

Xact® 625i Ambient Multi-Metals Monitoring System



ADAPT Screenshots

Ambient/Fence-Line Multi-Metals Monitor

Description

Cooper Environmental's Xact® 625i is designed for high time resolution multi-metals monitoring of ambient air, with detection limits that rival those of laboratory analysis. The Xact® 625i comes standard with a solid-state meteorological sensor and Cooper Environmental's proprietary ADAPT analysis package, making the instrument one of the most powerful air pollution source detection offerings in the industry.

The system uses reel-to-reel filter tape sampling and nondestructive energy dispersive X-ray fluorescence (EDXRF) analysis. The air is sampled through a low volume (16.7 l/min) particulate matter (PM) size-selective inlet and drawn through a filter tape. The resulting PM deposit is then advanced into the analysis area where the sample is analyzed by EDXRF for selected metals while the next sample is collected.

Standard Features

- ADAPT data analysis software that enables immediate research quality graphical reports to deliver unique insight on the temporal and variability trends of the metals measured
- Sampling and analysis methodology that has been validated by the US EPA ETV program
- Windows-based operating system with 10.1 inch touchscreen that may be ordered flat (shown) or tilted for lower placed instruments
- Sampling, analysis, and near real-time reporting (every 5, 15, 30, 60, 120, 180, or 240 minutes in ng/m³)
- Automatic quality assurance, alarms, & control features
- Incorporates an internal XRF quality assurance standard with every sample analyzed
- Provides automatic, daily XRF calibration drift checks
- Remote polling and remote system control
- Global power design does not require power conversion or conditioning
- Average detection limits improved by over 30% compared to previous generation Xact® 625

Benefits

- Adaptable to both stationary and mobile monitoring platforms
- Effective for fugitive emissions measurement
- Can be used to establish baseline levels for health-based standards
- Capable of identifying hazardous “hot spots” around the perimeter of a facility
- Enables effective source apportionment and chemical mass balance comparisons
- Highly sensitive and reliable (low pg/m³ to µg/m³ range)
- Nondestructive analysis allows for sample archiving
- Aids source identification by correlating metals concentrations to wind speed and direction
- Demonstrates metal concentration variability not observable with standard 24-hour methods
- Can be used to identify plant activities associated with high metals concentrations

Applications

The Xact® 625i monitoring system can simultaneously identify and measure multiple metals in ambient air to provide data for use in the following applications:

- Fence-line monitoring
- Source Apportionment
- Determination of background concentrations
- Spatial recognition of pollution sources
- Temporal recognition of pollution sources
- Resolve acute, short duration events
- Continuous measurement of industrial work areas

Specifications

Measurement method.....	Based on EPA Method IO 3.3: Determination of Metals in Ambient PM Using XRF
Key applicable elements.....	Sb, As, Ba, Cd, Ca Cr, Co, Cu, Fe, Pb, Hg, Mn, Ni, Se, Ag, Sn, Ti, Tl, V, Zn, and more available
Measurement range.....	Up to 60 µg/dscm and higher
Detection limits (IF, EPA IO - 3.3)1	Metal and sample time dependent; refer to the minimum detection limit (MDL) data
Sampling and analysis times.....	Every 5, 15, 30, 60, 120, 180, or 240 minutes, user defined
Calibration stability check frequency	Automatically with each sample analyzed
Estimated recalibration frequency	Annually, when manufacturer's operating recommendations are followed
Sample flow rate.....	16.7 lpm
Linearity	Correlation coefficient >0.99
Size and weight.....	19" w x 20" d x 30" h 130 lbs 19 inch (483 mm) rack-mountable or tabletop
Required operating environment	Lab environment with temperature controlled to 20±5°C (68°F)
Power requirements.....	120 VAC/60 Hz @ 20 amp or 220 VAC/50 Hz 10 amp circuit
Outputs	RS 232 or TCP/IP Modbus protocol Reporting of all metals that the system is calibrated to measure
Options	Change or add elements Enclosures (NEMA 4, 4x, 12, or 12x) Inlets (PM 10, PM 2.5, PM 1, Low Vol TSP, and Inlets for Industrial Hygiene)

Performance

Xact 625i Minimum Detection Limits (ng/m³)
68% Confidence Level per US EPA IO 3.3 and Currie *

Element (At. No.)	Sampling/Analysis Time (min)							Element (At. No.)	Sampling/Analysis Time (min)						
	5	15	30	60	120	180	240		5	15	30	60	120	180	240
Al (13)	5200	840	290	100	35	19	12	Y (39)	14	2.3	0.79	0.28	0.097	0.053	0.034
Si (14)	920	150	51	18	6.3	3.4	2.2	Zr (40)	17	2.7	0.94	0.33	0.12	0.063	0.041
P (15)	270	44	15	5.2	1.8	0.99	0.64	Nb (41)	20	3.3	1.2	0.41	0.14	0.078	0.05
S (16)	160	26	9.1	3.2	1.1	0.6	0.39	Mo (42)	24	3.9	1.4	0.48	0.17	0.092	0.06
Cl (17)	89	15	5	1.7	0.61	0.33	0.21	Pd (46)	110	18	6.3	2.2	0.78	0.42	0.27
K (19)	60	9.8	3.4	1.2	0.41	0.22	0.14	Ag (47)	97	16	5.5	1.9	0.68	0.37	0.24
Ca (20)	15	2.5	0.86	0.3	0.1	0.057	0.037	Cd (48)	130	21	7.2	2.5	0.89	0.48	0.31
Ti (22)	8.2	1.3	0.46	0.16	0.056	0.03	0.02	In (49)	160	26	8.9	3.1	1.1	0.6	0.39
V (23)	6.2	1	0.34	0.12	0.042	0.023	0.015	Sn (50)	200	33	12	4.1	1.4	0.78	0.51
Cr (24)	6	0.97	0.33	0.12	0.041	0.022	0.014	Sb (51)	260	42	15	5.2	1.8	0.99	0.64
Mn (25)	7.3	1.2	0.41	0.14	0.05	0.027	0.018	Te (52)	31	5	1.7	0.6	0.21	0.11	0.074
Fe (26)	8.7	1.4	0.49	0.17	0.061	0.033	0.021	I (53)	25	4.1	1.4	0.49	0.17	0.093	0.061
Co (27)	6.9	1.1	0.39	0.14	0.049	0.026	0.017	Cs (55)	19	3.1	1.1	0.37	0.13	0.071	0.046
Ni (28)	4.8	0.78	0.27	0.096	0.034	0.018	0.012	Ba (56)	20	3.3	1.1	0.39	0.14	0.074	0.048
Cu (29)	4	0.65	0.23	0.079	0.028	0.015	0.010	La (57)	19	3.1	1	0.36	0.13	0.069	0.045
Zn (30)	3.3	0.55	0.19	0.067	0.023	0.013	0.008	Ce (58)	15	2.5	0.86	0.3	0.11	0.057	0.037
Ga (31)	2.9	0.48	0.17	0.059	0.021	0.011	0.007	Pt (78)	5.9	0.96	0.34	0.12	0.041	0.023	0.015
Ge (32)	2.8	0.46	0.16	0.056	0.02	0.011	0.007	Au (79)	5.1	0.83	0.29	0.1	0.036	0.02	0.013
As (33)	3.2	0.52	0.18	0.063	0.022	0.012	0.008	Hg (80)	6.1	0.99	0.35	0.12	0.043	0.023	0.015
Se (34)	4.1	0.66	0.23	0.081	0.029	0.016	0.01	Tl (81)	5.8	0.95	0.33	0.12	0.041	0.022	0.014
Br (35)	5.2	0.85	0.3	0.1	0.037	0.02	0.013	Pb (82)	6.4	1	0.36	0.13	0.045	0.024	0.016
Rb (37)	9.7	1.6	0.55	0.19	0.068	0.037	0.024	Bi (83)	6.5	1.1	0.37	0.13	0.046	0.025	0.016
Sr (38)	11	1.8	0.62	0.22	0.076	0.041	0.027								

* - Interference free one sigma detection limits or "...net signal level (instrument response) above which an observed signal may be reliably recognized as "detected" (Currie, 1968). See www.cooperenvironmental.com for more details on detection limits.

US EPA Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, June 1999: Method IO-3.3.

US EPA XRF Web Seminar, Module 2: Basic XRF Concepts, August 2008.

Currie, L. A., "Detection and Quantification in X-Ray Fluorescence Spectrometry" in T. G. Dzubay, X-ray Fluorescence Analysis of Environmental Samples, Ann Arbor Science, 1977; and L. A. Currie, Analytical Chemistry, 40, p586, March 1968.

Detection limits above are for 0.707 in² spot sample size



Element can be measured

H																		He		
Li	Be														B	C	N	O	F	Ne
Na	Mg														Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br		Kr		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I		Xe		
Cs	Ba	*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At		Rn		
Fr	Ra	**	Rf	Ha	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut	Uuq	Uup	Uuh	Uus		Uuo		

* Lanthanide Series
** Actinide Series

La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

Elements Supported

Xact® 625i monitoring systems are capable of identifying and measuring the 67 elements highlighted in the table above. Please contact your Xact® representative for more information on your specific metals monitoring requirements.

As a "standard" set of elements of interest, the 625i will be equipped to report the following 44 elements - Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Rb, Sr, Y, Zr, Mo, Pd, Ag, Cd, In, Sn, Sb, Te, Cs, Ba, La, Ce, W, Pt, Au, Hg, Tl, Pb, and Bi. Of course, the elements can be tailored specifically to the user's needs as well.

Ordering Information

To place an order or for more information about the Xact® 625i continuous monitoring system, contact your regional CES representative or email us at info@sci-monitoring.com.