HM-1400 TRXC HgCEMS

- Extractive principle
- Certified Hg\(^0\) Calibration Gas bottle daily cal-checks
- Detection of Hg\(^0\) by dual beam photometer
- Operation by help of keypad with text messages
- Cabinet design, easy to use, simple exchange of components easy access
- PLC control
# HM-1400 TRXC HgCEMS

<table>
<thead>
<tr>
<th>Model</th>
<th>Use</th>
<th>Description</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM-1400TRXC</td>
<td>Continuous mercury emissions monitoring for cement, power, industrial or Superfund sites</td>
<td>Direct extraction to a dry cold vapor atomic absorption and UV photometer</td>
<td>Control module interface via MODBUS, TCP/IP; minimal maintenance; EPA protocols for compliance/calibration; switchable ranges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>First HgCEMS to use certified bottled Hg(^0) Calibration Gas</td>
<td></td>
</tr>
</tbody>
</table>
HM-1400 TRXC HgCEMS

Flow Chart Diagram
HM-1400 TR
HM-1400 TRXC HgCEMS

Photometer

Top View Dual Beam Detector
**HM-1400 TRXC HgCEMS**

**Photometer**

**Dual beam UV Detector**

- **Slit screen**
- **UV Lamp** (Lifetime 6 years)
- **Gas in**
- **Reference cell**
- **Measuring cell**

**Subtraction**

Measuring – Reference cell

**Signal output**

- **PLC**

**Hg trap** (Lifetime 1 year)

**Photodiode** (Lifetime 6 years)

**Gas in**

**3.25 µg/m³**
HM-1400 TRXC HgCEMS

Universal Analyzer Hg Probe System

- 275E Extraction Probe w/
  - SN-316 Stainless Steel w/ SilcoNert® Coating < 400°F (204°C)
  - TK-T/C Only (Type K) For Remote Control
  - 4in Flange
  - Standard “Cannon Shot” Blowback
  - 3in Boot (Standard) - 2.75-2.9 (69.8mm-73.5mm) Dia. Flood Cal (Standard)
  - 115-115 VAC 50/60 Hz
  - Failsafe (Standard) HK-Integrated HPA with Type K T/C for Remote Control
  - Filter Element, Sintered Titanium, (9" Long)
HM-1400 TRXC HgCEMS

Universal Analyzer Hg Probe Tube

- Heated Probe Assembly
  - 6SX - 6 FT 316SS Heated Probe, w/ Titanium Inner Tube - (Stack Temp < 750 degF)
  - 4 Inch Flange
  - 115 - 115 VAC 50/60 Hz
  - Remotely Controlled
HM-1400 TRXC HgCEMS

Universal Analyzer
HMI/PLC Sample System Controller

• PLC Enclosure
  - Probe Temperature Control (Type-K TC Input)
  - Heated Probe Tube Temperature Control (Type-K TC Input)
  - Combustion Chamber Temperature Control (Type-K TC Input)
  - Heated Sample Line Temperature Control (Type-K TC Input) (w/ GFCI Circuit)
  - Blowback Control
    ○ Includes Associated Solid State Relays
HM-1400 TRXC HgCEMS

O’Brian Sample Line

- Pre-insulated sample tube bundle with SV47 jacket
- Heated: Quantity (1) 3/8” x 0.062” and (1) 1/4” x 0.040” wall, PFA tubes
- Unheated: Quantity (3) 1/4” x 0.040” wall, PFA tubes
- 18 watt/ft. zone style constant power density, CPD,
  - cable rated for 208 V nominal (200-216 VAC)
  - Maximum controlled temperature of 400°F/204°C
  - Type K thermocouple located 50 ft. in from the power end
  - Quantity (9) 14 gauge TFE 204C rated wires (color coded)
  - Quantity (4) 18 gauge TFE 204C rated wires (color coded)
  - Quantity (3) 18 gauge type K shielded messengers

- Ambient Conditions
  - LOW Ambient Temp with 25 MPH (40 kph) wind: . . . -20° F
  - HIGH Ambient Temp with 10 MPH (16 kph) wind: . . . 104° F
  - Process Temperature at LOW ambient: . . . . . . . . 388° F
  - Process Temperature at HIGH ambient: . . . . . . . . 597° F
  - Operating Voltage: . . . . . . . . . . . . . . . . . . . . . . . . .208 VAC
  - Max Inlet Temperature: . . . . . . . . . . . . . . . . . . . . . . . 400° F
  - Max Current Draw: . . . . . . . . . . . . . . . . . . . . . . . . 139'/15 Amps
HM-1400 TRXC HgCEMS

Universal Analyzer 500 Series Gas Cooler

- Two (2) 5” heat exchangers
  - Glass
- One or two gas streams
- Flow rates from 1 – 5 l/m STP
- Digital display
- Adjustable temperature set point
- Stable dew point
- On-board electronics for liquid sensor
AirGas Specialty Gas Division

**Cylinders:**

- Gases are independent and certified separately by NIST traceable Thermo 80i. The concentration of a gas stays relatively constant.
- Handling the cylinders is the same as handling other low concentration, reactive EPA protocols (i.e. NO, NO$_2$, SO$_2$, H$_2$S, CO) are now.
- The gas cylinders are easy to transport from site to site. More tests can be performed in a day.
- More cost effective
# HM-1400 TRXC HgCEMS

## AirGas Specialty Gas Division

### Certificate of Analysis

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Required Concentration</th>
<th>Actual Concentration</th>
<th>Analytical Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERCURY</td>
<td>3.000 micrograms per cubic</td>
<td>2.960 micrograms</td>
<td>4.4%</td>
</tr>
<tr>
<td>NITROGEN</td>
<td></td>
<td>Endorse</td>
<td></td>
</tr>
</tbody>
</table>

Verbal: Management Traceability is declared, versus a Thermo-Fisher Mercury generator certified at NIST as a vendor prime, subject to NIST report 033-D-2005-485.

Approved for Release.

The analytical uncertainty takes into account the traceability to the Thermo 811 Mercury generator certified as a vendor prime.

This cylinder was analyzed using a vendor certified mercury gas regulator.

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AirGas Specialty Gas Division

Elemental Mercury Gas Specifications

- Concentrations range from 0.2ug/ml\(^3\) to 60ug/ml\(^3\)
- Balance Nitrogen
- Pressure (depending on cylinder size)
  - 300A’s = 2000 PSIG (5500 Usable Liters)
  - 150A’s = 1800 PSIG (3600 Usable Liters)
- Traceable to NIST certified cylinder mixtures
- Analytical Accuracy ±5% (currently)
AirGas Specialty Gas Division

- AirGas developed a standardized regulator and valve treatment.
  - AirGas has perfected a new coated regulator that has eliminated the initial value “creep”
    - Previous systems had approximately an hour of “creep” time initially

Medical grade regulator
**AirGas Specialty Gas Division**

**Zero Gas Fastloop Module**

- **12/24VDC power input**
- **12/24VDC contact input**
- **Low Pressure Alarm output**

**Process:**
1. Timer #2 energized and opens
2. Timer #1 energized and delays 5 seconds and then opens "vent"
3. Timer #1 delays 15 seconds and switches from "vent" to "system"
4. Contact input de-energizes
5. Controller holds Timer #2 open for 30 seconds
6. Controller holds Timer #1 open for 25 seconds and switches solenoid from "system" to "vent"
7. Controller maintains 'no power to solenoids' mode

**Double Block & Bleed Feedback Prevention System**