing movement (kinking and twisting). The ends have Cam and Groove connectors for easy installation and strain-relief.

Heated Umbilical Line Features

- Heavy Duty for Permanent or Portable Installation
- Lightweight, Self-Regulated
- Replaceable Sample Lines
- Braided Insulation Construction with High Temperature Jacket

MERCURY BRAIDED HEATED U-CORDS
Part Identification

HGUB-☐HD-R☐
Length in feet
Blank = 120V
V = 240V

PORTABLE CONFIGURATION
Part Identification

HGUBS-☐HD-R☐
Length in feet
Blank = 120V
V = 240V

Cable Specifications

Heater Cable	15 w/ft @ 50°F (10°C) (49 w/meter).
Supply Voltages:	110V - 120V or 208V - 277V.
Maintenance Temperature:	Up to 250°F (120°C). +/- 25°.
Maximum Exposure Temperature:	366°F (185°C).

Mercury Sorbent Traps

High quality sorbent traps for optimum mercury adsorption and retention. All sorbent media goes through rigorous QA/QC procedures to ensure that you receive the finest sorbent media available for your monitoring requirements. Traps can be spiked to meet your specific needs.

Long Term Mercury Traps (PS 12B)

Apex Trap Features:

- High Capacity Impregnated Carbon
- Low Mercury Background Levels
- Custom Spiking Available
- Textured, Easy Grip Caps will ensure Accurate Leak Checking
- Heavy Wall Glass Tubing
- Protective Transport Tubes
- Chain of Custody Included

Mercury Trap Legend

Type Option Spiking

MT ☐ – ☐ – ☐

B = Method 30 B
K = Appendix K
R = Appendix K RATA
Blank = No Option

H = High Temperature
A = Acid Gas
P = High Particulate
C = High Temperature & Acid Gas
S = Speciated

U = Unspiked
S = Spiked (Indicate ng Amount)

Example: MTB-H-S1000
Mercury Trap, Method 30B, High Temperature, Spiked at 1000ng

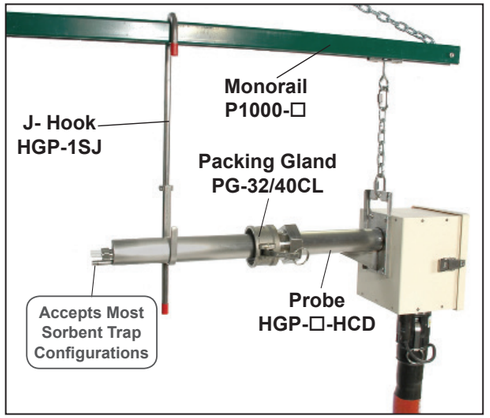
Any trap can be customized for special stack conditions. For high particulate and wet stacks, we recommend using the Apex Sorbent Trap Shield to reduce sorbent trap plugging.

APEX SOURCE TESTING EQUIPMENT INSTRUMENTS

Probes & Accessories

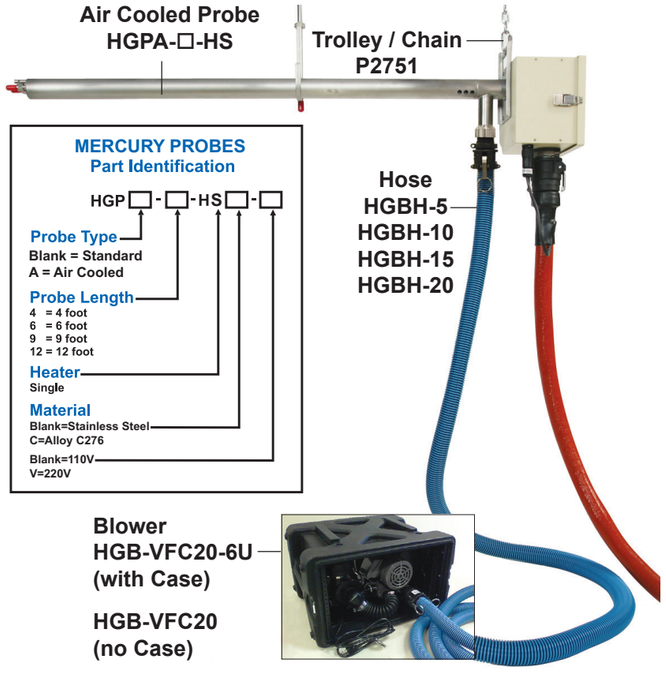
MERCURY PROBES

Apex Heated Mercury Sorbent Trap Probes are designed to accept a pair of standard 10 mm O.D. sorbent traps. The sorbent traps are placed at the probe inlet to prevent Hg transport losses during sampling. The traps are sealed in place with compression fittings using glass-filled PTFE ferrules. The probe is constructed from corrosion resistant tubing; the outer sheath is 2" O.D. and the inner lines are ½". Alloy C276 is recommended for its extreme corrosion resistant. The probe is fitted with two heaters; one to heat the traps and the second for heating the portion outside of the stack. Standard lengths are available from 4 to 12 ft. long. Longer lengths are available upon request.



MERCURY AIR COOLED PROBE & BLOWER

The Air Cooled probe is designed for speciated sampling and high temperature stacks. Probes are constructed similar to our standard probes however they accept an external source of cooling air that is directed down through the center of the probe to cool the traps. The cooling air exhaust is returned and released outside of the stack.



MERCURY PROBES
Part Identification

HGP ☐ - ☐ - HS ☐ - ☐

Probe Type
Blank = Standard
A = Air Cooled

Probe Length
4 = 4 foot
6 = 6 foot
9 = 9 foot
12 = 12 foot

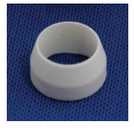
Heater
Single

Material
Blank=Stainless Steel
C=Alloy C276

Blank=110V
V=220V

MERCURY PROBE ACCESSORIES

PF-4/40CLS
PF-6/40CLS
4" - 6" Stainless Steel Flange



10M-F-TG
Glass Filled PTFE Ferrule
10mm

PG-32/40CL
2" Oversheath
Packing Gland

MERCURY SORBENT TRAP SHIELDS

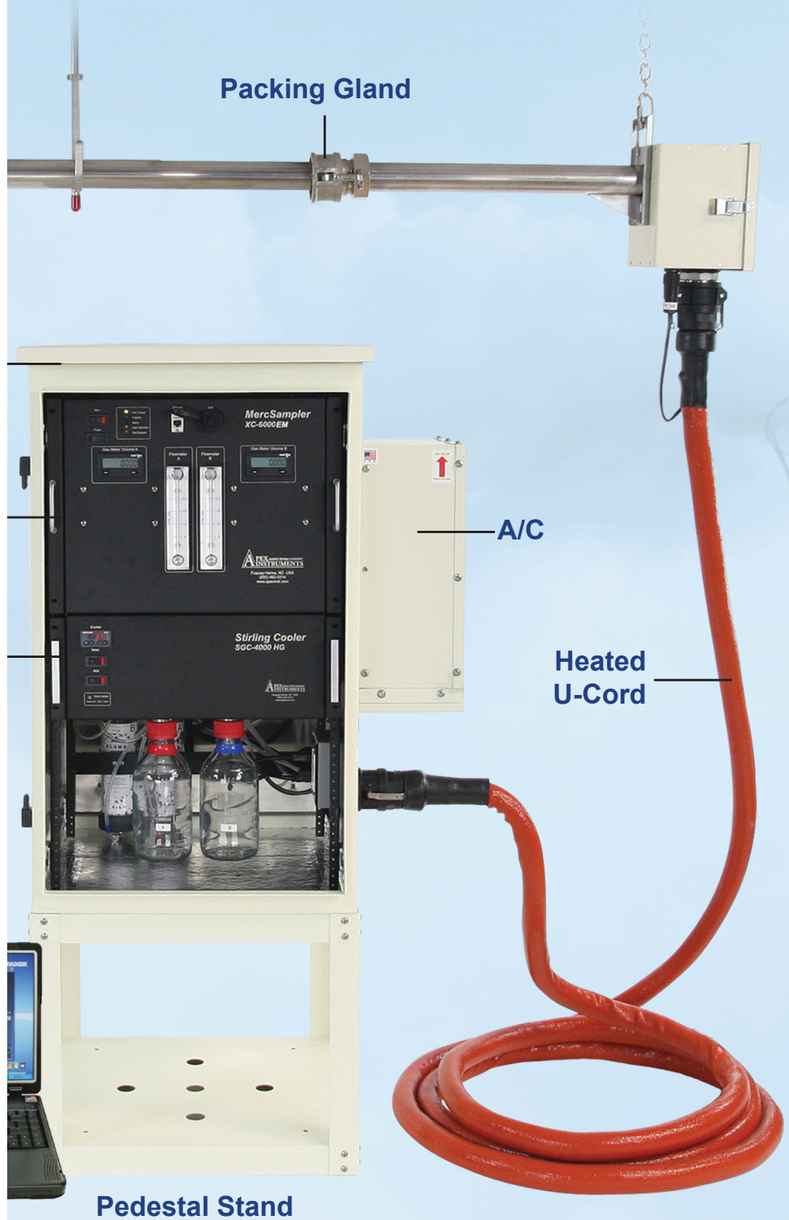
- Reduces Sorbent Trap Plugging when Used in High Particulate & High Moisture Environments.
- Easily Installed on Existing Mercury Probes.
- Simple Removal for Access to Sorbent Traps.

Mounts Easily on Apex Sorbent Trap Probe.
Choose Stainless Steel or C276 Alloy Trap Shield.

10MMNU2-S-EXT4 and 10MMNU2-S-EXT4D Stainless Steel Shields. *Requires 2 per probe.*

4.5" Long x 3/4" O.D. Diameter.

MERCURY SAMPLING SOLUTIONS - Simple, Proven Technology



XC-6000EM MercSampler™ System Features:

Console

- Fully Automated Paired Sampling
- Proportional Flow Control
- Customer Configured Alarms
- Dual Gas Meters with Optical Encoders (1cc resolution)
- External Inputs: Stack Flow, Remote Pause, Moisture Analyzer

Heated Sample Probe

- Dual-Trap Probe
- Single or Dual Tubular Heater
- Insulated Junction Box
- Stack, Trap & Probe Thermocouples
- 2" Oversheath
- C276 Alloy (Hastelloy)
- Camlock Connector to Heated Line

Gas Conditioner

SGC-4000HG(P) Stirling cooler is a robust, closed, dual-channel gas conditioning system.

- Cools Gas to Constant Dew Point
- Removes Moisture & Acid Gases
- Uses Acid Scrubbing Sorbent

Heated Umbilical/Sample Line

- Heavy Duty
- Portable, Lightweight
- Self-Regulated
- Replaceable Sample Lines
- Braided Insulation Construction with High Temperature Jacket

Cabinets

- Powder Coated Aluminum
- Easy Access Doors
- Durable Compact Design
- Optional Heating & Cooling System

XC-6000EM Console

Mercury Sorbent Trap Sampling Console

The **Apex Instruments XC-6000EM MercSampler™** simplifies most sampling requirements by automating data acquisition, sample flow adjustments, leak checks, calculations, temperature control, and calibrations. Data is easily transferred to a Microsoft Windows XP-based PC through Ethernet, USB or an optional Wireless Interface. The XC-6000EM MercSampler™ meter console captures all data necessary for paired sorbent trap sampling in accordance with PS 12B. The meter console controls the sample flow rate proportionally to the stack flow rate and determines the standardized volume extracted through each sorbent trap. To collect the samples, two diaphragm vacuum pumps which work with the proportional valves and mass flow sensors, pull the samples through sorbent traps.

Rack-mountable XC-6000EM

Specifications

Dry Gas Meters:
- Positive displacement type.
- 0.4 liter per revolution.
- Optical encoder sensor with quadrature pulse output.
- 8 digit LCD Display, 1 cc resolution.

Sample Pumps:
- BTC Diaphragm, Brushless Motor - 12 VDC, 20” Hg Vacuum, 10,000 hour MTBF, 3900 RPM, Max. PSIG 24”.

Sample Flow Control:
- Stainless steel sample manifolds fitted with mass flow sensors, vacuum sensors, and proportional valves.
- Proportional or constant flow sampling.
- Mass Air Flow: proportional flow control, 100 to 2000 ccm, port style, manifold mount.
- Proportional Valve: Voltage Sensitive Orifice (VSO), 12 VDC.

Data Acquisition Control Board (DAC):
- Enhanced Flash 16 bit RISC based microcontrollers; main and Digital Signal Processing (DS). Real time clock with auto backup and write protection to external SRAM.
- High Speed 14bit A/D convertor with parallel DSP interface.
- 1 GB SD Memory Card for data storage – stores up to 99 tests (30 day test runs). Embedded Ethernet Port with full TCP/IP Protocol and 256 bit encryption.
- USB 2.0 Comm Input connection.

Thermocouple Multiplexer:
- Accepts Type K Thermocouple inputs; input protection includes gas discharge tubes for ESD and surge protection.
- 11 Pic Microcontrollers, 1 for each channel and MUX circuitry
- MUX Circuitry to receive multiple inputs and transmit selected output.
- 10 microcontrollers, one for each optically isolated channel.

Integrated Temperature Control:
- Designed into DAC for probe/trap heat control output via 25 amp SSR.

Barometric Pressure: 600 to1100 mbar, 17.7 to 32.4”Hg, temperature compensated, amplified output.

Vacuum: 0 to 30” Hg, 0 to 101 kPa, 2% accuracy.

Communications:
- PC user interface via Ethernet, USB, or optional wireless router
- Remote access and control via onboard configurable router to owners Network Computer.
- TCP/IP MODBUS (ASCII or RTU) Communications to the DAHS.
- Interface to DAHS system via TCP/IP Modbus.

Weight: 34 lbs. (15.5 Kg).

Dimensions: HxWxD 14” x 19” x 15.5” (35.6 cm x 48.3 cm x 39.4 cm).

SGC-4000HG **STIRLING GAS COOLER**

The **Apex Instruments SGC-4000HG Stirling Gas Cooler** is specially designed for removing moisture and acid gases from flue gas samples. This gas cooler uses an industrial grade super efficient Free Piston Stirling Cooler (FPSC) for chilling the gas to a constant dew point. The module is hermetically sealed in stainless steel casing allowing for fast and easy installation and service.

Rack Mount or Portable Versions Available

Features:
- No additional tubing
- Digital temperature control
- Constant set temperature
- Integrated heater
- Free Piston Stirling Cooler (FPSC) has only two moving parts.
- Closed system, no condensate pump required.

SGC-4000HG
Rack Mount Shown with XC-6000EM

THE STIRLING ADVANTAGE

Only Two Moving Parts.

Hermetically Sealed in a Stainless Steel Casing.

Free Piston Stirling Cooler

SGC-4000HGP
Portable Version

Specifications

Digital Temperature Control:	PID +/- 1 ^{O}C, LED Display.
Cooling Capacity:	>40 watts
Dual Path Cooling Block:	Anodized Aluminum.
Condensate Bottle:	1000 ml (plastic coated glass)
Acid Scrubber Cartridges:	2 each. 500g Capacity.
Condenser:	Alloy C276, 1” OD x 4” Reverse Flow Active Zone.
Maximum Flow Rate:	2 lpm at 20% H_2O Channel.
Freeze Protection:	80w Heater.
Ambient Operating Temperature:	0 to 50^{0} C.
Power Requirements:	120V AC/2.5 amps. 220V Optional
Rack Mount Dimensions:	Without Bottles: (H) 17” x (W) 16” x (D) x7” (43.2 cm x 40.6 cm x 17.8 cm)
Rack Mount Weight:	25 lbs. (11.4 kg)
Portable Dimensions:	(H) 22” x (W) 13.5” x (D) 23.75” (55.9 cm x 34.3 cm x 60.3 cm)
Portable Weight:	32 lbs. (14.5 kgs.) without sorbent