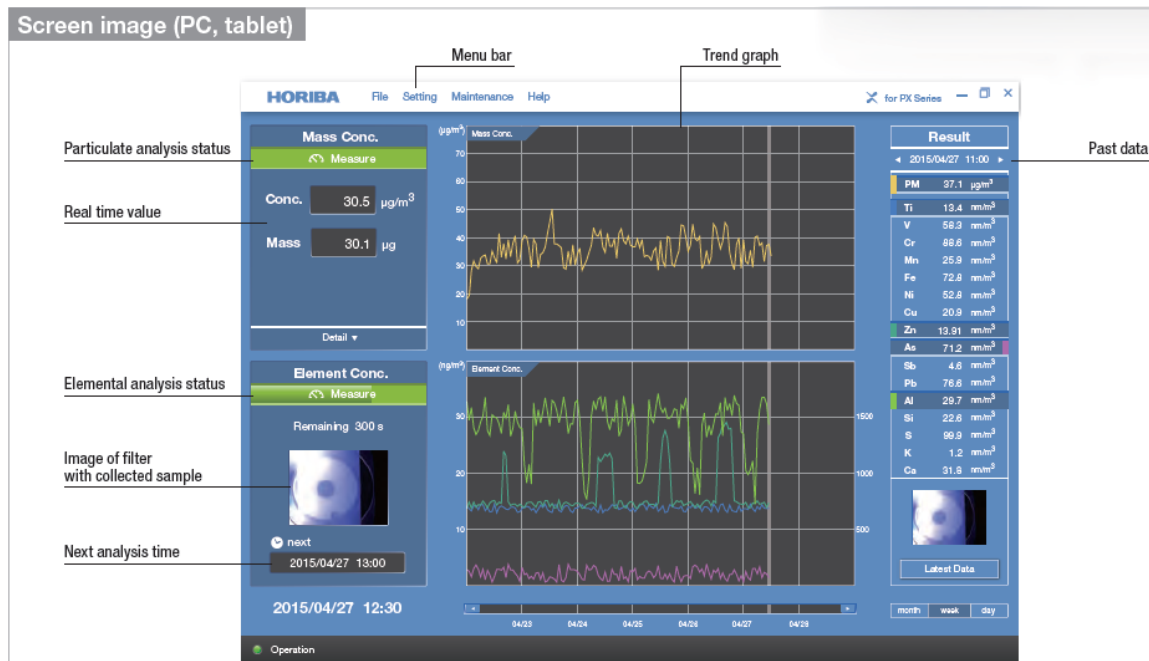




PM2.5 Automatic Particle & the Element analyzer 「PX-375」

HORIBA, Ltd.

Continuous analysis of particle and the element with automatic sampling



Characteristic

- Continuous analysis of PM and the element concentration by single unit directly at field.
- Advanced analysis by world proven technologies and reliable functions.
- Excellent sensitivity and precision realized by HORIBA new-developed filter tape.
- Air pollution source is more specific and accurate because of the installed CMOS camera.

Over view

PX-375 is capable of measuring of PM2.5, PM10 or TSP and the elemental concentration at Air Quality Monitoring Station (AQMS). Compact design enables the analyzer to be installed in laboratory too. The online measurement reduces the man power and the human error in using the manual method. X-ray fluorescence & Beta-ray attenuation are adoption of world proven technologies, and allow highly accurate analysis. PX-375 has safety function (X-ray shield structure and inter lock) for prevention of X-ray leakage. No need to appoint the particular working space and person in charge for the X-ray operation. Chemical background of the filter tape is extremely low. Therefore the filter with collected sample could be used for chemical analysis by other scientific analytical instruments. (ICP-MS etc.) Installed CMOS camera enables observation of collected particulate sample on the filter. In addition to particulate and elemental concentration, analysis of particulate sample image; its color, shape is possible. Particulate concentration, elemental concentration and particulate color - this 3 approach enables more reliable stationary air pollution source appointment.

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Performance and specification of technology and products

Product name	Continuous Particulate Monitor with X-ray Fluorescence
Model	PX-375
Measured object	Particulate matter (PM10, PM2.5, TSP)
Measurement content	Particulate concentration and element concentration

Mass analyzer unit

Measurement method	Beta-ray attenuation
PM10	US EPA Louvered PM10 Inlet
PM2.5	BGI VSCC™ Cyclone
TSP	TSP Inlet
Measurement range	0~200/500/1000µg/m³
Repeatability	±2% (against reference foil value)
Span drift	±3% (24hours)
Lowest detection limit (2σ)	±2µg/m³ (24hours)
Sampling and measurement cycle	0.5/1/2/3/4/6/8/12/24 hours
Radiation source	¹⁴ C (Carbon-14), less than 10MBq

Element analyzer unit

Measurement method	Energy dispersive X-ray spectroscopy
Detectable elements	See Table 2 "Detectable Elements". Standard parameter is S, Ti, Cr, Mn, Ni, Cu, Zn, Pb, Al, Si, K, Ca, V, Fe, As.
Primary X-ray filter	Automatic switching for light metals/heavy metals
Tube voltage	Automatic switching for 15kV/50kV
Detector	SDD (Silicon Drift Detector)
Sample image	CMOS camera
Lowest detection limit (2σ)	Recommended EPA Method IO 3.3 See Table 1 "Lowest Detection Limit (Example)"
Measurement range	Up to measurement time
Analysis time	1000s (16.6 min) as standard 100 / 200 / 500 / 1000s selectable
Calibration material for X-ray intensity for standard parameter	NIST SRM 2783, other materials (option)
Safety functions for X-ray	Internal lock system
	Key switch
	X-ray indication light

Application examples and results

Lowest Detection Limit (Example) (2σ) (ng/m³) (Table 1)

Element	Analysis time (sec.)				
	100	500	1000	5000	10000
S	14.7	6.6	4.6	2.1	1.5
Ti	11.2	5.0	3.5	1.6	1.1
Cr	1.1	0.5	0.3	0.2	0.1
Mn	4.9	2.2	1.6	0.7	0.5
Cu	19.4	8.7	6.1	2.7	1.9
Zn	14.4	6.4	4.5	2.0	1.4
As	0.1	0.0	0.0	0.0	0.0
Se	1.3	0.6	0.4	0.2	0.1
Ag	4.4	2.0	1.4	0.6	0.4
Cd	23.4	10.4	7.4	3.3	2.3
Sn	15.1	6.8	4.8	2.1	1.5
Hg	3.1	1.4	1.0	0.4	0.3
Pb	5.3	2.4	1.7	0.7	0.5

* LDL (σ) is half of the LDL (2σ)

Detectable Elements (Table 2)

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

* □ — Standard parameters, calibrated by standard calibration materials.
 * For measurement of element concentration calibration by standard calibration materials is needed.
 * Please contact separately about elements, marked as non-detectable.

Air Quality Monitoring Station (AQMS)

