

Accreditation scope

Accredited Body: Štátny geologický ústav Dionýza Štúra
Mlynská dolina 3962/1, 817 04 Bratislava – mestská časť Staré Mesto

Organizational unit performing the activity of the Accredited Body:
Geoanalytical laboratories

Workplace of the Accredited body:
Markušovská cesta 1, 052 01 Spišská Nová Ves

Identification number of the Accredited Body: 042/S-004

Laboratory with a fixed accreditation scope

Item	Object		Established method		Other specification (scope, uncertainty, purpose, modification/validation, opinions/interpretations, etc.)
	Subject / Matrix / Environment	Property / Parameter / Pointer / Analyte	Principle / Kind / Type	Label	
1.1	geological materials	Ag, Au	AAS-F	IP 1.6 (L1, L2, L3)	
1.2	geological materials, wastes, fuels, combustion products	Cd, Co	AAS-F	IP 1.7 (L1, L2, L3)	
1.3	geological materials, wastes, fuels, combustion products, waters: drinking, underground, surface, waste, mineral, leachates	Hg	AAS-AMA	IP 1.12 (ČSN 75 7440)	
2.1	geological materials, fuels, combustion products	B, V, Ce*, Hf*, La*, Y*	AES-ICP	IP 2.3 (L1, L2, L3, L4)	* only in geological materials
2.2	geological materials, fuels, combustion products	Be, K ₂ O, (K), Na ₂ O, (Na), P ₂ O ₅ , (P), Sc*	AES-ICP	IP 2.5 (L1, L2, L3, L4)	
2.3	geological materials, fuels, combustion products	Cr(VI)	AES-ICP	IP 2.11 (L4, L5)	
2.4	waters: drinking, underground, surface, waste, mineral, leachates	Ag, Al, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Si, (SiO ₂), Sn, Sr, Ti, V, Zn Total hardness – Sum of (Ca+Mg)	AES-ICP Calculation	IP 2.12 (STN EN ISO 11885)	
3.1	geological materials, wastes, fuels, combustion products	Dy, Er, Eu, Gd, Ho, Lu, Nd, Pr, Sm, Tb, Tm, Yb, As, Be, Cd, Co, Cr, Cu, Ga, Li, Ni, Pb, Sb, Tl, V	ICP-MS	IP 2.24 (L1, L6)	
3.2	waters: drinking, surface, underground, waste, mineral, leachates	Ag, As, Be, Bi, Cd, Co, Cr, Cu, Ga, Li, Mn, Mo, Ni, P, Pb, Sb, Se, Sn, Te, Th, Tl, U, V, Zn	ICP-MS	IP 2.21 (STN EN ISO 17294-2)	



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4.1	geological materials, fuels, combustion products	Al ₂ O ₃ , (Al), CaO, (Ca), Fe ₂ O ₃ , (Fe), K ₂ O, (K), MgO, (Mg), MnO, (Mn), Na ₂ O, (Na), P ₂ O ₅ , (P), SiO ₂ , (Si), TiO ₂ , (Ti)	RFS	IP 3.1 (L7, L8, L9)	
4.2	geological materials, wastes, fuels, combustion products	Ag, As, Ba, Bi, Br, Ce, Cd, Cl, Co, Cr, Cs, Cu, Ga, Ge, In, La, Mo, Nb, Ni, Pb, Rb, Se, Sb, Sn, Sr, Ta, Te, Th, U, V, W, Y, Zn, Zr	RFS	IP 3.2 (L7, L9)	
5	geological materials, fuels, combustion products	C (TC), H, N, Total sulphur (S _{total}), Sulphate sulphur (SO ₃ , SO ₄ ²⁻ , S _{sulphate}), Sulphide sulphur (S ²⁻ , S _{sulphide}), Organic sulphur (S _o)* Volatile sulphur (S _v)*	EA	IP 16.7 (STN EN ISO 16948, STN EN ISO 21663)	* only in fuels
6	fuels	Gross calorific value (Q _s), Net calorific value (Q _i)	K	IP 16.1 (ČSN ISO 1928, STN EN ISO 18125, STN EN ISO 21654, STN 65 6169)	
7	geological materials, combustion products	Density	Py	IP 17.1 (STN EN ISO 17892-3)	
8.1	fuels	Analytical water (W ^a), Total water (W _t ^r), Ash (A), Volatile matter (V)	G	IP 16.3 (STN EN ISO 18134-1,-3, STN ISO 1171, STN EN ISO 18122, ČSN ISO 5071-1, STN ISO 562, STN EN ISO 18123)	
8.2	geological materials, fuels	Bulk density		IP 17.2 (STN 72 1010, STN EN 993-1, STN EN 1097-6, STN EN ISO 17892-2, DIN 52182)	
8.3	geological materials, fuels, combustion products	Loose bulk density		IP 16.6 (STN 72 2061, STN EN 1097-3, STN EN ISO 17828)	

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8.4	geological materials, fuels, combustion products	Grain size analysis	G	IP 17.3 (STN 01 5030, STN EN 933-1,-2 STN 58 0111a, STN ISO 1953, STN EN 17892-4)	
8.5	waters: drinking, underground, surface, waste, mineral	Total substances (CL) Dissolved substances (RL, TDS, RAS)		IP 11.5 (STN EN 15216, STN 75 7373)	(105 °C a 550 °C) drinking, underground, surface, waste (180 °C a 260 °C) mineral
	leachates	Total dissolved substances (TDS)		IP 11.5 (STN EN 15216)	(105 °C)
	waters: underground, surface, waste	Insolubles (NL)		STN EN 872 (IP 11.5)	(105 °C a 550 °C)
8.6	geological materials, wastes, combustion products	Loss on drying (H ₂ O ⁻ , H ₂ O ⁺), Loss on ignition (LOI)		IP 11.3 (STN EN 15935, STN 72 0103, STN 44 1583-2, STN ISO 11465, STN EN 15934, STN 72 0102, STN EN 12880, STN EN ISO 18134-1, STN EN 17892-1+A1)	
9.1	waters: underground, surface, waste, leachates	Extractable (EOX) and Adsorbable (AOX) organically bound halogens	C	IP 6.8 (STN EN ISO 9562)	
9.2	geological materials, wastes, biofuels	Extractable (EOX) and Adsorbable (AOX) organically bound halogens		IP 8.1 (US EPA 9023)	
10	waters: drinking, underground, surface, waste, mineral, leachates	Fluoride (F ⁻) Chloride (Cl ⁻) Nitrate (NO ₃ ⁻), N-NO ₃ ⁻ Sulphate (SO ₄ ²⁻)	IC	IP 12.1 (STN EN ISO 10304-1)	
11.1	waters: drinking,	pH	E	STN EN ISO 10523 (IP 13.2)	Testing performed in the Testing Lab. even at sampling
11.2	underground, surface, waste, mineral, leachates	Electrical conductivity (EC)		STN EN 27888 (IP 13.5)	
11.3	waters: drinking, surface, waste	Dissolved oxygen (O ₂)	E, F	IP 13.3 (STN EN ISO 5814, ČSN ISO 17289)	
11.4	waters: surface, waste	Biochemical Oxygen Demand (BOD ₅)	E	STN EN ISO 5815-1, STN EN 1899-2 (IP 13.4)	
11.5	geological materials, wastes, fuels, combustion products	Fluoride (F ⁻)	E	IP 13.1 (L3)	



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12.1	waters: drinking,	Permanganate index (CHSK _{Mn})	OA, E	IP 10.6 (STN EN ISO 8467)	
12.2	underground, surface, mineral	Base neutralizing capacity: total acidity (ZNK _{8,3}), apparent acidity (ZNK _{4,5})		IP 10.10 (STN 75 7372)	
		Neutralizing capacity: total alkalinity (KNK _{4,5}), apparent alkalinity (KNK _{8,3})		IP 10.10 (STN EN ISO 9963-1)	
		Carbon dioxide forms: (HCO ₃ ⁻ , CO ₃ ²⁻ , aggressive CO ₂)		IP 10.10 (STN 75 7374)	
12.3	waters: waste	Ammonium ions (NH ₄ ⁺), N-NH ₄ ⁺	OA	STN ISO 5664 (IP 10.15)	
12.4	geological materials	Chloride (Cl ⁻)		IP 10.2 (STN 65 2466)	
12.5	geological materials	FeO		IP 10.4 (L3)	
12.6	combustion products	Sulfane (hydrogen sulphide)		IP 10.14 (STN 38 5533)	
13.1	waters: underground,	Hexavalent chromium (Cr(VI))	F	IP 14.5 (STN ISO 11083)	
13.2	surface, waste	Total nitrogen (N _{total})		IP 14.4 (STN EN ISO 11905-1)	
13.3	waters: surface, waste, leachates	Chemical Oxygen Demand (COD _{Cr})		STN ISO 15705 (IP 14.3)	
13.4	waters: drinking,	Phosphate (PO ₄ ³⁻), Total phosphorus (P _{total})		IP 14.1 (STN EN ISO 6878)	
13.5	underground, surface, waste, mineral, leachates	Total cyanide (CN _{total})		IP 14.7 (STN ISO 6703-1)	
13.6	waters: drinking,	Sulphide (S ²⁻) and hydrogen sulphide (H ₂ S)		IP 14.8 (STN 75 7483)	
13.7	underground, surface, waste,	Ammonium ions (NH ₄ ⁺), N-NH ₄ ⁺		IP 14.9 (STN ISO 7150-1)	
13.8	mineral	Nitrite (NO ₂ ⁻), N-NO ₂ ⁻		IP 14.10 (STN EN 26777)	
13.9	waters: underground,	Phenol index (PHI)		IP 14.11 (STN ISO 6439)	
13.10	surface, waste, mineral, leachates	Anionic surfactants (MBAS)		IP 14.12 (STN EN 903)	

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14.1	geological materials, wastes waters: drinking, underground, surface, waste, mineral, leachates	Volatile aliphatic and aromatic hydrocarbons: BTX (BTEX): benzene, toluene, styrene, o-xylene, m-xylene, p-xylene, ethylbenzene, chlorobenzene, tetrachloromethane, trichloromethane, 1,1-dichloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, 1,1,2-trichloroethylene, 1,1,2,2-tetrachloroethylene, 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, Vinyl chloride*, cyclohexanone*, cyclohexanol*	GC-FID	IP 6.1 (US EPA 8010, US EPA 8015)	* only in waters
14.2	geological materials, wastes, combustion products, waters: drinking, underground, surface, waste, mineral, leachates	Non-polar extractable substances – NEL (hydrocarbons C10–C40)		IP 6.11 (STN EN 14039, STN EN ISO 9377-2)	
14.3	waters: drinking, underground,	Phthalates: di-n-butyl phthalate, bis(2-ethylhexyl) phthalate		IP 6.9 (US EPA 8270-20)	
14.4	surface, waste, mineral, leachates	Phenol		IP 6.10 (STN ISO 8165-1)	
14.5	geological materials, wastes, waters: drinking, underground, surface waste, mineral, leachates	Polychlorinated biphenyls (PCB): PCB congeners: 28, 52, 101, 118, 138, 153, 180	GC-ECD	IP 6.4 (STN EN 15308, US EPA 508)	



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14.6	geological materials, wastes, waters: drinking, underground, surface waste, mineral, leachates	Chlorinated pesticides (OCP): heptachlorepoxyde, hexachlorobenzene, pentachlorobenzene, chlorpyrifos, chlorpyrifos-methyl, trifluralin, Lindane (γ -BHC), α -BHC, δ -BHC, β -BHC, o, p-DDD, p, p'-DDD, p, p'-DDE, o, p-DDT, p, p'-DDT, isodrin, heptachlor, methoxychlor, endosulfan I., endosulfan II., endrin, dielrin, alachlor	GC-ECD	IP 6.2 (STN EN 15308, US EPA 508)	
14.7	waters: drinking, underground, surface, waste, mineral, leachates	Chlorinated phenols: 2,3-dichlorophenol, 2,4-dichlorophenol, 2,5-dichlorophenol, 2,6-dichlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, pentachlorophenol	GC-FID GC-ECD	IP 6.6 (STN ISO 8165-1)	



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14.8	waters: drinking, underground, surface, waste, mineral, leachates	Pesticides: atrazine, ametryn, propazine, prometryn, simazine, terbutryn, terbuthylazine, pendimethalin, chlorfenvinphos, desethylatrazine, sebuthylazine, cyanazine, isoproturon, desmedipham, chloropropham, penmedipham, ethofumesate, chlortoluron, carboxin, chloridazon, clopyralid, 2,4-D, dicamba, bentazon, MCPA, MCPB, MCPB, metamitron, desisopropylatrazine, acetochlor	GC-MSD	IP 6.7 (US EPA 8000)	
14.9	geological materials, wastes, waters: drinking, underground, surface, waste, mineral, leachates	Polycyclic aromatic hydrocarbons - PAHs: acenaphthylene, acenaphthene, anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(a)anthracene, benzo(g,h,i)perylene, phenanthrene, fluoranthene, fluorene, naphthalene, pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene		IP 6.3 (STN EN 15527, US EPA 550)	



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15	waste waters, leachates	Acute lethal toxicity to fish <i>Poecilia reticulata</i>	TÚ	IP 21 (STN 83 8303, STN EN ISO 7346-1, STN EN ISO 6341, STN EN ISO 8692)	
		Inhibition of mobility <i>Daphnia magna</i> Straus			
		Growth inhibition test of root higher cultivated plants <i>Sinapis alba</i>			
		Algal growth inhibition test <i>Scenedesmus quadricauda</i> , <i>Desmodesmus subspicatus</i>			
16	emissions ²⁾ and workplace air ³⁾	Hg and its compounds expressed as Hg	AAS-AMA	IP 1.12 (STN EN 13211)	N / I ²⁾
17.1		Cr (VI) and its compounds expressed as Cr	AES-ICP	IP 2.11 ¹⁾ (L4, L5)	
17.2		Sulphur oxides expressed as SO ₂ , mercaptans expressed as SO ₂ , organic compounds containing reduced sulfur expressed as H ₂ S, or SO ₂ (TRS)		IP 2.6 ¹⁾ (L4, L10)	
18		As and its compounds expressed as As	ICP-MS	IP 2.23 (STN EN 14385, EPA 29, ISO 30011, NIOSH 7300)	
		Cd and its compounds expressed as Cd			
	Co and its compounds expressed as Co				
	Cr and its compounds expressed as Cr, except Cr(VI)				
	Cu and its compounds expressed as Cu				
	Mn and its compounds expressed as Mn				
	Ni and its compounds expressed as Ni				
	Pb and its compounds expressed as Pb				
	Sb and its compounds expressed as Sb				
	Tl and its compounds expressed as Tl				
	V and its compounds expressed as V		IP 2.23 (STN EN 14385, ISO 30011, NIOSH 7300)		



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18	emissions ²⁾ and workplace air ³⁾	Be and its compounds expressed as Be	ICP-MS	IP 2.23 (EPA 29, ISO 30011, NIOSH 7300)	N / I ²⁾
		Se and its compounds expressed as Se			
		Zn and its compounds expressed as Zn			
		Sn and its compounds expressed as Sn		IP 2.23 ¹⁾ (ISO 30011, NIOSH 7300)	
		Te and its compounds expressed as Te			
19.1		Ammonia and its gaseous compounds expressed as NH ₃	F	IP 14.21 (STN EN ISO 21877, STN ISO 7150-1)	
19.2		Cyanides expressed as CN ⁻ Hydrogen cyanide		IP 14.23 ¹⁾ (L11)	
20		Inorganic gaseous chlorine compounds expressed as HCl	IC	IP 12.1 (STN EN 1911, STN EN ISO 10304-1)	
21.1		Fluoride expressed as F ⁻	E	IP 13.6 part C (EPA13B, STN 83 4752-3 STN P CEN/TS 17340 NIOSH 7902, OSHA 110)	
		Fluorine and its gaseous compounds such as HF		IP 13.6 part A (STN ISO 15713, STN P CEN/TS 17340 NIOSH 7902, OSHA 110)	
21.2		Formic acid	ITP	IP 15.1 ¹⁾	
		Acetic acid			
22		Sulfur oxides – sulfur dioxide, sulfur trioxide and vapor H ₂ SO ₄ expressed as SO _x	OA	IP 10.13 (STN EN 14791, EPA 8)	
23.1		Polycyclic aromatic hydrocarbons - PAHs: benzo(a)pyrene, 2-naphthylamine, 1-methylnaphthalene, 2-methyl naphthalene, naphthalene, dibenzo(a,h)anthracene, benzo(b)fluoranthene, benzo(k) fluoranthene, indeno(1,2,3-cd)pyrene	GC-MSD	IP 6.13 (STN ISO 11338-2, NIOSH 5515)	



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23.2	emissions ²⁾ and workplace air ³⁾	Volatile aliphatic and aromatic hydrocarbons: benzene, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, 1,2-dichloroethylene, dichloromethane, chlorobenzene, ethylbenzene, chloroethane, isopropylbenzene, styrene, toluene, tetrachloroethane, tetrachloroethylene, trichloroethylene, trichloromethane, xylene	GC-FID ¹	IP 6.14 (STN P CEN/TS 13649 NIOSH 1003, NIOSH 1005, NIOSH 1007, NIOSH 1501)	N / I ²⁾
23.3		Phenol		IP 6.12 part A ¹⁾ (NIOSH 2546)	
		Ethylene glycol		IP 6.12 part A ¹⁾ (NIOSH 5523)	
23.4		Aldehydes: acetaldehyde, formaldehyde		IP 6.16 part B, C ¹⁾ (EPA 0011, NIOSH 2016)	
		formaldehyde	HPLC-DAD	IP 7.1 (STN P CEN/TS 17638)	
		Acetone	GC-FID ¹	IP 6.16 part A (STN P CEN/TS 13649 NIOSH 1300)	
23.5		Acetates and ethers: butyl acetate, ethyl acetate, methyl acetate, vinyl acetate, dibutyl ether, diethyl ether, diphenyl ether, diisopropylether, 4-methyl-2- pentanone, alkylalcohols		IP 6.15 (STN P CEN/TS 13649 NIOSH 1450, NIOSH 1457, NIOSH 1458, NIOSH 1400, NIOSH 1401)	
24	geological materials, wastes, combustion products	Carbon forms: TC, TIC, TOC, CO ₂	VTO	IP 4.2 (STN EN 13137)	
	waters: drinking, underground, surface, waste, mineral, leachates	TOC, DOC		IP 4.2 (STN EN 1484, STN EN ISO 20236)	



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Personnel competent to express opinions and interpretations for the execution of subcontracts of authorized technical activities according to Act no. 146/2023 Coll. on air protection and amendments to some laws

First and last name, titles	Capacity to express opinions and interpretations - - item of activity specification No.
Jana Vabcová, Ing.	23.1 to 23.5
Viera Lučivjanská, RNDr.	23.1 to 23.5
Tatiana Antolová, Mgr.	23.1 to 23.5
Jarmila Nováková, RNDr.	16 to 22
Anna Gibalová, Ing.	16 to 22
Katarína Janusová, Mgr.	16 to 22
Kovalčíková Adriána, Ing.	16 to 22

Shortcuts for the methods:

AAS-AMA	Atomic Absorption Spectrometry - Mercury Analyzer
AAS-F	Flame Atomic Absorption Spectrometry
AES-ICP	Atomic Emission Spectrometry with Inductively Coupled Plasma
C	Coulometry
E	Electrochemistry
EA	Elementary Analyze with Thermal Conductivity Detector
F	Photometry
G	Gravimetry
GC-ECD	Gas Chromatography with Electron Capture Detector
GC-FID	Gas Chromatography with Flame Ionization Detector
GC-FID ¹	Gas Chromatography with Flame Ionization Detector – solvent extraction
GC-MSD	Gas Chromatography with Mass Spectrometry Detector
HPLC-DAD	High-performance liquid chromatography with photodiode-array detection
IC	Ion Chromatography
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
ITP	Capillary Isotachophoresis
K	Calorimetry
OA	Volumetric
Py	Pycnometry
RFS	X-Ray Fluorescence Spectrometry
TÚ	Toxic effect
VTO	High Temperature Oxidation

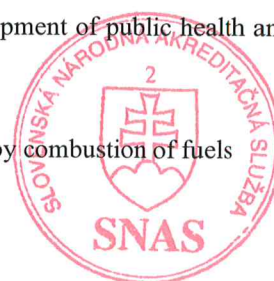
Other shortcuts:

CARB	California's air quality control methods
DOC	Dissolved Organic Carbon
IP	Internal Instruction
LOI	Loss on ignition
N / I	Opinions and interpretations
NIOSH	The National Institute for Occupational Safety and Health
RAS	Soluble Inorganic Salts
TC	Total Carbon
TIC	Total Inorganic Carbon
TOC	Total Organic Carbon
TDS	Total Dissolved Solids

Notes:

- ¹⁾ Alternative authorized non-standard methods
- ²⁾ N/I for the authorized measurement of emissions in accordance with § 58, point 7, of Air Protection Act no. 146/2023 Coll. on air protection and amendments to some laws and notification requirements § 9 of the Decree of the Ministry of the Interior of the Slovak Republic no. 299/2023 Coll.
- ³⁾ For the purposes of Act No. 355/2007 Coll. On the protection, support and development of public health and on the amendment of certain acts, as amended

Geological materials:	e. g. ore, non ore materials, soil, sediment, salt
Combustion products:	e. g. ash, fly ash, cinder, product after desulphurization of gases produced by combustion of fuels
Fuels:	e. g. black, brown coal, anthracite, coke, biofuel, alternative fuel



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Literature:

- L1 Šulcek Z. a kol.: Rozklady základných anorganických surovín, SNTL, Praha, 1966
- L2 E. Krakovská, M. Kuss: Rozklady v analytickej chémii, Košice, Viena, 2001
- L3 Dalibor Weiss a kol.: Metódy chemickej analýzy nerastných surovín, Praha, Ústřední ústav geologický, 1983
- L4 Operačný manuál Agilent Technologies ICP-OES 5100, 2018
- L5 Livia Smirnová a kol.: Stanovenie toxického Cr(VI) vedľa Cr(III) v popolčekoch z hutníckej výroby. Chemický priemysl, roč. 38/63, číslo 7, PRIFUK, Bratislava, 1988
- L6 Manuál k prístroju ICP-MS Bruker, Aurora M90, manuál k prístroju Agilent Technologies 7900 ICP-MS, STN EN ISO 17294-2 (757478), Kvalita vody. Použitie hmotnostnej spektrometrie s indukčne viazanou plazmou (ICP-MS). Časť 2: Stanovenie vybraných prvkov vrátane izotopov uránu
- L7 Dokumentácia SPECTRO XEPOS HE, 2014
- L8 2 THETA Hutní analytika '94, Z. Ersepke, Tavicí metody přípravy vzorků pro rentgenfluorescenční spektrometrii, Český Těšín, 1994
- L9 Feriančík E. a kol.: Vývoj postupov pre úpravu vzoriek pre RF analýzu, Spišská Nová Ves, Geologický prieskum, 1985
- L10 STN EN 14 791 Ochrana ovzdušia. Stacionárne zdroje emisií. Stanovenie hmotnostnej koncentrácie oxidov síry. Štandardná referenčná metóda, 2018
- STN EN ISO 11885 (75 7466) Kvalita vody. Stanovenie vybraných prvkov optickou emisnou spektrometriou s indukčne viazanou plazmou (ICP-OES) (ISO 11885: 2007), 2009
- EPA Method 16A Determination of total reduced sulfur emissions from stationary sources (Impinger technique), 3.8.2017
- L11 CARB Method 426, Determination of Cyanide Emissions from Stationary Sources, 1987

The range of activities in which the laboratory performs sampling

Item	Object			Method		Other specifications
	Subject	Attribute	Sampling point	Type / Principle	Label	
1.1	water: underground	Sampling for the tests listed within the scope of accreditation,	wells, springs, boreholes	Point sample	STN EN ISO 5667-1, -3, -14 STN ISO 5667-11 (IP 18.4)	
1.2	water: surface	non-accredited tests and tests carried out in subcontract	water reservoirs, surface streams	Point sample – manual sampling	STN EN ISO 5667-1, -3, -6, -14, STN ISO 5667-4, STN EN ISO 19458 (IP 18.4)	

