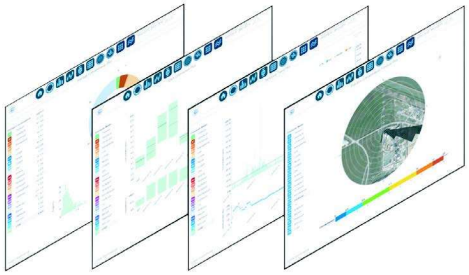
Xact® 625i Ambient Multi-Metals Monitoring System

COOPER ENVIRONMENTAL
A DIVISION OF SCI

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
- Sampling and analysis methodology that has been validated by the US EPA ETV program
- Windows-based operating system with tilted 10.1 inch touchscreen
- Sampling, analysis, and near real-time reporting (every 5, 15, 30, 60, 120, 180, or 240 minutes in ng/m^3)
- Automatic quality assurance, alarms, & control features
- Incorporates an internal XRF quality assurance standard with every sample
- Provides automatic, daily XRF calibration drift checks
- Remote polling and remote system control
- Global power design does not require power conversion

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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, Mn, Ni, Se, Ag, Sn, Ti, Tl, V, Zn, and more available
Measurement range	Up to 60 µg/dscm
Detection limits	Metal and sample time dependent; See performance section
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
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, 50/60 Hz @ 4 amp or 120 VAC, 50/60 Hz @ 20 amp (with small AC Enclosure) 220 VAC, 50/60 Hz @ 2.1 amp or 220 VAC, 50/60 Hz @ 11 amps (with small AC Enclosure)
Outputs	RS 232 or TCP/IP, Modbus protocol CSV (comma-separated value) file Reporting of metals, operational parameters, alarms, and warnings
Options	Change or add elements Enclosures (NEMA 4, 4x, 12, or 12x) Inlets (PM10, PM2.5, PM1, and Low Vol TSP) Automatic PM10 and PM2.5 inlets switcher

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Performance

Xact® 625i Minimum Detection Limits (ng/m^3) *

Element	Sampling/Analysis Time (min)								Element	Sampling/Analysis Time (min)						
(At. No.)	5	15	30	60	120	180	240		(At. No.)	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	0.01		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.sci-monitoring.com for more details on detection limits.

Detection limits above are for 0.707 cm^2 spot sample size.

Reference:

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.

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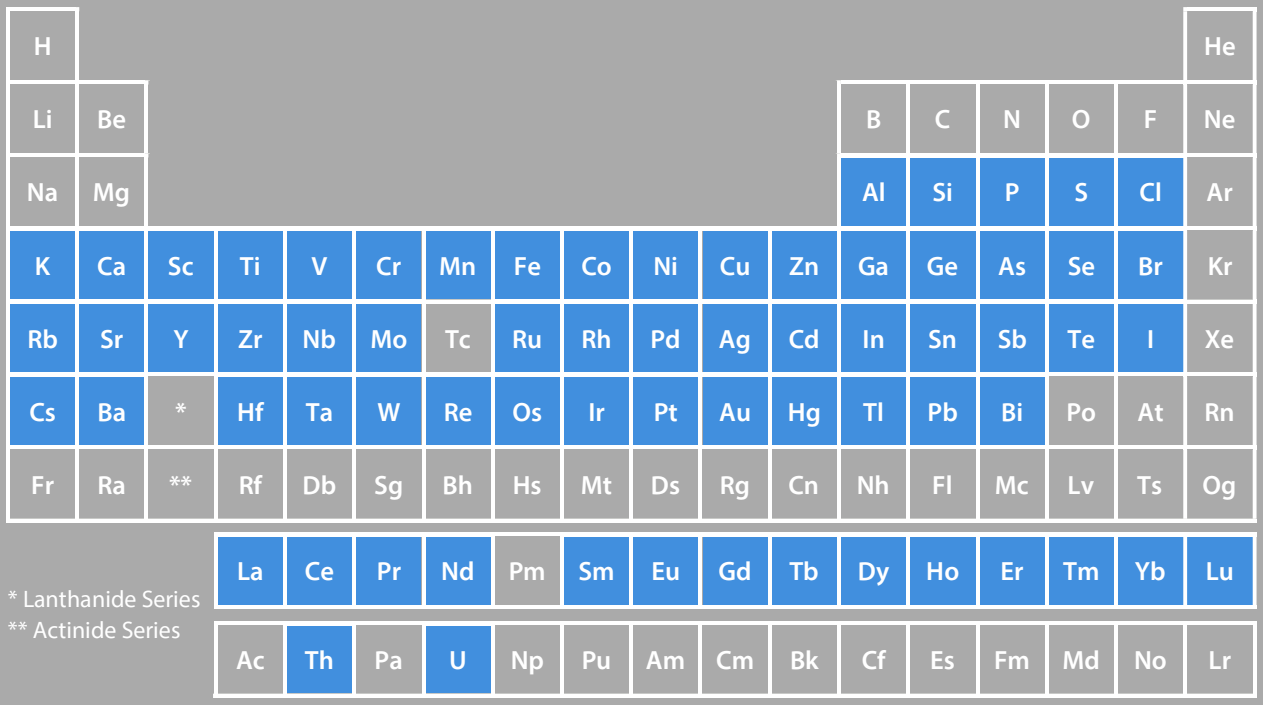
Element measured by Xact® 625i



* Lanthanide Series
** Actinide Series

Elements Supported

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

The default set of elemental standards can report the ambient concentrations of up to 44 elements, consisting of the following: - 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. The elements can be tailored specifically to the user's needs.

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