



WATER

Product Catalogue ALS
EUROPE

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150
YEARS IN OPERATION

13k+
STAFF

350+
LOCATIONS

65+
COUNTRIES

As one of the world's largest and most diversified testing services providers, ALS has sites strategically located around the world to provide accurate and timely services. We have operations in more than 350 locations, in 55 countries, and on six continents. We have teams of experts around the world available to provide specialised business solutions that align with client needs. Major hub laboratories are located in Australia, Asia, North America, South America, Europe, the Middle East and Africa.

ALS Life Sciences in Europe employs over 1300 professional laboratory and support personnel represented in 13 countries at 31 locations. The European network consists of modern, analytical, ISO 17025 accredited laboratories and national service centres. Main laboratories are located in the Czech Republic, Sweden, Portugal, United Kingdom & Ireland, Turkey and Denmark. National service centres and smaller laboratories are located in Norway, Finland, Poland, Slovakia, Romania and Spain.

While varying in size and capabilities, the network performs an extensive range of physical, chemical, microbiological, biological, radiological and ecotoxicological analysis to meet the needs of local and regional clients.

Inter-office support and courier arrangements facilitate timely access to the full range of services and on-time delivery of results.

ALS Life Sciences Europe has also a number of centres of excellence dedicated to specialty services and industrial applications. These laboratories utilise the latest high-resolution technology in order to meet very stringent demands from clients worldwide:

ALS operates the best equipped laboratory globally for determination of metals (elements). Examples of analyses include chemical composition, impurities, and stable as well as radiogenic isotopes.

ALS carries out analyses of ultra-trace level organic compounds (dioxins, PCBs, PBDE and other flame retardants) and runs radiochemical testing.

Both laboratories have vast experience from matrices including environmental, food, and pharmaceuticals in addition to clinical, specialized industrial and research applications.



**WATER FRAMEWORK
DIRECTIVE**



ISOTOPE ANALYSIS

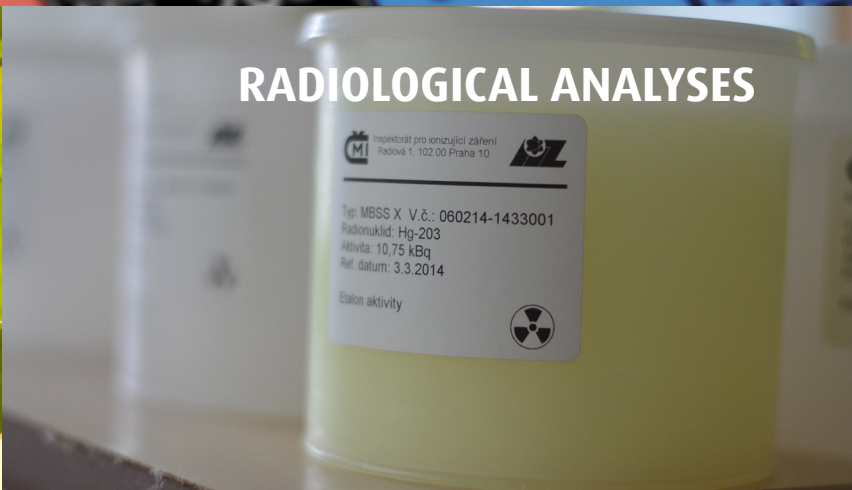
FOR FURTHER **INFORMATION ON WATER
ANALYSES**, CONSULT www.alsglobal.eu



ELEMENT SPECIATION



PESTICIDES



RADIOLOGICAL ANALYSES



DIOXINS



ECOTOXICITY

PREMIUM SERVICES



This logo indicates: ✓ Premium Metal Analysis
✓ Premium Radiometric Testing
✓ Premium Ultra-trace Level Organic Analysis

These analyses are performed in custom facilities using state-of-the-art analytical instrumentation by teams with more than 20 years of expertise in the field.

Analytical Services

This catalogue does represent a mere fragment of the full range of parameters, matrices, LOQ and other analytical capabilities, which ALS can provide. Contact your local sales representative to discover more and get the parameters you really need, with the associated quote, logistics services and reporting features.

ALS Quick

Standard turnaround time (TAT) for most analyses is 5 to 10 business days. Nevertheless, many projects and manufacturing processes require quick information. Quick decisions have to be made. Reliability of laboratory results and possibility to use express services for results delivery when needed, is a key factor for choosing a laboratory.

At ALS Life Sciences, expedited services and rush analyses are available for most analyses. All data routinely produced under ALS Quick procedures are available just after the quality validation on our on-line portal. Contact your local sales representative to know more and take advantage from ALS Quick services.



LOQ

Limits of quantification (LOQ) mentioned in this catalogue are orientative only. They may vary depending on sample composition or may differ based on new technological considerations. Contact your local sales representative for a quote with actual LOQ.

Enjoy our product catalogue and feel free to contact us to let us provide you with the Right solutions!



Drinking water pack

Parameter	LOQ	Parameter	LOQ	Parameter	LOQ
<i>Clostridium perfringens</i>	-	total organic carbon (TOC)	0.5 mg/l	nitrites	2 mg/l
enterococci	-	chromium	1 µg/l	nitrites	0.005 mg/l
<i>Escherichia coli</i>	-	taste	-	fluorides	0.2 mg/l
coliform bacteria	-	cadmium	0.5 µg/l	aluminium	10 µg/l
microscopy - abioseseston	-	conductivity	0.1 mS/m	magnesium	3 µg/l
microscopy - number of organisms	-	total cyanides	0.005 mg/l	COD _{Mn}	0.5 mg/l
microscopy - living organisms	-	manganese	0.5 µg/l	chloroethene	0.1 µg/l
colony counting at 22 °C	-	copper	1 µg/l	chlorides	1 mg/l
colony counting at 36 °C	-	nickel	2 µg/l	chlorates	10 µg/l
1,2-dichloroethane	0.75 µg/l	lead	1 µg/l	tetrachloroethene	0.2 µg/l
ammonium ions	0.05 mg/l	odour	-	trihalomethanes	0.5 µg/l
antimony	1 µg/l	water reaction (pH)	1	bromodichloromethane	0.1 µg/l
arsenic	1 µg/l	sum of 4 PAHs	0.08 µg/l	tribromomethane	0.2 µg/l
colour	2 mg Pt/l	benzo(b)fluoranthene	0.02 µg/l	dibromochloromethane	0.1 µg/l
benzene	0.2 µg/l	benzo(k)fluoranthene	0.02 µg/l	trichloroethene	0.1 µg/l
ethylbenzene	0.1 µg/l	benzo(g,h,i)perylene	0.02 µg/l	trichloromethane	0.1 µg/l
toluene	1 µg/l	indeno(123 cd)pyrene	0.02 µg/l	calcium	5 µg/l
xylenes	0.3 µg/l	mercury	0.01 µg/l	calcium and magnesium	0.0002 mmol/l
benzo(a)pyrene	0.005 µg/l	selenium	1 µg/l	turbidity	1 ZFn (NTU)
beryllium	0.2 µg/l	sulphate	5 mg/l	iron	2 µg/l
boron	10 µg/l	sodium	30 µg/l		
bromates	5 µg/l	silver	1 µg/l		

Minimum sample volume: sterile plastic, 500 ml; glass, 1000 ml; plastic, 60 ml (HNO₃); 2x glass vial, 40 ml
Method: ICP, AFS, SPC, IC, FTIR, GC-MS

Total metals in drinking water

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
Ag	1	Be	0.2	Cu	1	Mn	0.5	Sb	1
Al	10	Ca	5	Fe	2	Na	30	Se	1
As	1	Cd	0.5	Hg	0.01	Ni	2		
B	10	Cr	1	Mg	3	Pb	1		

Minimum sample volume: plastic, 60 ml + glass, 50 ml for Hg
Method: ICP-OES, ICP-MS, AFS for Hg

Anions in drinking water

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
bromide	0.05	sulfate	0.5	nitrites	0.04
chloride	0.5	nitrate nitrogen	0.01	nitrites	0.04
fluoride	0.02	nitrite nitrogen	0.01		

Minimum sample volume: glass, 250 ml
Method: ion chromatography

Bromate and chlorate in drinking water

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
bromate	5	chlorite	10
chlorate	10		

Minimum sample volume: plastic, 250 ml
Method: ion chromatography

Polycyclic aromatic hydrocarbons (PAH) in drinking water

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
benzo(b)fluoranthene	0.02	benzo(ghi)perylene	0.02
benzo(k)fluoranthene	0.02	indeno(123cd)pyrene	0.02
benzo(a)pyrene	0.005	sum of 4 PAHs*	0.08

*Sum of PAHs without benzo(a)pyrene.

Minimum sample volume: glass, 250 ml
Method: GC-MS

Microbiology in drinking water

Parameter	Parameter
<i>Escherichia coli</i>	living microorganisms*
coliform bacteria	colony counting at 22°C
enterococci	colony counting at 36°C
<i>Clostridium perfringens</i>	abioseston*
number of microorganisms*	

*Microscopy.

Minimum sample volume: sterile sealed glass, plastic, 500 ml

Special products in drinking water

Parameter	LOQ	Sample volume
acrylamide	0.05 µg/l	glass vial, 40 ml
epichlorhydrine	0.1 µg/l	glass, 500 ml
pesticides	see page 16 and following	
radiology	see page 25	

**NEED A SPECIFIC DRINKING WATER PACKAGE?
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Environmental anions package

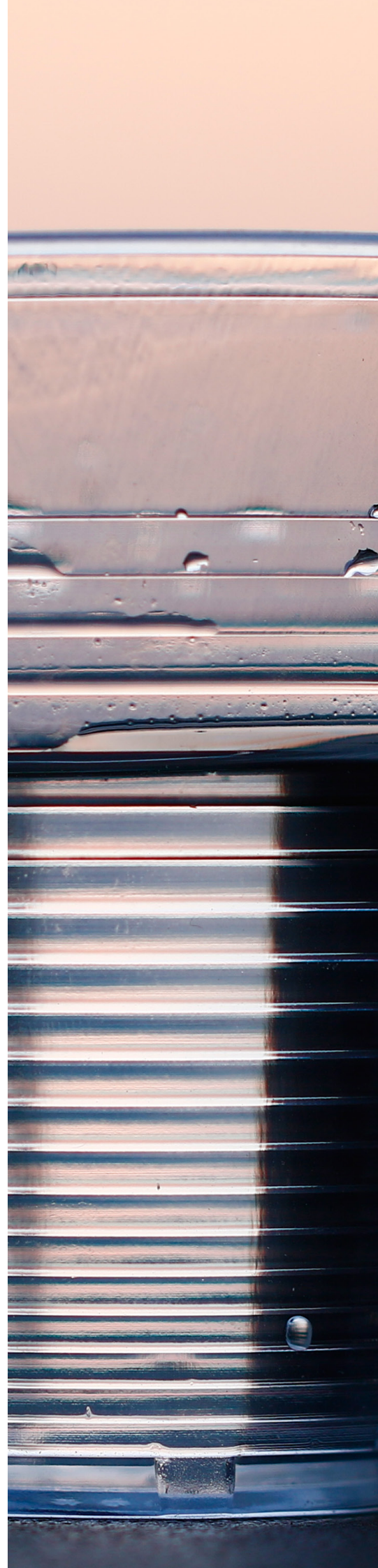
Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
bromide	0.5	nitrate nitrogen	0.1
chloride	0.5	nitrite nitrogen	0.15
fluoride	0.5	nitrates	0.5
sulfate	0.5	nitrites	0.5

Minimum sample volume: plastic, 250 ml
Method: ion chromatography

Nitrogen forms

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
ammonium nitrogen	0.04	inorganic nitrogen	0.5
nitrate nitrogen	0.5	organic nitrogen	0.5
nitrite nitrogen	0.04	total nitrogen	1
Kjeldahl nitrogen	0.5		

Minimum sample volume: plastic, 250 ml
Method: spectrophotometry



Indicator parameters

Parameter	LOQ	Sample volume
ammonium ions	0.05 mg/l	plastic, 250 ml
free ammonia	0.01 mg/l	plastic, 250 ml
colour	2 mg Pt/l	plastic, 500 ml
BOD _n (n=5 or 7) - without COD-Cr	1 mg/l	plastic, 1000 ml
BOD _n (n=5 or 7)- with COD-Cr	1 mg/l (BOD _n) 5 mg/l (COD _{Cr})	plastic, 1000 ml
total nitrogen (TNb)	0.1 mg/l	plastic, 250 ml
total inorganic fluor	2 mg/l	plastic, 250 ml
fluorides	0.2 mg/l	plastic, 250 ml
total phosphorus (waste water)	0.01 mg/l	plastic, 250 ml
total inorganic phosphorus	0.01 mg/l	plastic, 250 ml
phosphates	0.04 mg/l	plastic, 250 ml
FOS/TAC ratio	0.01	plastic, 250 ml
COD-Cr	5 mg/l	plastic, 250 ml
COD-Mn	0.5 mg/l	plastic, 250 ml
conductivity	0.1 mS/m	plastic, 250 ml
dissolved silicates as SiO ₂ dissolved silicates as SiO ₃	0.08 mg/l 0.1 mg/l	plastic, 150 ml
total cyanides	0.005 mg/l	dark glass, 100 ml - preserved with NaOH
complexing cyanides	0.005 mg/l	dark glass, 100 ml - preserved with NaOH
free cyanides	0.005 mg/l	dark glass, 100 ml - preserved with NaOH
acid neutralizing capacity (ANC): to pH 4,5 (ANC 4,5) - total alkalinity to pH 8,3 (ANC 8,3) - apparent alkalinity	0.15 mmol/l 0.15 mmol/l	plastic, 250 ml
basic neutralizing capacity (BNC): to pH 8.3 (BNC 4.5) - total acidity to pH 4.5 (BNC 8.3) - apparent acidity	0.15 mmol/l 0.15 mmol/l	plastic, 250 ml
dissolved oxygen	0.2 mg/l	glass, 250 ml - without air bubble
nondissolved matters - loss on ignition at 550 °C	5 mg/l	plastic, 250 ml
nondissolved matters - dried at 105 °C	5 mg/l	plastic, 250 ml
nondissolved matters - burnt at 550 °C	5 mg/l	plastic, 250 ml
odour	-	dark glass, 500 ml - without air bubble
pH	1	plastic, 250 ml
dissolved matters - dried at 105 °C	10 mg/l	plastic, 250 ml
dissolved matters - loss on ignition at 550 °C	10 mg/l	plastic, 250 ml
dissolved matters - burnt at 550 °C	10 mg/l	plastic, 250 ml
sulfites Na ₂ SO ₃	1 mg/l	plastic, 150 ml - preserved with EDTA, without air bubble
hydrogen sulfide and sulfide	0.05 mg H ₂ S/l	dark glass, 250 ml
TIC (total inorganic carbon)	0.5	plastic, 250 ml
uranium - total, and activity calculation of U-238	2 µg/l, and 0.025 Bq/l U-238	plastic, 500 ml
settleable matters (30 min)	0.1 mg/l	plastic, 1000 ml
turbidity	1 ZFn (NTU)	plastic, 250 ml

Metals in seawater

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
Al	0.7	Fe	4	Ni	0.5
Ba	0.1	Hg	0.002	P	40
Ca	200	K	500	Pb	0.3
Cd*	0.05	Mg	90	S	160
Co	0.05	Mn	0.1	Si	200
Cr	0.1	Mo	0.1	Sr	50
Cu	0.5	Na	120	Zn	2

*A higher LOQ applies to samples with high molybdenum levels.

Minimum sample volume: 60 ml

Method: ICP-OES, ICP-SFMS and AFS

Maximum salinity: 3.5%

Note: LOQs apply to routine analyses. Lower LOQs can be achieved by specially optimized analyses.

Metals in brackish water

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
Al	0.3	Fe	2	Ni	0.2
Ba	0.04	Hg	0.002	P	5
Ca	200	K	500	Pb	0.1
Cd*	0.02	Mg	90	S	160
Co	0.02	Mn	0.04	Si	40
Cr	0.04	Mo	0.04	Sr	10
Cu	0.2	Na	120	Zn	0.8

*A higher LOQ applies to samples with high molybdenum levels.

Minimum sample volume: 60 ml

Method: ICP-OES, ICP-SFMS and AFS

Maximum salinity: 1.2%

Note: LOQs apply to routine analyses. Lower LOQs can be achieved by specially optimized analyses.

Low level dissolved metals (freshwater)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
Al	0.2	Fe	0.4	P	1
As*	0.05	Hg	0.002	Pb	0.01
Ba	0.01	K	400	S	160
Ca	100	Mg	90	Si	30
Cd**	0.002	Mn	0.03	Sr	2
Co	0.005	Mo	0.05	Zn	0.2
Cr	0.01	Na	100		
Cu	0.1	Ni	0.05		

*A higher LOQ applies to samples with high chloride levels.

**A higher LOQ applies to samples with high molybdenum levels.

Minimum sample volume: 60 ml

Method: ICP-OES, ICP-SFMS and AFS

TOTAL METALS ARE ALSO AVAILABLE. CONTACT US FOR MORE INFORMATION.





Monitoring metal package - dissolved metals (group 1)

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
Al	0.01	Co	0.002	P	0.01
Sb	0.01	Cu	0.002	K	0.015
As	0.005	Fe	0.002	Se	0.01
Ba	0.0005	Pb	0.005	Ag	0.001
Be	0.0002	Li	0.001	Na	0.03
B	0.01	Mg	0.003	Tl	0.01
Cd	0.0004	Mn	0.0005	V	0.001
Ca	0.005	Mo	0.002	Zn	0.002
Cr	0.001	Ni	0.002		

Minimum sample volume: plastic, 60 ml
Method: ICP-OES

Dissolved metals (group 2)

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
Bi	0.01	S	0.06	Ti	0.001
Si	0.01	Te	0.01	Zr	0.001
Sr	0.001	Sn	0.01		

Minimum sample volume: plastic, 60 ml
Method: ICP-OES

Dissolved metals (group 3)

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
Ge	0.02	Nb	0.02	Rb	0.02
Au	0.02	Os	0.05	Ta	0.05
Hf	0.02	Pd	0.02	W	0.02
Ir	0.05	Pt	0.02	U	0.05
La	0.02	Rh	0.02		

Minimum sample volume: plastic, 60 ml
Method: ICP-OES

Dissolved halogens

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
bromide	5	bromine	5	iodine	2

Minimum sample volume: plastic, 60 ml
Method: ICP-MS

Dissolved Cr(III) and Cr(VI)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
Cr (III)	1	Cr (IV)	0.4	Cr	1

Minimum sample volume: plastic, 60 ml + plastic, 150 ml
Method: ICP-OES, IC

Dissolved mercury

Parameter	LOQ (µg/l)
Hg	0.01

Minimum sample volume: glass, 100 ml
Method: AFS
Note: Lower LOQ can be achieved.

Parameter	LOQ (ng/l)
methylmercury	0.03

Minimum sample volume: glass, 100 ml
Method: ID-GC-ICP-MS

Organotin compounds

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
monobutyltin	0.001	tributyltin (TBT)	0.001	monophenyltin	0.001
dibutyltin	0.001	tetrabutyltin	0.001	diphenyltin	0.001
tributyltin (TBT)	0.001	mono-octyltin	0.001	triphenyltin	0.001
tetrabutyltin	0.001	di-octyltin	0.001		
mono-octyltin	0.001	tricyclohexyltin	0.001		

Minimum sample volume: glass, 250 ml
Method: GC-AED, GC-ICP-SFMS

Organic indicator parameters

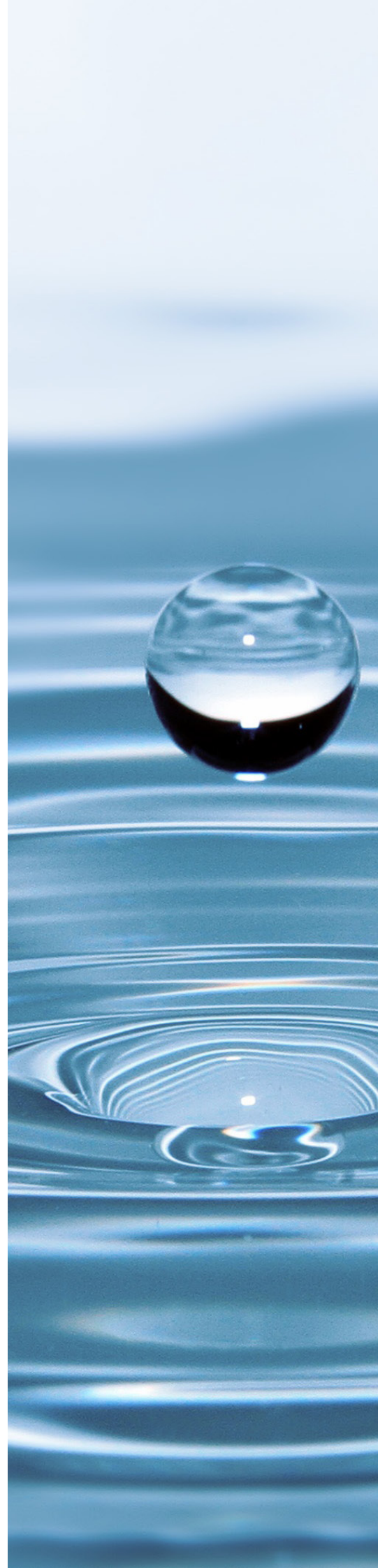
Parameter	LOQ	Sample volume
AOX	0.01 mg/l	glass, 100 ml
DOC	0.5 mg/l	glass, 100 ml
EOX	0.05 mg/l	glass, 250 ml
formaldehyde	0.05 mg/l	glass, 100 ml
formic acid	2 mg/l	glass, 1000 ml
humic matter	1 mg/l	glass, 250 ml
phenol index	0.005 mg/l	glass, 100 ml
acetone	10 µg/l	2x glass vial, 40 ml
anionic tensides (surfactants)	0.02 mg/l	glass, 100 ml
cationic tensides (surfactants)	0.25 mg/l	glass, 250 ml
non-ionic tensides (surfactants)	0.2 mg/l	glass, 1000 ml
TOC	0.5 mg/l	plastic, 250 ml

Trihalomethanes (VOC)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
trichloromethane	0.3	bromodichloromethane	0.1
tribromomethane	0.2	sum of trihalogenomethanes	0.7
dibromochloromethane	0.1		

Minimum sample volume: glass vials, 2x 40 ml
Method: GC-MS

**CUSTOMISATION OF VOC PACKAGE?
 CONTACT US!**



Fuel additives (VOC)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
MTBE (methyl tert-butyl ether)	0.2	TBA (tert-butyl alcohol)	5
ETBE (ethyl tert-butyl ether)	0.2	TAME (tert-amyl methyl ether)	0.2
DIPE (diisopropyl ether)	0.6	TEL (tetraethyl lead)	1
ethanol	100		

Minimum sample volume: glass vials, 2x 40 ml
Method: GC-MS

Volatile organic compounds (VOC - EPA 8260)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
1,1,1,2-tetrachloroethane	0.1	ethyl tert-butylether (ETBE)	0.2
1,1,1-trichloroethane	0.1	ethylbenzene	0.1
1,1,2,2-tetrachloroethane	1	hexachlorobutadiene	1
1,1,2-trichloroethane	0.2	chlorobenzene	0.1
1,1-dichloro-1-propene	1	chloroethane	1
1,1-dichloroethane	0.1	chloromethane	10
1,1-dichloroethene	0.1	chloroform	0.3
1,2,3-trichlorobenzene	0.1	isopropylbenzene	1
1,2,3-trichloropropane	1	m, p-xylenes	0.2
1,2,4-trichlorobenzene	0.1	methyl tert-butylether (MTBE)	0.2
1,2,4-trimethylbenzene	1	naphtalene	1
1,2-dibromo-3-chloropropane	1	n-butylbenzene	1
1,2-dibromoethane (EDB)	0.5	p-isopropyltoluene	1
1,2-dichlorobenzene	0.1	n-propylbenzene	1
1,2-dichloroethane	0.5	o-xylene	0.1
1,2-dichloropropane	1	sec-butylbenzene	1
1,3,5-trichlorobenzene	0.2	styrene	0.2
1,3,5-trimethylbenzene	1	sum of 3 dichlorobenzenes	0.3
1,3-dichlorobenzene	0.1	sum of 3 trichlorobenzenes	0.4
1,3-dichloropropane	1	sum of 4 trihalomethanes	0.7
1,4-dichlorobenzene	0.1	sum of 5 chlorinated ethenes	0.6
2,2-dichloropropane	1	sum of BTEX	1.1
2-chlorotoluene	1	sum of BTEXS	1.3
4-chlorotoluene	1	sum of TEX	0.9
bromobenzene	1	sum of xylenes	0.3
benzene	0.2	tert-amylethylether (TAEE)	0.2
bromodichloromethane	0.1	tert-amylmethylether (TAME)	0.2
bromochloromethane	2	tert-butylalcohol (TBA)	5
bromomethane	1	tert-butylbenzene	1
bromoform	0.2	tetrachloroethene	0.2
cis-1,2-dichloroethene	0.1	tetrachloromethane	0.1
cis-1,3-dichloro-1-propene	1	toluene	0.5
dibromochloromethane	0.1	trans-1,2-dichloroethene	0.1
dibromomethane	1	trans-1,3-dichloropropene	1
dichlorodifluoromethane	1	trichloroethene	0.1
dichloromethane	6	trichlorofluoromethane	1
diisopropylether (DIPE)	0.6	vinylchloride	0.1

Minimum sample volume: top-filled glass vials, 2x 40 ml
Method: GC-MS

Gases C1 - C2

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
acetylen (ethin)	1	ethan	1	ethen	1
methan	2				

Minimum sample volume: op-filled glass vials, 2x 40 ml
Method: GC-FID

Polycyclic aromatic hydrocarbons (EPA-PAH)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
naphthalene	0.1	chrysene	0.01
acenaphthylene	0.01	benzo(b)fluoranthene	0.01
acenaphthene	0.01	benzo(k)fluoranthene	0.01
fluorene	0.02	benzo(a)pyrene	0.02
phenanthrene	0.03	dibenzo(ah)anthracene	0.01
anthracene	0.02	benzo(ghi)perylene	0.01
fluoranthene	0.03	indeno(123cd)pyrene	0.01
pyrene	0.06	sum of PAH	0.38
benzo(a)anthracene	0.01		

Maximum sample volume: glass, 200 ml
Method: GC-MS

Petroleum hydrocarbons by FTIR in waste water

Parameter	LOQ (mg/l)
non-polar extractable aliphatics	0.1

Minimum sample volume: glass, 500 ml
Method: FTIR

Petroleum hydrocarbons by FTIR (perchloroethylene extraction)

Parameter	LOQ (mg/l)
total extractable aliphatics	0.10
non-polar aliphatics	0.10
total extractable aromatics	0.10

Minimum sample volume: glass, 500 ml
Method: FTIR

Petroleum hydrocarbons - C10 - C40 fractions

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
fraction C10-C12	5	fraction C35-C40	10
fraction C12-C16	5	fraction C10-C40	50
fraction C16-C35	30		

Minimum sample volume: glass, 250 ml
Method: GC-FID

**DIFFERENT FRACTIONS NEEDED
 FOR PETROLEUM HYDROCARBONS?
 CONTACT US!**





Petroleum hydrocarbons - fractions C5 - C40 with aliphatic fractions and aromatic fractions

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
fraction C5-C6	10	fraction C16-C35	50
fraction C6-C8	10	fraction C35-C40	10
fraction C8-C10	5	fraction C5-C10	25
fraction C10-C12	5	fraction C5-C40	120
fraction C12-C16	30		
ALIPHATIC FRACTION			
aliphatic fraction C5-C6	10	aliphatic fraction C16-C35	50
aliphatic fraction C6-C8	10	aliphatic fraction C35-C40	10
aliphatic fraction C8-C10	5	aliphatic fraction C5-C10	25
aliphatic fraction C10-C12	5	aliphatic fraction C5-C40	120
aliphatic fraction C12-C16	30		
AROMATIC FRACTION			
aromatic fraction C5-C7	10	aromatic fraction C16-C21	20
aromatic fraction C7-C8	10	aromatic fraction C21-C35	30
aromatic fraction C8-C10	5	aromatic fraction C35-C40	10
aromatic fraction C10-C12	5	aromatic fraction C5-C10	25
aromatic fraction C12-C16	30	aromatic fraction C5-C40	120

Maximum sample volume: glass, 500 ml
Method: GC-FID

Petroleum hydrocarbons - qualitative determination

type of petroleum contamination and chromatogram profile

Minimum sample volume: glass, 250 ml
Method: GC-FID

GASOLINE RANGE ORGANICS (GRO), DIESEL RANGE ORGANICS (DRO) AND OIL RANGE ORGANICS (ORO) ACCORDING TO EPA 8015B ARE ALSO AVAILABLE.

Pesticides screening

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
1-(3,4-Dichlorophenyl) urea (DCPU)	0.02	desmetryn	0.01
2-amino-N-(isopropyl)benzamide	0.02	diazinon	0.02
2-Chloro-2,6-diethylacetanilide	0.01	dicrotophos	0.01
acetamiprid	0.01	diethofencarb	0.02
acetochlor	0.03	difenacoum	0.02
acibenzolar-S-methyl	0.03	difenoconazole	0.02
aclonifen	0.03	difenoxuron	0.02
alachlor	0.02	diflubenzuron	0.02
aldicarb	0.05	diflufenican	0.02
aldicarb sulfone	0.01	dichlofenthion	0.05
ametryn	0.01	dichlormid	0.05
amidosulfuron	0.02	dichlorvos	0.05
atraton	0.01	dimefuron	0.02
atrazine	0.01	dimethachlor	0.01
atrazine-2-hydroxy	0.01	dimethenamid	0.01
atrazine-desethyl	0.01	dimethoate	0.01
atrazine-desisopropyl	0.01	dimethomorph	0.01
azinhos-ethyl	0.04	diuron	0.01
azinhos-methyl	0.04	diuron desmethyl (DCPMU)	0.03
azoxystrobin	0.01	epoxiconazole	0.03
BAM	0.01	EPTC	0.02
BDMC	0.02	ethiofencarb	0.02
benalaxyl	0.02	ethion	0.02
bendiocarb	0.01	ethofumesate	0.01
bentazone methyl	0.03	ethoprophos	0.02
bifenox	0.04	fenamiphos	0.02
bitertanol	0.02	fenarimol	0.03
boscalid	0.01	fenhexamid	0.03
bromacil	0.01	fenoxaprop	0.03
bromophos-ethyl	0.03	fenoxycarb	0.02
cadusafos	0.02	fenpropidin	0.02
carbaryl	0.01	fenpropimorph	0.01
carbendazim	0.01	fensulfothion	0.02
carbetamide	0.01	fenuron	0.01
carbofuran	0.01	fipronil	0.05
carbofuran-3-hydroxy	0.01	florasulam	0.02
carboxin	0.02	fluazifop	0.02
carfentrazone-ethyl	0.04	fluazifop-butyl (isomers)	0.02
clodinafop	0.03	flusilazole	0.01
clomazone	0.01	flutolanil	0.02
clomeprop	0.01	fonofos	0.05
clothianidin	0.05	foramsulfuron	0.01
coumaphos	0.02	furathiocarb	0.02
crimidine	0.03	haloxyfop	0.03
cyanazine	0.01	haloxyfop-methyl (isomers)	0.03
cybutryne (irgarol)	0.01	hexaconazole	0.02
cymoxanil	0.05	hexazinone	0.01
cyprazine	0.02	hexythiazox	0.02
cyproconazole	0.01	chlorbromuron	0.01
cyprodinil	0.02	chlorfenvinphos	0.01
cyromazine	0.05	chloridazon	0.01

2,4-D

Aldrin

Atrazine

Bentazon

CHLORPYRIFOS

Chlortoluro

DI

DIMETHOATE

FENTH

Glyphosate

Malathion

Ma

MCPA

Paraquat

Propachlor

Si

Triflura



ne

on

OT

DIQUAT

ION

isoproturon

ancozeb

mazine

lin

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
chloridazon-desphenyl	0.03	neburon	0.01
chlorotoluron	0.01	nicosulfuron	0.01
chlorotoluron-desmethyl	0.02	nuarimol	0.02
chloroxuron	0.01	omethoate	0.05
chlorpropham	0.05	oxadixyl	0.03
chlorpyrifos	0.005	oxamyl	0.01
chlorpyrifos-methyl	0.02	paclobutrazol	0.02
chlorsulfuron	0.01	paraoxon-ethyl	0.02
imazalil	0.03	paraoxon-methyl	0.02
imazamethabenz-methyl	0.01	parathion-ethyl	0.05
imazamox	0.01	penconazole	0.02
imazethapyr	0.01	pencycuron	0.02
imidacloprid	0.02	pendimethalin	0.03
indoxacarb	0.05	phorate	0.03
iprodione	0.03	phosalone	0.01
iprovalicarb	0.01	phosmet	0.05
isoproturon	0.01	phosphamidon	0.01
isoproturon-desmethyl	0.02	picloram	0.05
isoproturon-monodesmethyl	0.02	picoxystrobin	0.01
isopyrazam	0.03	pirimicarb	0.01
kresoxim-methyl	0.03	pirimiphos-ethyl	0.02
lenacil	0.03	pirimiphos-methyl	0.01
linuron	0.02	pretilachlor	0.02
malaoxon	0.02	primisulfuron-methyl	0.02
Malathion	0.01	prodiamine	0.05
mandipropamid	0.02	profenofos	0.01
mecarbam	0.02	prochloraz	0.02
mefenpyr-diethyl	0.02	promecarb	0.01
mesosulfuron-methyl	0.02	prometon	0.02
mesotrione	0.05	prometryn	0.01
metalaxyl (isomers)	0.01	propachlor	0.01
metamitron	0.03	propamocarb	0.03
metazachlor	0.01	propanil	0.03
metconazole	0.02	propaquizafop	0.03
methabenzthiazuron	0.01	propazine	0.01
methamidophos	0.01	propham	0.05
methidathion	0.01	propiconazole	0.01
methiocarb	0.02	propoxur	0.01
methomyl	0.01	propoxycarbazone-sodium	0.05
methoxyfenozide	0.03	propyzamide	0.01
metobromuron	0.03	prosulfocarb	0.01
metolachlor (isomers)	0.01	prothioconazole	0.05
metoxuron	0.01	pyribenzoxim	0.05
metribuzin	0.03	pyrimethanil	0.02
metribuzin-desamino	0.01	pyriproxifen	0.03
metsulfuron-methyl	0.01	quinclorac	0.02
molinate	0.01	quinmerac	0.01
monocrotophos	0.01	quinoxifen	0.04
monolinuron	0.02	quizalofop	0.05
monuron	0.02	rimsulfuron	0.01
napropamide	0.01	sebutylazine	0.01
naptalam	0.03	secbumeton	0.01

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
sethoxydim	0.02	thiamethoxam	0.01
simazine	0.01	thifensulfuron-methyl	0.01
simazine-2-hydroxy	0.01	thiobencarb	0.01
simetryn	0.01	thiophanate-methyl	0.03
spiroxamine	0.01	triadimefon	0.02
sulfosulfuron	0.01	triadimenol	0.01
tebuconazole	0.01	tri-allate	0.05
tebuthiuron	0.02	triasulfuron	0.02
teflubenzuron	0.03	triazophos	0.02
terbuthylazine	0.01	tribenuron-methyl	0.01
terbuthylazine-desethyl	0.01	tricyclazole	0.01
terbuthylazine-desethyl-2-hydroxy	0.01	trifloxysulfuron-sodium	0.01
terbuthylazine-hydroxy	0.01	triflusulfuron-methyl	0.01
terbutryn	0.01	triforine	0.05
thiabendazole	0.03	triticonazole	0.01

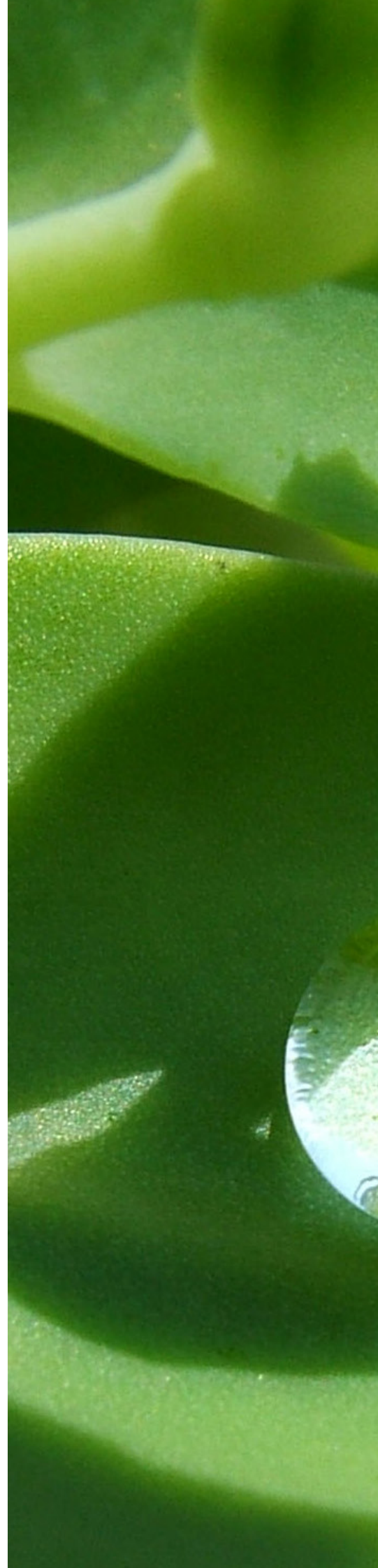
Minimum sample volume: glass vial, 2x 40 ml
Method: LC-MS-MS

Acidic herbicides

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
2,4,5-T	0.01	bromoxynil	0.01	MCPA	0.01
2,4,5-TP	0.01	clopyralid	0.03	MCPB	0.02
2,4-D	0.01	dicamba	0.03	MCPP (isomers)	0.01
2,4-DB	0.02	diclofop	0.02	mecoprop-P	0.01
2,4-DP (isomers)	0.01	dichlorprop-P	0.01	picloram	0.02
4-CPP	0.01	dinoseb	0.02	propoxycarbazone-sodium	0.01
acifluorfen	0.01	DNOC	0.03	triclopyr	0.03
aminopyralide	0.05	fluroxypyr	0.02	triclosan	0.05
bentazone	0.01	ioxynil	0.01		

Minimum sample volume: glass vials, 2x 40 ml
Method: LC-MS-MS

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Organochlorinated pesticides

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
1,2,3,4-Tetrachlorobenzene	0.01	hexachlorocyclohexane Beta	0.01
1,2,3,5- & 1,2,4,5-Tetrachlorobenzene	0.02	hexachlorocyclohexane Delta	0.01
2,4-DDD	0.01	hexachlorocyclohexane Epsilon	0.01
2,4-DDE	0.01	hexachlorocyclohexane Gamma	0.01
2,4-DDT	0.01	hexachloroethane	0.01
4,4'-DDD	0.01	chlordane-cis	0.01
4,4'-DDE	0.01	chlordane-trans	0.01
4,4'-DDT	0.01	isodrin	0.01
Alachlor	0.01	methoxychlor	0.01
Aldrin	0.005	mirex	0.01
alpha-Endosulfan	0.01	nonachlor-cis	0.01
beta-Endosulfan	0.01	nonachlor-trans	0.01
dieldrin	0.01	oxychlordane	0.01
dichlobenil	0.05	pentachlorobenzene	0.01
endosulfan sulfate	0.01	sum of 3 tetrachlorobenzenes	0.03
endrin	0.01	sum of 4 hexachlorocyclohexanes	0.04
heptachlor	0.01	sum of 4 isomers DDT	0.04
heptachloroepoxide-cis	0.01	sum of 6 isomers DDT	0.06
heptachloroepoxide-trans	0.01	telodrin	0.01
hexachlorobenzene (HCB)	0.005	trifluralin	0.01
hexachlorobutadiene	0.01	PBB 153	0.01
hexachlorocyclohexane Alpha	0.01		

Minimum sample volume: glass, 500 ml
Method: GC-ECD

Glyphosate and metabolites

Parameter	LOQ (µg/l)
glyphosate	0.1
gluphosinate ammonium	0.1
AMPA	0.1

Minimum sample volume: plastic, 100 ml
Method: LC-MS-MS

PERSISTENT ORGANIC POLLUTANTS

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Coplanar PCBs and indicator PCBs

Parameter	Parameter	Parameter
NON-ORTHO PCB		MONO-ORTHO PCB
PCB 77	PCB 105	PCB 156
PCB 81	PCB 114	PCB 157
PCB 126	PCB 118	PCB 167
PCB 169	PCB 123	PCB 189
DI-ORTHO PCB		INDICATOR PCB
PCB 170	PCB 28	PCB 138
PCB 180	PCB 52	PCB 153
	PCB 101	PCB 180
	PCB 118	

LOQ is 1.5 pg/l WHO-TEQ for total coplanar PCB and 68 ng/l for sum of indicator PCBs.

Minimum sample volume: glass, 1000 ml

Method: HRGC-HRMS

Note: Dioxins and dioxin-like PCBs can be determined together. Please contact your local sales representative for further information.

Dioxins (PCDD/F)

Parameter	Parameter	Parameter
2,3,7,8-PCDD/F CONGENERS		
2,3,7,8-TCDD	OCDD	1,2,3,7,8,9-HxCDF
1,2,3,7,8-PeCDD	2,3,7,8-TCDF	2,3,4,6,7,8-HxCDF
1,2,3,4,7,8-HxCDD	1,2,3,7,8-PeCDF	1,2,3,4,6,7,8-HpCDF
1,2,3,6,7,8-HxCDD	2,3,4,7,8-PeCDF	1,2,3,4,7,8,9-HpCDF
1,2,3,7,8,9-HxCDD	1,2,3,4,7,8-HxCDF	OCDF
1,2,3,4,6,7,8-HpCDD	1,2,3,6,7,8-HxCDF	
OTHER CONGENERS		
tetra-CDD	hepta-CDD	hexa-CDF
penta-CDD	tetra-CDF	hepta-CDF
hexa-CDD	penta-CDF	

LOQ is 5 pg I-TEQ/l for total 2,3,7,8-PCDD/F congeners.

Minimum sample volume: glass, 1000 ml

Method: HRGC-HRMS

Note: Results can also be expressed according to WHO factors. Dioxins and dioxin-like PCBs can be determined together. Please contact your local sales representative for further information.

Polybrominated diphenylethers

Parameter	LOQ (pg/l)	Parameter	LOQ (pg/l)	Parameter	LOQ (pg/l)
BDE 28	100	BDE 100	80	BDE 183	260
BDE 47	1100	BDE 153	80	BDE 209	2600
BDE 99	250	BDE 154	80	Sum	4600

Minimum sample volume: glass, 1000 ml

Method: HRGC-HRMS

Note: Homologue groups and other congeners can also be determined. Please contact your local sales representative.





Polychlorinated biphenyls (PCB 7)

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
PCB 28	0.0011	PCB 138	0.0012
PCB 52	0.0011	PCB 180	0.00095
PCB 101	0.00075	PCB 153	0.0011
PCB 118	0.0011	Sum of PCBs	0.0073

Minimum sample volume: glass, 1000 ml
Method: GC-ECD

Chloroalkanes

Parameter	LOQ (µg/l)
chlorinated alkanes C10-C13	0.4

Minimum sample volume: glass, 250 ml
Method: GC-MS

Glycols

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
monopropylene glycol	100	ethylene glycol	100
triethylene glycol	100	diethylene glycol	100

Minimum sample volume: 2x glass vial, 40 ml
Method: GC-MS

Bisphenol A

Parameter	LOQ (µg/l)	Method	Minimum sample volume
bisphenol A	0.05	GC-MS	glass, 500 ml

Nonylphenol and octylphenol

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
4-tert-octylphenol	0.01	4-nonylphenol	0.1

Minimum sample volume: glass, 250 ml
Method: GC-MS

Nonylphenol, octylphenol and their ethoxylates

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
4-n-octylphenol (CAS 1806-26-4)	0.1	4-nonylphenol (CAS 104-40-5)	0.1
4-t-octylphenol (CAS 140-66-9)	0.01	nonylphenol - isomer mix (CAS 84852-15-3) = nonylphenol (CAS 25154-52-3)	0.1
4-t-octylphenol monoethoxylate (CAS 2315-67-5)	0.01	nonylphenol monoethoxylate - isomer mix (CAS 104-35-8)	0.1
4-t-octylphenol diethoxylate (CAS 2315-61-9)	0.01	nonylphenol diethoxylate - isomer mix (CAS 20427-84-3)	0.1
4-t-octylphenol triethoxylate (CAS 2315-62-0)	0.01	nonylphenol triethoxylate - isomer mix (CAS 51437-95-7)	0.1

Minimum sample volume: glass, 250 ml
Method: GC-MS

Phenols and cresols

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
phenol	1	2,6-dimethylphenol	1
o-cresol	1	3,4-dimethylphenol	1
m-cresol + p-cresol	2	3,5-dimethylphenol	1
2,3-dimethylphenol	1	sum of cresols	3
2,4-dimethylphenol + 2,5-dimethylphenol	2		

Minimum sample volume: glass, 500 ml
Method: GC-MS

Chlorophenols

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
2-monochlorophenol	0.1	2,4,6-trichlorophenol	0.1
3-monochlorophenol	0.1	3,4,5-trichlorophenol	0.1
4-monochlorophenol	0.1	2,3,4,5-tetrachlorophenol	0.1
2,3-dichlorophenol	0.1	2,3,4,6-tetrachlorophenol	0.1
2,4+2,5-dichlorophenols	0.2	2,3,5,6-tetrachlorophenol	0.1
2,6-dichlorophenol	0.1	pentachlorophenol	0.1
3,4-dichlorophenol	0.1	sum of 3-monochlorophenols	0.3
3,5-dichlorophenol	0.1	sum of 6-dichlorophenols	0.6
2,3,4-trichlorophenol	0.1	sum of 6-trichlorophenols	0.6
2,3,5-trichlorophenol	0.1	sum of 6-tetrachlorophenols	0.3
2,3,6-trichlorophenol	0.1	sum of 19 chlorophenols	1.9
2,4,5-trichlorophenol	0.1		

Minimum sample volume: glass, 500 ml
Method: GC-MS

Phthalates

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
dimethylphthalate (DMP)	0.6	di-n-octylphthalate (DnOP)	0.6
diethylphthalate (DEP)	0.6	bis(2-ethylhexyl)phthalate (DEHP)	1.3
di-n-propylphthalate (DnPP)	0.6	butylbenzylphthalate (BBP)	0.6
di-n-butylphthalate (DnBP)	0.6	di-cyclohexylphthalate (DCHP)	0.6
di-isobutylphthalate (DiBP)	0.6	sum of phthalates	6.7
di-pentylphthalate (DPP)	0.6		

Minimum sample volume: glass, 500 ml
Method: GC-MS

Complexing agents

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
ethylenediaminetetraacetic acid	0.5	propylenediaminetetraacetic acid	0.5
nitrilotriacetic acid	0.5		

Minimum sample volume: glass, 250 ml
Method: GC-MS

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Nitrotoluenes

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
2,4,6-trinitrotoluene (TNT)	0.1	2,6-dinitrotoluene	0.1	3-nitrotoluene	0.1
2,3-dinitrotoluene	0.1	3,4-dinitrotoluene	0.1	4-nitrotoluene	0.1
2,4-dinitrotoluene	0.1	2-nitrotoluene	0.1		

Minimum sample volume: glass, 1000 ml
 Method: GC-MS

RDX, HMX and TNT

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
RDX (hexogen)	0.2	TNT (trotyl)	0.1
HMX (octogen)	0.2		

Minimum sample volume: glass, 1000 ml
 Method: HPLC-DAD and GC-MS

Organic acids

Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)	Parameter	LOQ (mg/l)
acetic acid	5	lactic acid	5	isovaleric acid	5
caproic acid	10	propionic acid	5	formic acid	5
butylic and isobutylic acid	5	valeric acid	5		

Minimum sample volume: plastic, 100 ml
 Method: capillary electrophoresis

Anilines

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
aniline	0.05	3-chloraniline	0.05	4-chloro-2-nitroaniline	0.1
N-ethylaniline	0.1	3,4-dichloraniline	0.1	benzidine	0.1
2-chloraniline	0.05	4-bromaniline	0.05		

Minimum sample volume: glass, 1000 ml
 Method: GC-MS

Perfluorinated compounds

Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)	Parameter	LOQ (µg/l)
PFOS	0.01	PFD _o A	0.01	PFD _o S	0.025
PFOA	0.01	PFT _r DA	0.025	FTS-6:2	0.01
PFHxA	0.01	PFTA	0.025	FTS-8:2	0.01
PFHpA	0.01	PFBS	0.01	PFOSA	0.01
PFPeA	0.01	PFHxS	0.01	N-Me-FOSA	0.05
PFNA	0.01	PFHpS	0.01	N-Et-FOSA	0.05
PFDA	0.01	PFBA	0.01	N-Me-FOSE	0.025
PFUnA	0.01	PFDS	0.01	N-Et-FOSE	0.025

Minimum sample volume: plastic, 100 ml
 Method: LC-MS-MS

Envipack - monitoring package

Parameter		LOQ (µg/l)		Parameter		LOQ (µg/l)		Parameter		LOQ (µg/l)	
NON-HALOGENATED VOC											
benzene		0.2		o-xylene		0.1		xylenes		0.5	
ethylbenzene		0.1		styrene		0.2		sum of BTEX		1.5	
m, p-xylene		0.2		toluene		0.5		methyl tert-butyl ether		0.2	
CHLORINATED VOC											
dichloromethane		6		tetrachloromethane		0.1		trans-1,2-dichloroethene		0.1	
1,1-dichloroethane		0.1		1,1,1-trichloroethane		0.1		trichloroethene		0.1	
1,2-dichloroethane		1		1,1,2-trichloroethane		0.2		tetrachloroethene		0.2	
1,2-dichloropropane		1		hexachloroethane		0.01		vinyl chloride		1	
trichloromethane		0.3		cis-1,2-dichloroethene		0.1					
CHLORBENZENES											
monochlorobenzene		0.1		1,2,3-trichlorobenzene		0.1		1,2,3,5+1,2,4,5-TeCB		0.02	
1,2-dichlorobenzene		0.1		1,2,4-trichlorobenzene		0.2		tetrachlorobenzenes		0.03	
1,3-dichlorobenzene		0.1		1,3,5-trichlorobenzene		0.3		pentachlorobenzene		0.01	
1,4-dichlorobenzene		0.1		trichlorobenzenes		0.6		hexachlorobenzene		0.005	
dichlorobenzenes		0.3		1,2,3,4-tetrachlorobenzene		0.01					
CHLOROPHENOLS											
2-monochlorophenol		0.1		3,4-dichlorophenol		0.1		2,4,6-trichlorophenol		0.1	
3-monochlorophenol		0.1		3,5-dichlorophenol		0.1		3,4,5-trichlorophenol		0.1	
4-monochlorophenol		0.1		2,3,4-trichlorophenol		0.1		2,3,4,5-tetrachlorophenol		0.1	
2,3-dichlorophenol		0.1		2,3,5-trichlorophenol		0.1		2,3,4,6-tetrachlorophenol		0.1	
2,4+2,5-dichlorophenols		0.2		2,3,6-trichlorophenol		0.1		2,3,5,6-tetrachlorophenol		0.1	
2,6-dichlorophenol		0.1		2,4,5-trichlorophenol		0.1		pentachlorophenol		0.1	
OCP											
alpha-hexachlorocyclohexane		0.01		isodrin		0.01		o,p-DDE		0.01	
beta-hexachlorocyclohexane		0.01		telodrin		0.01		o,p-DDT		0.01	
gamma-hexachlorocyclohexane		0.01		heptachlor		0.01		p,p-DDD		0.01	
aldrin		0.005		cis-heptachlor epoxide		0.01		p,p-DDE		0.01	
dieldrin		0.01		trans-heptachlor epoxide		0.01		p,p-DDT		0.01	
endrin		0.01		o,p-DDD		0.01		alpha-endosulfan		0.01	
PAH											
naphthalene		0.1		fluoranthene		0.03		benzo(a)pyrene		0.02	
acenaphtylene		0.01		pyrene		0.06		dibenzo(ah)anthracene		0.01	
acenaphtrene		0.01		benzo(a)anthracene		0.01		benzo(ghi)perylene		0.01	
fluorene		0.02		chrysene		0.01		indeno(123cd)pyrene		0.01	
phenanthrene		0.03		benzo(b)fluoranthene		0.01		sum of PAH		0.37	
anthracene		0.01		benzo(k)fluoranthene		0.01					
PCB											
PCB 28		0.0011		PCB 118		0.0011		PCB 180		0.00095	
PCB 52		0.0011		PCB 138		0.0012		sum of 7 PCBs		0.0073	
PCB 101		0.00075		PCB 153		0.0011					
TPH											
>C10-C12 fraction		5		>C16-C35 fraction		30		>C8-C10 fraction		10	
>C12-C16 fraction		5		>C5-C8 fraction		10					
METALS											
As	1	Co	0.5	Hg	0.01	Pb	1	Zn	2		
Ba	1	Cr	5	Mo	1	Sn	1				
Cd	0.5	Cu	1	Ni	1	V	5				

Minimum sample volume: 2x glass vial, 40 ml; glass, 2100 ml; plastic, 60 ml
Method: GC-MS, GC-FID, GC-ECD, ICP-OES, ICP-MS, AFS



Microbiological parameters

Parameter	Sample Volume
<i>Candida</i>	sterile plastic or glass, 500 ml
<i>Clostridium perfringens</i> (EN 26461-2)	sterile plastic or glass, 500 ml
<i>Escherichia coli</i> , coliform bacteria (EN ISO 9308-1) - drinking, pool water	sterile plastic or glass, 500 ml
enterococci (EN ISO 7899-2)	sterile plastic or glass, 500 ml
coliform bacteria (TNV 757837) - non-disinfected water	sterile plastic or glass, 500 ml
<i>Legionella pneumophila</i>	sterile plastic or glass, 500 ml
<i>Legionella species</i>	sterile plastic or glass, 500 ml
<i>Legionella</i> - species typification	sterile plastic or glass, 500 ml
mesophile bacteria	sterile plastic or glass, 250 ml
colony counting at 22°C (ISO 6222)	sterile plastic or glass, 250 ml
colony counting at 36°C (ISO 6222)	sterile plastic or glass, 250 ml
microscopy - abioseston	plastic or glass, 250 ml
microscopy - dead organisms	plastic or glass, 250 ml
microscopy - living organisms, number of organisms	plastic or glass, 250 ml
moulds	sterile plastic or glass, 500 ml
<i>Pseudomonas aeruginosa</i>	sterile plastic or glass, 500 ml
psychrophile bacteria	sterile plastic or glass, 250 ml
<i>Salmonella</i>	sterile plastic or glass, 1000 ml
spores of sulfite - reducing anaerobes	sterile plastic or glass, 500 ml
<i>Staphylococcus aureus</i>	sterile plastic or glass, 500 ml
thermotolerant coliform bacteria and <i>Escherichia coli</i> (TNV 757835) - raw, surface, wastewater	sterile plastic or glass, 500 ml

Ecotoxicity tests

Parameter	Sample volume
acute toxicity on <i>Daphnia magna</i> (EC ₅₀) - basic test	glass or plastic, 2 l
acute toxicity on <i>Daphnia magna</i> - limit test 10 ml/l	glass or plastic, 0.5 l
acute toxicity on <i>Daphnia magna</i> - verification test	glass or plastic, 1 l
acute toxicity on <i>Poecilia reticulata</i> (LC ₅₀) - basic test	glass or plastic, 8 l
acute toxicity on <i>Poecilia reticulata</i> - limit test 10 ml/l	glass or plastic, 1 l
acute toxicity on <i>Poecilia reticulata</i> - verification test	glass or plastic, 4.5 l
acute toxicity on <i>Scenedesmus subspicatus</i> (<i>Desmodesmus Subspicatus</i>) (IC ₅₀) - basic test	glass or plastic, 1 l
acute toxicity on <i>Scenedesmus subspicatus</i> (<i>Desmodesmus Subspicatus</i>) - limit test 10 ml/l	glass or plastic, 0.5 l
acute toxicity on <i>Scenedesmus subspicatus</i> (<i>Desmodesmus Subspicatus</i>) - verification test	glass or plastic, 0.25 l
acute toxicity on <i>Sinapis alba</i> (IC ₅₀) - basic test	glass or plastic, 0.25 l
acute toxicity on <i>Sinapis alba</i> - limit test 10 ml/l	glass or plastic, 0.5 l
acute toxicity on <i>Sinapis alba</i> - verification test	glass or plastic, 50 ml
acute toxicity on <i>Lemna minor</i> - basic test	glass or plastic, 2 l
acute toxicity on <i>Lemna minor</i> - verification test	glass or plastic, 1 l
luminescent bacteria test (<i>Vibrio fischeri</i>) - Microtox	glass or plastic, 100 ml

Ecotoxicity - basic test package

Parameter
acute toxicity on <i>Daphnia magna</i> (EC ₅₀)
acute toxicity on <i>Poecilia reticulata</i> (LC ₅₀)
acute toxicity on <i>Scenedesmus subspicatus</i> (<i>Desmodesmus Subspicatus</i>) (IC ₅₀)
acute toxicity on <i>Sinapis alba</i> (IC ₅₀)

Minimum sample volume: glass or plastic, 10 l

Radiometric analysis

Parameter	LOQ	Sample volume
total indicative dose (TID) - estimation	0.03 mSv/r	plastic, 1000 ml
total indicative dose (TID) - drinking water - calculation	0.03 mSv/r	plastic, 1000 ml
gross alpha activity	0.05 Bq/l	plastic, 1000 ml
gross alpha activity - precipitation method (dissolved matters >500 mg/l)	0.05 Bq/l	plastic, 1000 ml
gross alpha activity gross beta activity after correction for K-40	0.05 Bq/l 0.10 Bq/l	plastic, 2000 ml
gross alpha activity gross beta activity after correction for K-40 tritium	0.05 Bq/l 0.10 Bq/l 10 Bq/l	plastic, 2000 ml
gross beta activity	0.10 Bq/l	plastic, 1000 ml
gross beta activity after correction for K-40	0.10 Bq/l	plastic, 1000 ml
lead-210	0.05 Bq/l	plastic, 1000 ml
plutonium-239	0.001 Bq/l	plastic, 250 ml
polonium-210	0.05 Bq/l	plastic, 1000 ml
radium-226	0.03 Bq/l	plastic, 1000 ml
radium-228	0.05 Bq/l	plastic, 2000 ml
radon-222	5 Bq/l	plastic, 330 ml – without air bubble*
rubidium-87	0.001 Bq/l	plast, 100 ml
stroncium-90	0.05 Bq/l	plastic, 1000 ml
stroncium - 90 - low limit	0.02 Bq/l	plastic, 2000 ml
tritium - low limit	2 Bq/l	plastic, 100 ml
tritium (LOQ 5 Bq/l)	5 Bq/l	plastic, 100 ml
tritium	10 Bq/l	plastic, 100 ml
carbon C-14	0.5 Bq/l	plastic, 1000 ml
total uranium (photometry) calculation of U-238 activity	2 µg/l, resp. 0.025 Bq/l U-238	plastic, 500 ml

*For radon 222 a calibrated container is necessary.

Note: Please contact your local sales representative for detailed information on sampling and preservation.

Gamma spectrometry – artificial radionuclides

Parameter	LOQ (Bq/l)	Parameter	LOQ (Bq/l)
cesium 134	0.05	iodine 131	0.05
cesium 137	0.05		

Minimum sample volume: plastic, 1000 ml
Method: high resolution gamma spectrometry

Natural isotopes of uranium

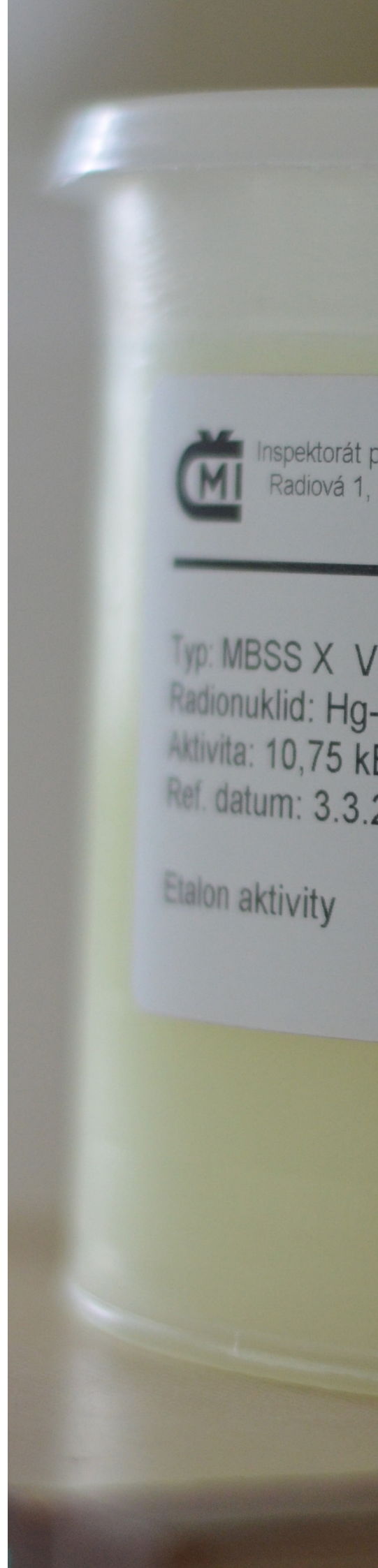
Parameter	LOQ (Bq/L)	Parameter	LOQ (Bq/L)
uranium 238	0.001	uranium 234	0.001
uranium 235	0.001		

Minimum sample volume: plastic, 20 ml
Method: ICP-SFMS

Natural isotopes of thorium

Parameter	LOQ (Bq/L)	Parameter	LOQ (Bq/L)
thorium 232	0.001	thorium 230	0.004

Minimum sample volume: plastic, 20 ml
Method: ICP-SFMS



pro ionizující záření
102 00 Praha 10



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2014



RADIOLOGICAL ANALYSES

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PERFLUORINATED COMPOUNDS (PFC)

As a result of the growth of the synthetic chemical industry over the last 50 years, many thousands of new fluorinated molecules have been synthesised and through various mechanisms, have become almost ubiquitous in the environment. A multitude of poly- and perfluoroalkyl substances (PFAS), valued for their ability to repel both water and oils, have been used for decades for diverse applications such as water repellent "outdoor" fabrics, stain resistant carpets, non-stick frying pans and firefighting foams.

PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoate) are the best known examples of PFAS. Their potential impact on human health has already been recognized internationally as they are extremely persistent, bioaccumulative and toxic.

As a result, PFOS is restricted under the Stockholm Convention and classed as a persistent organic pollutant (POP), with PFOA being actively considered for inclusion.

PFOS is also listed in the European Union Priority Substances Directive (2013/39/EU) with Environmental Quality Standards (EQSs) in fresh, surface water, coastal waters and biota.

However, more recently, regulators' in differing countries interest and concern has expanded to take in a much wider number of the PFAS now known to be present in the environment such as perfluorinated or polyfluorinated alkyl substances compounds (PFAS) which have entered the environment from aqueous film forming foam (AFFF) and multiple other products. Perfluorinated compounds do not break down or biotransform under natural conditions in the environment. Whereas, the polyfluorinated compounds are sometimes termed "precursors" as they can biotransform to form more simple Perfluorinated alkyl acids such as PFOA.

As a result, there are significant analytical challenges to overcome when considering how to assess soil and groundwater contaminated with PFAS as there are multiple analytes to consider, not just PFOS and PFOA, with many of the perfluorinated compounds being of unknown composition.

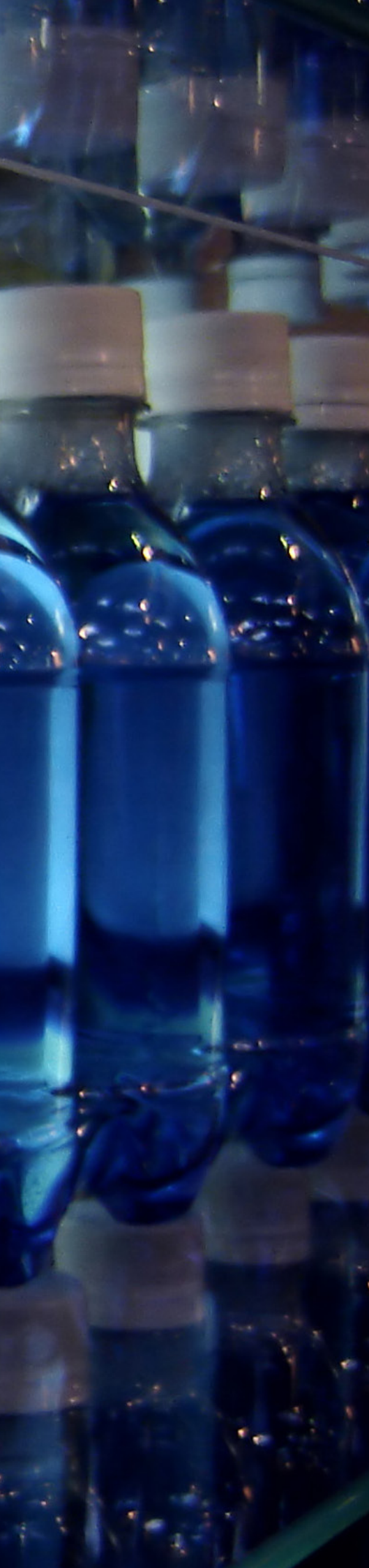
Routine analysis of these compounds is undertaken by Liquid Chromatography - Triple Quadrupole Mass Spectrometry (LC-QQQ). This analytical technique is very selective and sensitive, allowing for compounds which have been calibrated for to be detected at low concentrations, typically around 1 ng/l or less in water and 1 ug/Kg in soil. However LC-QQQ does not measure compounds which have not been calibrated for and there could be many thousands of these in the PFAS category.

To allow assessment of the polyfluorinated "precursors" of unknown composition, which are not in the standard analytical suites, the Total Oxidisable Precursor (TOP) Assay has been developed.

The TOP assay has four steps

- Analyse the routine analysis list of PFAS (pre-oxidised sample)
- Oxidise a portion of the sample to convert polyfluorinated precursors to target perfluorinated compounds
- Analyse the oxidised sample for routine list of PFAS (post-oxidised sample)
- Compare pre-oxidised sample results to post-oxidised sample results. The difference is the polyfluorinated "pre-cursor" concentration of the sample which may biotransform to the measured perfluorinated compounds over time in the natural environment.





TOP Assay Compound List

Parameter	LOQ	Unit
Perfluorobutanoic acid (PFBA)	0.01	µg/L
Perfluoropentanoic acid (PFPeA)	0.01	µg/L
Perfluorohexanoic acid (PFHxA)	0.01	µg/L
Perfluoroheptanoic acid (PFHpA)	0.01	µg/L
Perfluorooctanoic acid (PFOA)	0.01	µg/L
Perfluorononanoic acid (PFNA)	0.01	µg/L
Perfluorodecanoic acid (PFDA)	0.01	µg/L
Perfluoroundecanoic acid (PFUnDA)	0.01	µg/L
Perfluorododecanoic acid (PFDoDA)	0.01	µg/L
Perfluorobutane sulfonic acid (PFBS)	0.01	µg/L
Perfluorohexane sulfonic acid (PFHxS)	0.01	µg/L
Perfluoroheptane sulfonic acid (PFHpS)	0.01	µg/L
Perfluorooctane sulfonic acid (PFOS)	0.01	µg/L
Perfluorodecane sulfonic acid (PFDS)	0.01	µg/L
Perfluorooctane sulfonamide (FOSA)	0.01	µg/L
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.01	µg/L
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.01	µg/L

Method: LC/MS/MS
Minimum sample volume: plastic, 80 ml

PASSIVE SAMPLING

Passive sampling in water offers several advantages over conventional sampling. The sampler is deployed for extended periods of time (often days or weeks), enriching trace analytes to facilitate their detection and quantification. The results obtained are concentrations averaged over the sampling time. ALS offers passive samplers for non-polar organic compounds (e.g., PAH, PCB, dioxins), polar organic compounds (e.g., water soluble pesticides) and metals.

PS Organic

PS Organic is our passive sampling system for non-polar organic compounds, such as PAHs, PCBs and dioxins. The sampler consists of a stainless steel canister that holds one or two membranes, mounted in so-called spiders. Canisters and spiders can be hired or purchased. Alternatively, a smaller and simpler disposable sampler, which holds one or two shorter membranes can be used. The membrane contains a lipid that easily absorbs hydrophobic substances. The length of the sampling period is variable, but is often about one month. During this time, organic pollutants in dissolved or gas phase diffuse through the membrane and accumulate in the lipid. This uptake mimics the accumulation of organic pollutants in, for example, fish. The organic compounds are then extracted from the membrane for subsequent chemical analysis by conventional methods. From the analytical result, the concentrations in the ambient water can be calculated.

Concentrations of lipid-soluble substances in water are often so low that direct chemical analysis is difficult, but the passive sampler provides substantial preconcentration and thus enables more reliable analyses. Due to the large capacity of the lipid, a relatively long time (often >1 month) will elapse before the sampler is saturated, i.e., before a state of equilibrium has been attained between sampler and water. This means that even polluted waters can be sampled using PS Organic.

Analyses for PS Organic



Analytical package
Polycyclic aromatic hydrocarbons (PAH)
Polychlorinated biphenyls (PCB)
Organochlorinated pesticides
Dioxins and furans (PCDD/F)
Coplanar PCBs and indicator PCBs
Brominated flame retardants (PBDE)
Organotin compounds

LOQs depend on sampling times.
Other analyses may be possible. Please contact your local sales representative for further information.

PS Metal

PS Metal is used to sample metals in situ in water, soil and sediment. The simple plastic sampler contains a filter, a hydrogel, and an ion exchange resin. Metal ions in water diffuse through the filter and the gel, and finally accumulate in the ion exchange resin. The longer the sampling time, the larger the amounts of ions accumulated. In uncontaminated water, the equipment can be left in place for several months. The ions are then eluted from the resin with acid, and can be determined by ICP-AES or ICP-MS. If the water temperature and the exposure time are known, the concentration of each metal in the water can easily be calculated.

Analyses for PS Metal

Analytical package
Basic metal package (Al, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, U, Zn)
Extended metal package (Ag, Al, Ba, Ca, Cd, Ce, Co, Cr, Cu, Dy, Er, Eu, Fe, Gd, Ho, La, Lu, Mg, Mn, Nd, Ni, Pb, Pr, Sm, Sr, Tb, Tm, U, Yb, Zn)

LOQs depend on sampling times. Please contact your local sales representative for further information.





PS Polar

PS Polar is our sampling system for polar organic compounds in water. Many hydrophilic pesticides and drug substances, among others, belong to this category. The sampler consists of a solid sorbent (a powder) enclosed between two membrane layers that are mounted between a pair of stainless steel washers. Up to three PS Polar samplers can be mounted in one steel canister (the same type of canister as for PS Organic), that can be hired or purchased from ALS. Polar compounds diffuse through the membranes and are accumulated by the sorbent. Following extraction, the analysis is carried out by standard methods, and the concentrations in the sampled water can be calculated.

Analyses for PS Polar

Analytical package
Polar pesticides

LOQs depend on sampling times. Please contact your local sales representative for further details or for information on analyses of pharmaceutical substances.

PS VOC

PS VOC, our method for passive sampling of volatile organic compounds, consists of LDPE tube (approximately 35 cm long) with a polyethylene protective mesh on the outside. The tube is filled with deionized water through a fill nozzle and closed with a plug.

The appropriate deployment time is dependent on the time required by the sampler to equilibrate with ambient water and the time required for environmental disturbances caused by sampler deployment to return to ambient conditions. The rate at which deionized water in the sampler equilibrates with the ambient water depends on e.g. the type of compound and the water temperature. A minimum equilibrium time of two weeks is suggested for most field applications.

When the sampler is retrieved, a discharge tube is pressed into the membrane and two vials are filled. The samples are then analyzed using standard methods (see page 13).

IF YOU CONSIDER PASSIVE SAMPLING AS AN INTERESTING TOOL, DO NOT HESITATE TO CONTACT US FOR FURTHER INFORMATION.



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