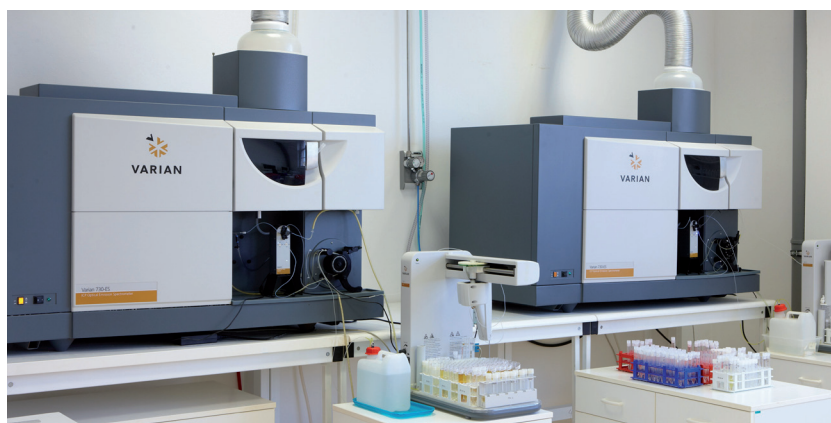




Heavy metals in emissions and ambient air

ALS Czech Republic performs analysis of metals (elements) in emissions and ambient air by ICP–optical emission spectrometry (ICP–OES) and mass spectrometry (ICP–MS), atomic absorption spectrometry (AAS) and atomic fluorescence spectrometry (AFS).

ALS Czech Republic provides analytical services for emission / immission sampling groups, analyzing samples of filters and liquid fractions of air pollution emission and ambient air sampling. We not only specialize on routine emission and outside ambient air analysis, but also on control of work environment or other non typical industrial production activities.



Analytical methods are developed and used to determine elements (heavy metals):

- in sorption solutions
- in sorption materials
- on filters
- in atmospheric rainfalls

Analyses are provided by accredited testing procedures in accordance with current legislation and in accordance with globally recognized standards and methodologies.

Instrument	Standard
Elements by ICP–OES	US EPA 200.7, EN ISO 11885, EN ISO 13211, EN 14385
Elements by ICP–MS	US EPA 200.8, EN ISO 17294, EN ISO 13211, EN 14385
AFS (Hg)	US EPA 245.7, US EPA 1631, EN ISO 17852, EN ISO 13211, EN 1483
ICP–OES/MS (Cr(VI))	US EPA 200.7, EN ISO 11885, US EPA 200.8, EN ISO 17294, EN ISO 13211, EN 14385
ICP–MS (U)	US EPA 200.8, EN ISO 17294, EN ISO 13211, EN 14385

Toxicity of heavy metals

Toxicity of heavy metals is clearly proven: cell growth inhibition, cell membrane permeability limitation and inhibition of vitally important enzymatic processes. Heavy metals also have the ability to bio–accumulate, which means they are stay in the body and exert long–term influence. The most toxic elements are As, Cd, Hg, Pb and Cr (VI), which also exhibit proven carcinogenic and teratogenic effects.

Methods specification

Measurement is provided either directly from the emission samples (sorption solutions) or in mineralized filters/sorption materials. Mineralization of solid samples is performed by modern microwave furnace methods, which are validated and according to current standards dealing with air quality.

Determination is carried out by modern ICP spectrometer with optical (ICP-OES) and mass (ICP-MS) detection. Mercury is determined by very selective analyzers AMA-254 on the principle of AAS and by modern, highly sensitive and selective device PSA working on the principle of atomic fluorescence spectrometry.



List of analytes and their quantification limits

Quantification limits (µg/sample)											
Element	ICP OES	ICP MS	Element	ICP OES	ICP MS	Element	ICP OES	ICP MS	Element	ICP OES	ICP MS
As	0.5	0.05	Co	0.1	0.025	Mo	0.5	-	Ti	0.5	-
Ag	0.1	-	Cr	0.25	0.15	Na	20	-	Tl	0.5	0.025
Al	1	-	Cu	0.1	0.05	Ni	0.5	0.25	U	-	0.01
B	5	-	Fe	5	-	Pb	0.5	0.025	V	0.5	0.05
Ba	0.5	-	K	5	-	Sb	0.5	0.025	W	1	-
Be	0.01	0.01	Li	0.5	-	Se	0.5	0.25	Zn	1	0.25
Ca	5	-	Mg	5	-	Sn	0.5	0.25			
Cd	0.05	0.025	Mn	0.1	0.025	Te	0.5	0.25			
Cr (VI) - ICP/OES			0.25			Cr (VI) - ICP/MS			0.15		
Hg - AAS (AMA)			0.015			Hg - AFS (PSA)			0.001		

(Calculated for final solution volume of 50 ml)

Range of analyzed parameters is mainly based on existing air protection legislation, but also on customer requirements.

Ordering codes

Matrix	Code
Elements on filters - ICP/OES	A-METAXDG1 ; A-METAXDG2
Elements on filters - ICP/MS	A-METMSDT1
Elements in condensates and absorbates - ICP/OES	A-METAFX1 ; A-METAFX2
Elements in condensates and absorbates - ICP/MS	A-METMSFX1
Hg on filters - AAS/AMA	A-HG-AMADT
Hg on filters - AFS	A-HG-AFSDG
Hg in condensates and absorbates - AAS/AMA	A-HG-AMAEMT
Hg in condensates and absorbates - AFS	A-HG-AFSFX
Cr (VI) on filters - ICP/OES	A-CR6-AXDG
Cr (VI) in condensates and absorbates - ICP/OES	A-CR6-AXFX

Contacts

Branch	Phone	Email
Prague, Czech Republic	(+420) 226 226 228	customer.support@alsglobal.com
Istanbul, Turkey	(+90) 212 663 30 05	czsupport.turkey@alsglobal.com
Madrid, Spain	(+34) 618 475 539	czsupport.spain@alsglobal.com
Barcarena, Portugal	(+351) 214 222 017	czsupport.portugal@alsglobal.com
Warsaw, Poland	(+48) 22 855 10 31	czsupport.poland@alsglobal.com
Täby, Sweden	(+46) 08 5277 5200	info.ta@alsglobal.com
Oslo, Norway	(+47) 22 13 18 00	info.on@alsglobal.com
Copenhagen, Denmark	(+45) 35 85 64 00	info.cp@alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

www.alsglobal.eu