

**The Appendix is an integral part of
Certificate of Accreditation No. 252/2024 of 03/06/2024**

Accredited entity according to ČSN EN ISO/IEC 17025:2018:

Technická univerzita v Liberci
CAB number 1611, Analytical Laboratory CXI TUL
Bendlova 1409/7, 460 01 Liberec 1

*The laboratory provides opinions and interpretations of the test results.
Detailed information on activities within the scope of accreditation (determined analytes / tested subject / source literature) is given in the section „Specification of the scope of accreditation“.*

Tests:

Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
1	Microbiological and biological tests			
1.1	Detection and enumeration of coliform bacteria and <i>Escherichia coli</i> by membrane filtration method	ČSN EN ISO 9308-1	Drinking, bathing, hot, ground, mineral water	-
1.2	Enumeration of culturable microorganisms at 22 °C and 36 °C by direct inoculation in a nutrient agar culture medium	ČSN EN ISO 6222	Drinking, raw, bathing, surface, hot, ground, mineral, treated water	-
1.3	Detection and enumeration of <i>Pseudomonas aeruginosa</i> by membrane filtration method	ČSN EN ISO 16266	Drinking, raw, bathing, surface, hot, ground, bottled water	-
1.4	Enumeration of coagulase-positive staphylococci by membrane filtration method	ČSN EN ISO 6888-1	Drinking, raw, bathing, surface, hot water	-
1.5	Detection and enumeration of <i>Legionella</i> by membrane filtration method	ČSN ISO 11731	Hot, bathing water	-
1.6	Detection and enumeration of <i>Clostridium perfringens</i> (including spores) by membrane filtration method	SOP M 1 (Decree No. 252/2004 Coll. Annex No. 6)	Drinking, raw, bathing, surface, ground water	-
1.7	Detection and enumeration of intestinal enterococci by membrane filtration method	ČSN EN ISO 7899-2	Drinking, raw, bathing, hot, surface, ground, mineral water	-

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
1.8	Detection and enumeration of thermotolerant coliform bacteria and <i>Escherichia coli</i> by membrane filtration method	ČSN 75 7835	Raw, surface, ground, bathing water	-
1.9	Determination of the vitality of microorganisms by culture	SOP M (AHEM No. 1/2014; Decree No. 306/2012 Coll.)	Biological indicators	-
1.10	Detection and enumeration of coliform bacteria by membrane filtration method	ČSN 75 7837	Raw, surface, ground water	-
1.11	Determination of bioseston by microscopic method	ČSN 75 7712	Drinking, bottled, ground, surface, raw, mineral water	-
1.12	Determination of abioseston by microscopic method	ČSN 75 7713	Drinking, raw, ground, surface water	-
1.13	Detection and enumeration of <i>Clostridium perfringens</i> by membrane filtration method	ČSN EN ISO 14189	Drinking, ground, surface, raw, mineral water	-
1.14	Testing of the efficiency of sterilization	SOP M 9 (Decree No. 306/2012 Coll.; ČSN EN ISO 11140-1; ČSN EN 13060+A1; ČSN EN ISO 15883-1; AHEM č. 1/2014)	Sterilizers	-
1.15	Detection and analysis of green aerophytic algae by optical microscopy	SOP M 7 (technical literature)	External plastering of buildings	-
2	Chemical and physico-chemical tests			
2.1*	Determination of pH by potentiometry	SOP CH 7 (ČSN ISO 10523)	Drinking, raw, bathing, surface, hot, waste, ground, treated water	-
2.2*	Determination of redox potential	ČSN 75 7367	Drinking, ground, waste, surface, treated water	-
2.3*	Determination of electrical conductivity	ČSN EN 27888	Drinking, raw, bathing, surface, waste, ground, treated water	-

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
2.4*	Determination of dissolved oxygen electrochemically	SOP CH 6 (ČSN EN ISO 5814; ČSN ISO 17289)	Bathing, surface, ground, treated water	-
2.5*	Determination of temperature	ČSN 75 7342	Drinking, raw, bathing, surface, hot, ground, treated water	-
2.6*	Determination of free and total chlorine by photometry using Hach set and bound chlorine by calculation	SOP CH 2 (Hach manual; ČSN EN ISO 7393-2)	Drinking, bathing, distilled, treated water	-
2.7*	Preliminary sensory analysis	SOP CH 8 (ČSN 75 7340; ČSN EN 1622)	Drinking, bathing water	-
2.8	Determination Biochemical Oxygen Demand (BOD _n) by oxygen sensor measurement	SOP CH 54 (ČSN EN 1899-1; ČSN EN 1899-2)	Waste, surface, raw water	-
2.9	Respirometric Biochemical Oxygen Demand (BOD _n) determination	SOP CH 53	Waste, surface, raw water	-
2.10	Determination of chemical oxygen demand (COD) by spectrophotometry with Hach set	SOP CH 1 - a (ČSN ISO 6060; Hach manual)	Surface, ground, waste, treated water	-
2.11	Determination of nitrate and nitrate nitrogen by spectrophotometry with Hach set	SOP CH 1-e (Hach manual; ČSN 75 7455)	Drinking, bathing, ground, surface, waste water	-
2.12	Determination of dissolved solids (DS), dissolved inorganic salts (DIS) and total solids (TS) by gravimetry	SOP CH 4 (ČSN 75 7346; ČSN 75 7347)	Drinking, raw, surface, waste, ground, treated water	-
2.13	Determination of suspended solids (SS) by gravimetry	SOP CH 5 (ČSN EN 872; ČSN 75 7350)	Raw, surface, waste, ground, treated water	-
2.14	Determination of colour by spectrophotometry	SOP CH 13 (ČSN EN ISO 7887)	Drinking, bathing, ground, surface water	-

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
2.15	Determination of ammonium by spectrophotometry and ammonia nitrogen by calculation	SOP CH 25 (ČSN ISO 7150-1)	Drinking, bathing, ground, surface, waste water, aqueous extracts	-
2.16	Determination of turbidity nephelometrically	SOP CH 55 (ČSN EN ISO 7027-1)	Drinking, bathing, treated water	-
2.17	Determination of acid neutralizing capacity (ANC) by titration	SOP CH 22 (ČSN EN ISO 9963-1)	Drinking, waste, ground, surface, raw, treated water	-
2.18	Determination of basic neutralizing capacity (BNC) by titration and of free CO ₂ by calculation	SOP CH 23 (ČSN 75 7372; ČSN 75 7373)	Drinking, waste, ground, surface, raw, treated water	-
2.19	Determination of dry residue by gravimetry and water content by calculation	SOP CH 48 (ČSN EN 15934)	Sludge, waste and soils	-
2.20	Determination of loss on ignition by gravimetry	SOP CH 49 (ČSN EN 15935)	Sludge and soils	-
2.21	Determination of nitrates, nitrites, chlorides, sulphates, fluorides, phosphates, bromates, chlorites and chlorates by ion chromatography. Determination of N-inorganic and forms of N-NO ₃ , N-NO ₂ by calculation. Determination of the sum of chlorates and chlorites by calculation.	SOP CH 9 (ČSN EN ISO 10304-1)	Drinking, bathing, waste, ground, surface, treated water, extract	-
2.22	Determination of TC, TOC, TIC, DOC, NPOC and TN _b by combustion method	SOP CH 17 (ČSN EN ISO 20236)	Drinking, bathing, ground, surface, waste, treated water, extract	-
2.23	Determination of elements by ICP-OES method	SOP CH 11-a (ČSN EN ISO 11885)	Drinking, bottled, raw, bathing, surface, hot, waste, ground, treated water, extract	-

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
2.24	Determination of elements by ICP-OES method	SOP CH 11-b (ČSN EN ISO 11885)	Soils, rocks, sludge, filters with aerosol samples	-
2.25	Determination of elements by ICP-MS method	SOP CH 16-a (ČSN EN ISO 17294-1; ČSN EN ISO 17294-2)	Drinking, bottled, raw, bathing, surface, hot, waste, ground, process, purified water, extract	-
2.26	Determination of elements by ICP-MS method	SOP CH 16-b (ČSN EN ISO 17294-1; ČSN EN ISO 17294-2)	Soils, rocks, sludge, filters with aerosol samples	-
2.27	Determination of mercury by photometric method on AMA 254 analyzer	SOP CH 30 (ČSN 75 7440)	Drinking, bottled, raw, bathing, surface, hot, waste, ground, treated water, extract, soils, rocks, sludge, sediments	-
2.28	Determination of hydrocarbons C ₁₀ -C ₄₀ by GC/FID method	SOP CH 14 a (ČSN EN ISO 9377-2)	Raw, ground, surface, waste, treated water	-
2.29	Determination of volatile organic compounds by head-space GC/MS method	SOP CH 10 (ČSN EN ISO 10301)	Drinking, hot, raw, waste, ground, surface, treated water	-

¹ asterisk at the ordinal number identifies the tests, which the laboratory is qualified to carry out outside the permanent laboratory premises

² if the document identifying the test procedure is dated, only these specific procedures are used. If the document identifying the test procedure is not dated, the latest valid edition of the specified procedure is used (including any changes)

³ the laboratory does not apply a flexible approach to the scope of accreditation

Specification of the scope of accreditation:

Ordinal test number	Detailed information on activities within the scope of accreditation (determined analytes)
2.29	chloroethene, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, tetrachloroethene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, bromoform, dichloromethane, trichloromethane, tetrachloromethane, 1,1,2-trichloroethane, bromodichloromethane, dibromochloromethane, benzene, chlorobenzene, toluene, ethylbenzene, p+m-xylene, o-xylene, styrene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,2,4-trichlorobenzene
2.23, 2.24	Ag, Al, As, Au, B, Ba, Be, Ca, Cd, Co, Cr, Cr ³⁺ , Cr ⁶⁺ , Cu, Fe, Ir, K, Mg, Mn, Mo, Na, Ni, P, Pb, Pd, Pt, Rh, Ru, Sb, Sn, Se, Sr, Ti, Tl, V, Zn, total Ca + Mg

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Ordinal test number	Detailed information on activities within the scope of accreditation (determined analytes)
2.25, 2.26	Ag, Al, As, Au, B, Ba, Be, Br, Ca, Cd, Co, Cr, Cr ³⁺ , Cr ⁶⁺ , Cu, Fe, Hg, I, Ir, K, Mg, Mn, Mo, Na, Ni, P, Pb, Pd, Pt, Rh, Ru, Sb, Sn, Se, Sr, Th, Ti, Tl, U, V, Zn, total Ca + Mg

Specification of the scope of accreditation:

Ordinal test number	Detailed information on activities within the scope of accreditation (tested subject)
2.21, 2.22, 2.23, 2.25, 2.27	extract – aqueous extract of solid materials
1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.10, 2.12, 2.13, 2.16, 2.17, 2.18, 2.21, 2.22, 2.23, 2.25, 2.27, 2.28, 2.29	treated water = distilled water, demineralized water, water treated with softeners, process water

Specification of the scope of accreditation:

Ordinal test number	Detailed information on activities within the scope of accreditation (source literature)
1.15	T. KALINA, J. VÁŇA. Sinice, řasy, houby, mechorosty a podobné organismy v současné biologii. Praha: Karolinum, 2005 M. ZAHRADNÍKOVÁ, H. L. ANDERSEN, T. TØNSBERG a A. BECK. Molecular Evidence of Apatococcus, including A. fuscidae sp. nov., as Photobiont in the Genus Fuscidea. Protist [online]. 2017, 168(4), 425-438. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1434461017300548 H. ETTL, G. GÄRTNER. Syllabus der Boden-, Luft- und Flechtenalgen. 2., ergänzte Aufl. Berlin: Springer Berlin, 2013
2.9	Operation of the Single Measuring System OxiTop, Instruction manual, 2019; AR_BOD5_domestic waste water_lab_02_E, Application report, WTW, 2010; AR_BOD5_waste water, (in)organic toxins or inhibitors_lab_01_E, Application report, WTW, 2010; AR_BOD_system supervision_lab_01_E, Application report, WTW, 2010; Determination of Biochemical Oxygen Demand (BOD), WTW, 2020

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Sampling:

Ordinal number	Sampling procedure name	Sampling procedure identification ¹	Subject of sampling
1	Drinking water sampling	SOP VZ 1 (ČSN EN ISO 5667-1; ČSN EN ISO 5667-3; ČSN ISO 5667-5; ČSN EN ISO 5667-14; ČSN EN ISO 19458; Decree No. 252/2004 Coll.)	Drinking water
2	Bathing water sampling	SOP VZ 2 (ČSN EN ISO 5667-1; ČSN EN ISO 5667-3; ČSN ISO 5667-4; ČSN EN ISO 5667-6; ČSN EN ISO 5667-14; ČSN EN ISO 19458; Decree No. 238/2011 Coll.)	Bathing water
3	Sampling by biological and non-biological systems for the check of sterilization efficiency of devices	SOP VZ 4 (ČSN EN ISO 11138-1; ČSN EN ISO 11138-3; ČSN EN ISO 11140-1; AHM No. 1/2014)	Sterilizers

¹ if the document identifying the sampling procedure is dated, only these specific procedures are used. If the document identifying the sampling procedure is not dated, the latest edition of the specified procedure is used (including any changes)

Explanations and abbreviations:

- GC/MS – Gas Chromatography/Mass Spectrometry
- GC/FID – Gas chromatography / Flame Ionization Detector
- ICP-OES – Inductively Coupled Plasma - Optical Emission Spectrometry
- ICP-MS – Inductively Coupled Plasma - Mass Spectrometry
- AMA – Advanced Mercury Analyzer
- TC – total carbon
- TOC – total organic carbon
- TIC – total inorganic carbon
- DOC – dissolved organic carbon
- NPOC – non-purgeable organic carbon
- TN_b – total nitrogen bound

"This document is an appendix to the certificate of accreditation. In case of any discrepancies between the English and Czech versions, the Czech version shall prevail, both for the certificate appendix and the certificate itself. "