

**The Appendix is an integral part of  
Certificate of Accreditation No. 578/2023 of 06/11/2023**

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

**Výzkumný ústav stavebních hmot, a.s.**  
CAB number 1130.2, ATElab  
Hněvkovského 30/65, Komárov, 617 00 Brno

*The laboratory applies a flexible approach to the scope of accreditation.*

*The current list of activities carried out within the flexible scope is publicly available on the laboratory's website <http://www.vush.cz/hlavni-strana/zamereni-spolecnosti/speclab/akreditovane-laboratore/> in the form „List of activities within the flexible scope of accreditation“.*

*The laboratory provides opinions and interprets test results.*

*The laboratory is qualified to carry out independent sampling.*

*Detailed information on activities within the scope of accreditation (determined analytes/ subject of testing) is given in the section „Specification of the scope of accreditation“.*

**Tests:**

| Ordinal number <sup>1</sup> | Test procedure / method name   | Test procedure / method identification <sup>2</sup>                            | Subject of the test  | Degrees of freedom <sup>3</sup> |
|-----------------------------|--|--|--|---------------------------------|
| <b>1</b>                    | <b>Analytical chemistry</b>  |  |  |                                 |
| 1.1                         | Determination of the loss by drying by gravimetry  | SOP CH01<br>(ČSN 72 0102;<br>ČSN 72 1206, cl. 28;<br>ČSN ISO 11465)            | Building materials,<br>raw materials for their<br>production and waste | -                               |
| 1.2                         | Determination of the loss on ignition by gravimetry  | SOP CH02<br>(ČSN 72 0103;<br>ČSN 72 1206, cl. 30)                              | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.3                         | Determination of the loss by ignition in cement by gravimetry                                  | SOP CH03<br>(ČSN EN 196-2, cl. 4.4.1)  | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.4                         | Determination of silicon dioxide by gravimetry   | SOP CH04<br>(ČSN 72 0105-1)  | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.5                         | Determination of silicon dioxide by double evaporation by gravimetry                           | SOP CH05<br>(ČSN EN 196-2, cl. 4.5.2,<br>4.5.3, 4.5.6, 4.5.7, 4.5.8,<br>4.5.9) | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.6                         | Determination of silicon dioxide by decomposition with ammonium chloride by gravimetric method | SOP CH06<br>(ČSN EN 196-2,<br>cl. 4.5.5, 4.5.6, 4.5.7, 4.5.8,<br>4.5.9)        | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.7                         | Determination of silicon dioxide by defumigation with hydrofluoric acid by gravimetric method  | SOP CH07<br>(ČSN 72 0105-2)  | Building materials,<br>raw materials for their<br>production           | -                               |
| 1.8                         | Determination of silicon dioxide and acid-indecomposable share by gravimetric method           | SOP CH08<br>(ČSN 72 0106)  | Building materials,<br>raw materials for their<br>production           | -                               |

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|-----------------------------|---|---|--|---------------------------------|
| 1.9                         | Determination of acid-indecomposable share by gravimetric method  | SOP CH09<br>(ČSN 72 0107)                           | Building materials, raw materials for their production | -                               |
| 1.10                        | Determination of the residue insoluble in hydrochloric acid and sodium carbonate by gravimetric method    | SOP CH10<br>(ČSN EN 196-2, cl. 4.4.3)               | Building materials, raw materials for their production | -                               |
| 1.11                        | Determination of the residue insoluble in hydrochloric acid and potassium hydroxide by gravimetric method | SOP CH11<br>(ČSN EN 196-2, cl. 4.4.4)               | Building materials, raw materials for their production | -                               |
| 1.12                        | Determination of oxides of ammoniacal group- $R_2O_3$ by gravimetric method                               | SOP CH12<br>(ČSN 72 0108:1974)                      | Building materials, raw materials for their production | -                               |
| 1.13                        | Determination of total sulphur expressed as sulphur dioxide by gravimetric method                         | SOP CH13<br>(ČSN 72 0118)                           | Building materials, raw materials for their production | -                               |
| 1.14                        | Determination of sulphate sulphur expressed as sulphur trioxide by gravimetric method                     | SOP CH14<br>(ČSN 72 0117)                           | Building materials, raw materials for their production | -                               |
| 1.15                        | Determination of sulphate expressed as sulphur trioxide by gravimetric method                             | SOP CH15<br>(ČSN EN 196-2, cl. 4.4.2)               | Building materials, raw materials for their production | -                               |
| 1.16                        | Complexometric determination of the content of aluminium oxide  | SOP CH16<br>(ČSN EN 196-2, cl. 4. 5. 11)            | Building materials, raw materials for their production | -                               |
| 1.17                        | Complexometric determination of calcium monoxide after removal of disturbing elements                     | SOP CH17<br>(ČSN 72 0113-2)                         | Building materials, raw materials for their production | -                               |
| 1.18                        | Complexometric determination of calcium monoxide  | SOP CH18<br>(ČSN EN 196-2, cl. 4. 5. 12)            | Building materials, raw materials for their production | -                               |

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|-----------------------------|--|--|--|---------------------------------|
| 1.19                        | Complexometric determination of magnesium oxide after removal of disturbing elements   | SOP CH19<br>(ČSN 72 0114-2)  | Building materials, raw materials for their production           | -                               |
| 1.20                        | Complexometric determination of the content of magnesium oxide   | SOP CH20<br>(ČSN EN 196-2, cl. 4. 5. 13)   | Building materials, raw materials for their production           | -                               |
| 1.21                        | Complexometric determination of the content of iron oxide  | SOP CH21<br>(ČSN EN 196-2, cl. 4. 5. 10)   | Building materials, raw materials for their production           | -                               |
| 1.22                        | Determination of iron oxide by photometry with sulphosalicylic acid  | SOP CH22<br>(ČSN 72 0110-1)  | Building materials, raw materials for their production           | -                               |
| 1.23                        | Determination of titanium dioxide by photometry with hydrogen peroxide   | SOP CH23<br>(ČSN 72 0112-1)  | Building materials, raw materials for their production           | -                               |
| 1.24                        | Determination of phosphorus pentoxide by photometry as phosphomolybdenum vanadium complex  | SOP CH24<br>(ČSN 72 0116-1)  | Building materials, raw materials for their production           | -                               |
| 1.25                        | Determination of oxides Na <sub>2</sub> O, K <sub>2</sub> O, MgO, Fe <sub>2</sub> O <sub>3</sub> , MnO, Al <sub>2</sub> O <sub>3</sub> by F-AAS and Na <sub>2</sub> O equivalent by calculation from measured values | SOP CH25<br>(ČSN 72 0119-2:1974;<br>ČSN 72 0114-3:1974;<br>ČSN EN 196-2, cl. 4.5.19) | Building materials, raw materials for their production           | B                               |
| 1.26                        | Determination of alkali content – Na <sub>2</sub> O and K <sub>2</sub> O by F- AAS method and Na <sub>2</sub> O equivalent by calculation from measured values   | SOP CH26<br>(ČSN EN 480-12)  | Admixtures for concrete, mortar and injection mortar             | B                               |
| 1.27                        | Determination of Na <sub>2</sub> O, K <sub>2</sub> O, CaO in extract by F-AAS method   | SOP CH27c<br>(ČSN 72 2080, cl. 9.22)   | Building materials, raw materials for their production           | -                               |
| 1.28                        | Determination of the content of chlorides by mercury metric method   | SOP CH28<br>(ČSN 72 2111:1988)   | Building materials, raw materials for their production, extracts | -                               |
| 1.29                        | Determination of chlorides by argentometry   | SOP CH29<br>(ČSN EN 196-2, cl. 4. 5. 16)   | Building materials, raw materials for their production           | -                               |

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|-----------------------------|---|---|---|---------------------------------|
| 1.30                        | Determination of iron monoxide by dichromatometry   | SOP CH30<br>(ČSN 72 0111)                           | Building materials, raw materials for their production                            | -                               |
| 1.31                        | Determination of free calcium monoxide by saccharate method   | SOP CH31<br>(ČSN 72 2080, cl. 9.18)                 | Building materials, raw materials for their production                            | -                               |
| 1.32                        | Determination of sulphide sulphur by iodometry  | SOP CH32<br>(ČSN EN 196-2, cl. 4.4.5)               | Building materials, raw materials for their production                            | -                               |
| 1.33                        | Determination of ammonium by spectrophotometry and NH <sub>3</sub> , NH <sub>3</sub> -N by calculation from measured values | SOP CH33<br>(ČSN ISO 7150;<br>ČSN EN 14671)         | Extracts  | -                               |
| 1.34                        | Determination of free calcium monoxide by acidimetry  | SOP CH34<br>(ČSN EN 451-1)                          | Building materials, raw materials for their production                            | -                               |
| 1.35                        | Determination of carbon dioxide by gravimetry   | SOP CH35<br>(ČSN EN 196-2,<br>cl. 4. 5. 17)         | Building materials, raw materials for their production                            | -                               |
| 1.36                        | Determination of sulphur dioxide by gravimetry  | SOP CH36<br>(ČSN 72 2080, p. 9.20)                  | Building materials, raw materials for their production                            | -                               |
| 1.37                        | Determination of elements by ICP-OES in solid matrices  | SOP CH37<br>(ČSN EN ISO 11885)                      | Building materials, raw materials for their production and waste                  | B                               |
| 1.38                        | Determination of elements by ICP-OES in liquid matrices   | SOP CH38<br>(ČSN EN ISO 11885)                      | Extracts, water   | B                               |
| 1.39                        | Determination of ions by HPCE method  | SOP CH39<br>(PN 5063-6511 Inorganic Anion Analysis) | Building materials, raw materials for their production and waste, extracts, water | -                               |
| 1.40                        | Determination of mercury by single purpose analyzer AMA 254   | SOP CH40<br>(ČSN 75 7440;<br>ČSN EN 12457-4)        | Building materials, raw materials for their production and waste, extracts, water | -                               |
| 1.41                        | Determination of elements by ETA-AAS method in liquid matrices  | SOP CH41<br>(ČSN EN ISO 15586)                      | Extracts, water   | -                               |
| 1.42                        | Determination of pH of extract by electrochemical method  | SOP CH27a<br>(ČSN 72 2080, cl. 9.22)                | Building materials, raw materials for their production                            | -                               |

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| Ordinal number <sup>1</sup> | Test procedure / method name   | Test procedure / method identification <sup>2</sup>                                    | Subject of the test  | Degrees of freedom <sup>3</sup> |
|-----------------------------|--|--|--|---------------------------------|
| 1.43                        | Determination of sulphate in extract expressed as sulphur trioxide by gravimetry           | SOP CH27b<br>(ČSN 72 2080, cl. 9.22)   | Building materials, raw materials for their production                                       | -                               |
| <b>2</b>                    | <b>Biology</b>   |  |  |                                 |
| 2.1                         | Determination of the inhibition of the mobility of cladocerans <i>Daphnia magna</i> Straus | SOP E52<br>(ČSN EN ISO 6341)   | Building materials, raw materials for their production and waste, extracts, chemicals, water | A                               |
| 2.2                         | Freshwater algal growth inhibition test <i>Desmodesmus subspicatus</i>                     | SOP E53<br>(ČSN EN ISO 8692)   | Building materials, raw materials for their production and waste, extracts, chemicals, water | A                               |
| 2.3                         | White mustard <i>Sinapis alba</i> root growth inhibition test                              | SOP E54<br>(Guideline 8, MoE Bulletin XVII, part 4/2007)                               | Building materials, raw materials for their production and waste, extracts, chemicals, water | A                               |
| 2.4                         | Test of the inhibitory effect on the light emission of <i>Aliivibrio fischeri</i> bacteria | SOP E57<br>(ČSN EN ISO 11348-2)  | Building materials, raw materials for their production and waste, extracts, chemicals, water | A                               |
| 2.5                         | Test for inhibition of reproduction of Collembola <i>Folsomia candida</i>                  | SOP E55<br>(ČSN EN ISO 11267)  | Building materials, raw materials for their production and waste, extracts, chemicals        | A                               |
| 2.6                         | Test for inhibition of root growth of <i>Lactuca sativa</i>                                | SOP E56<br>(ČSN EN ISO 11269 -1;<br>Reg. No. 273/2021 Coll.;<br>Reg. No. 8/2021 Coll.) | Building materials, raw materials for their production and waste, chemicals                  | A                               |
| 2.7                         | Determination of resistance to algae and cyanobacteria by culture method                   | SOP M61<br>(ČSN EN 15458)  | Building materials, raw materials for their production, chemical substances and preparations | -                               |

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|-----------------------------|--|--|---|---------------------------------|
| 2.8                         | Enumeration of yeasts and moulds by culture method   | SOP M62<br>(Reg. No. 6/2003 Coll, Annex No. 3);<br>ČSN ISO 7954:1994;<br>Gov. Reg. No. 361/2007 Coll.)   | Workplace air,<br>building indoor air,<br>outdoor air                                 | -                               |
| 2.9                         | Determination of the number of biodeteriogens by culture, microscopy   | SOP M63<br>(ČSN EN ISO 18593;<br>ČSN EN ISO 16212;<br>ČSN 56 0100:1968)  | Building materials,<br>surfaces of building materials                                 | -                               |
| 2.10                        | Determination of mould resistance by culture   | SOP M64<br>(ČSN EN 15457;<br>ČSN 72 4310)  | Building materials,<br>raw materials for their production, chemicals and preparations |                                 |
| <b>3</b>                    | <b>Radionuclides</b>   |  |   |                                 |
| 3.1                         | Measurement of the content of natural radionuclides by high-resolution gamma-ray spectrometry method and calculation of the mass activity index from the measured values | SOP RNL80<br>(SÚJB Recommendation for the measurement and evaluation of the content of natural radionuclides in building materials)  | Building materials,<br>raw materials for their production and waste                   | -                               |
| 3.2*                        | Determination of radon index of a building site by direct radon measurement using an ion chamber   | SOP RNL81<br>(SÚJB Recommendation for the determination of radon index by direct measurement)  | Soil air  | -                               |
| 3.3                         | Measurement of the content of natural radionuclides in radioactive material by high-resolution gamma-ray spectrometry method   | SOP RNL82<br>(SÚJB Recommendation, Measurement and evaluation of the content of natural radionuclides in radioactive material released from a workplace with the possibility of increased irradiation from a natural radiation source) | Raw materials for the production of building materials and waste                      | -                               |

<sup>1</sup> asterisk at the ordinal number identifies the tests, which the Laboratory is qualified to carry out outside the permanent laboratory premises

<sup>2</sup> 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)

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- <sup>3</sup> degrees of freedom: A – Flexibility concerning materials/products (subject of the test), B – Flexibility concerning components/parameters/characteristics, C – Flexibility concerning the performance of the method, D – Flexibility concerning the method.

The laboratory can modify the test procedures with the specified degree(s) of freedom in the scope of accreditation while maintaining the principle of measurement. If no degree of freedom is specified, the laboratory cannot apply a flexible approach to the scope of accreditation for the test.

**Specification of the scope of accreditation:**

| Ordinal test number | Detailed information on activities within the scope of accreditation (determined analytes)  |
|---------------------|---|
| 1.12                | Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , TiO <sub>2</sub> , P <sub>2</sub> O <sub>5</sub>  |
| 1.37                | As, B, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn, Si (expressed also as SiO <sub>2</sub> )  |
| 1.38                | As, B, Ba, Be, Cd, Cr, Cu, Mo, Ni, Pb, Sb, Se, Zn   |
| 1.39                | (NH <sub>4</sub> ) <sup>+</sup> , N-NH <sub>3</sub> , K <sup>+</sup> , Br <sup>-</sup> , Cl <sup>-</sup> , (SO <sub>4</sub> ) <sup>2-</sup> , (NO <sub>2</sub> ) <sup>-</sup> , (NO <sub>3</sub> ) <sup>-</sup> , F <sup>-</sup> , (PO <sub>4</sub> ) <sup>3-</sup> |
| 1.41                | Cr, Sb, Se  |
| 2.9                 | moulds, algae   |
| 3.1                 | <sup>40</sup> K, <sup>226</sup> Ra, <sup>228</sup> Th   |
| 3.3                 | <sup>238</sup> U, <sup>226</sup> Ra, <sup>210</sup> Pb, <sup>228</sup> Ra, <sup>228</sup> Th, <sup>40</sup> K   |

**Specification of the scope of accreditation:**

| Ordinal test number                        | Detailed information on activities within the scope of accreditation (subject of testing)   |
|--|---|
| 1.1, 1.37, 1.39, 1.40, 2.1 - 2.6, 3.1, 3.3 | Solid waste according to Act No. 185/2001 Coll. on waste                                    |
| 1.38, 1.39, 1.40, 2.1 - 2.4                | Aqueous extracts of solid samples according to Decree No. 273/2021 Coll. and ČSN EN 12457-4 |
| 1.38, 1.39, 1.40, 2.1 - 2.4                | Drinking, ground, distilled, demineralised, surface, waste water                            |

**Sampling:**

| Ordinal number | Sampling procedure name  | Sampling procedure identification <sup>1</sup>                   | Subject of sampling                             |
|----------------|--|--|---|
| 1              | Air sampling by air aspiration using an aeroscope to determine microbial contamination     | SOP VZ1<br>(Reg. No. 6/2003 Coll., Annex No. 3;<br>ČSN EN 13098) | Workplace air, building indoor air, outdoor air |
| 2              | Sampling of building surfaces by swabbing and rubbing to determine microbial contamination | SOP VZ2<br>(ČSN EN ISO 18593;<br>ČSN 56 0100:1968)               | Internal and external surfaces of buildings     |

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**Explanations:**

|         |   |
|---------|---|
| MoE     | – Ministry of Environment   |
| SOP     | – Standard Operating Procedure - internal procedure based on a standard or technical literature |
| F-AAS   | – Flame Atomic Absorption Spectrophotometry   |
| ICP/OES | – Inductively Coupled Plasma Optical Emission Spectrometry                                      |
| SÚJB    | – State Office for Nuclear Safety   |
| PN      | – Part Number   |
| Indoor  | – Indoor air  |
| ETA-AAS | – Electrothermal Atomization Atomic Absorption Spectrometry                                     |
| HPCE    | – High Performance Capillary Electrophoresis  |