



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 920



General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model, the mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH₄ (as N) in clay soils (ISE).

All values, expressed on a weight basis (kg or %), are reported as oven-dried (105°C) material. Moisture is reported in the material as received.

Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation, the ISE samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This ISE sample 920 of Sandy soil, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 7 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2025	4	1
2024	4	4
2022	3	4
2020	1	3
2017	4	4



Consensus Values ISE 920



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	13.9	1.20	8.6	87	13.9	0.650	0.161	1.16
As	mg/kg	2.20	0.611	27.8	53	2.30	0.300	0.105	4.77
Ba	mg/kg	164	17.5	10.7	76	166	12.5	2.52	1.53
Br	mg/kg	6.71	1.41	21.0	35	6.80	0.890	0.298	4.44
Ca	g/kg	4.64	0.439	9.5	85	4.63	0.243	0.059	1.28
Cd	mg/kg	0.113	0.023	20.0	33	0.113	0.013	0.005	4.35
Co	mg/kg	1.10	0.361	32.8	50	1.14	0.246	0.064	5.80
Cr	mg/kg	15.0	6.23	41.4	77	16.2	3.91	0.887	5.90
Fe	g/kg	3.35	0.461	13.8	89	3.38	0.240	0.061	1.82
K	mg/kg	7609	495	6.5	99	7583	293	62.2	0.817
Li	mg/kg	7.48	1.27	17.0	12	7.44	0.815	0.459	6.14
Mg	mg/kg	924	206	22.2	77	920	113	29.3	3.17
Mn	mg/kg	93.1	18.6	20.0	77	94.0	10.9	2.65	2.85
Na	mg/kg	3844	337	8.8	72	3828	226	49.6	1.29
Ni	mg/kg	4.40	1.78	40.5	71	4.60	1.10	0.265	6.01
P	mg/kg	309	61.4	19.9	77	311	34.0	8.75	2.83
Pb	mg/kg	9.17	2.28	24.8	71	9.13	1.47	0.338	3.69
Rb	mg/kg	29.8	1.97	6.6	58	29.9	1.10	0.323	1.09
Si	g/kg	430	9.44	2.2	69	428	5.21	1.42	0.331
Sr	mg/kg	52.3	5.99	11.5	71	52.0	3.50	0.889	1.70
Y	mg/kg	5.96	1.44	24.1	45	5.79	0.957	0.268	4.50
Zn	mg/kg	20.0	3.45	17.3	88	20.2	2.15	0.460	2.30
Zr	mg/kg	102	21.2	20.7	50	102	13.5	3.75	3.66
C-elementary	g/kg	8.11	0.979	12.1	142	8.16	0.575	0.103	1.27
Tl	mg/kg	0.213	0.028	13.1	14	0.207	0.020	0.009	4.37
V	mg/kg	10.7	2.25	21.0	69	10.9	1.31	0.339	3.17
Ti	mg/kg	635	101	15.8	76	646	56.3	14.4	2.27
N - elementary	g/kg	0.691	0.124	17.9	242	0.700	0.080	0.010	1.44
Hg	µg/kg	37.7	4.31	11.4	64	38.0	3.01	0.674	1.79

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	2.01	0.604	30.1	52	2.03	0.380	0.105	5.21
As	mg/kg	1.78	0.274	15.3	56	1.80	0.160	0.046	2.56
Ca	g/kg	3.71	0.508	13.7	59	3.72	0.336	0.083	2.23
Cd	mg/kg	0.117	0.020	17.0	66	0.120	0.010	0.003	2.61
Co	mg/kg	0.891	0.146	16.3	59	0.882	0.092	0.024	2.66



Consensus Values ISE 920



Method: Acid extractable (So-called totals)

(cont.)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cr	mg/kg	8.43	1.92	22.8	92	8.61	1.30	0.251	2.98
Cu	mg/kg	2.05	0.810	39.5	76	2.14	0.469	0.116	5.66
Fe	g/kg	2.36	0.413	17.5	62	2.39	0.264	0.066	2.78
K	mg/kg	448	143	31.9	61	467	94.0	22.9	5.11
Mg	mg/kg	710	95.2	13.4	63	699	55.8	15.0	2.11
Mn	mg/kg	57.3	9.53	16.6	75	57.5	5.30	1.38	2.40
N	g/kg	0.684	0.131	19.2	123	0.700	0.080	0.015	2.16
Na	mg/kg	43.2	13.1	30.3	45	44.1	8.41	2.44	5.65
Ni	mg/kg	3.36	0.512	15.2	78	3.38	0.347	0.073	2.16
P	mg/kg	313	52.0	16.6	83	316	28.0	7.13	2.28
Pb	mg/kg	5.09	0.930	18.3	93	5.19	0.590	0.120	2.37
S	mg/kg	165	37.4	22.7	57	163	25.9	6.19	3.76
Sr	mg/kg	17.8	3.06	17.2	16	18.1	2.65	0.958	5.39
Zn	mg/kg	17.3	2.88	16.7	98	17.8	1.85	0.364	2.10
V	mg/kg	6.73	1.35	20.1	53	6.80	0.920	0.233	3.46
Be	mg/kg	0.105	0.019	18.3	21	0.106	0.016	0.005	4.99
Hg	µg/kg	35.7	7.45	20.9	39	35.5	4.68	1.49	4.18

Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	1.75	0.377	21.6	96	1.73	0.221	0.048	2.75
As	mg/kg	1.83	0.180	9.9	94	1.84	0.117	0.023	1.27
Be	mg/kg	0.100	0.013	12.7	21	0.100	0.010	0.003	3.47
Ca	g/kg	3.63	0.387	10.7	91	3.68	0.220	0.051	1.40
Cd	mg/kg	0.120	0.025	20.6	95	0.120	0.015	0.003	2.65
Co	mg/kg	0.944	0.130	13.8	85	0.965	0.073	0.018	1.87
Cr	mg/kg	8.13	1.41	17.3	133	8.24	0.790	0.152	1.87
Cu	mg/kg	2.08	0.401	19.3	113	2.10	0.240	0.047	2.27
Fe	g/kg	2.38	0.322	13.5	106	2.38	0.199	0.039	1.64
Hg	µg/kg	38.4	6.63	17.3	44	40.0	3.60	1.25	3.25
K	mg/kg	487	125	25.8	85	485	63.1	17.0	3.50
Mg	mg/kg	716	85.2	11.9	97	722	61.0	10.8	1.51
Mn	mg/kg	56.7	7.06	12.5	112	57.0	4.40	0.834	1.47
Mo	mg/kg	0.226	0.039	17.4	46	0.230	0.030	0.007	3.21
Na	mg/kg	41.4	11.7	28.1	61	42.0	7.90	1.86	4.50
Ni	mg/kg	3.34	0.406	12.2	116	3.39	0.239	0.047	1.41
P	mg/kg	314	27.2	8.7	86	311	17.5	3.67	1.17



Consensus Values ISE 920



Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)

(cont.)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Pb	mg/kg	5.52	0.915	16.6	127	5.57	0.540	0.102	1.84
S	mg/kg	166	18.6	11.2	61	167	10.0	2.97	1.79
Sb	mg/kg	0.108	0.018	16.9	18	0.108	0.009	0.005	4.98
Sr	mg/kg	18.3	2.04	11.1	33	18.5	1.06	0.443	2.42
Tl	mg/kg	0.051	0.010	19.8	17	0.050	0.007	0.003	6.01
U	mg/kg	0.291	0.026	9.1	20	0.300	0.019	0.007	2.54
V	mg/kg	6.45	0.659	10.2	54	6.45	0.448	0.112	1.74
Zn	mg/kg	17.6	2.08	11.8	137	17.7	1.30	0.222	1.27

Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.119	0.016	13.7	57	0.120	0.010	0.003	2.27
Co	mg/kg	0.802	0.081	10.1	59	0.810	0.053	0.013	1.65
Cr	mg/kg	5.00	0.435	8.7	68	5.00	0.263	0.066	1.32
Cu	mg/kg	1.97	0.339	17.2	58	1.99	0.225	0.056	2.82
Hg	µg/kg	35.1	5.39	15.4	52	35.6	3.00	0.935	2.67
Mo	mg/kg	0.137	0.026	18.7	34	0.138	0.015	0.005	4.01
Ni	mg/kg	2.42	0.241	10.0	63	2.44	0.160	0.038	1.57
Pb	mg/kg	5.64	0.808	14.3	67	5.71	0.550	0.123	2.19
Tl	mg/kg	0.038	0.004	11.7	15	0.038	0.002	0.001	3.79
Zn	mg/kg	17.1	1.66	9.7	69	17.2	1.10	0.250	1.47

Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	46.7	4.21	9.0	23	48.0	2.40	1.10	2.35

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	27.9	4.69	16.8	14	26.8	3.21	1.57	5.62
K	mg/kg	46.4	3.33	7.2	36	46.4	2.55	0.693	1.49
Mg	mg/kg	34.8	3.60	10.4	26	34.7	2.50	0.883	2.54
Mn	mg/kg	2.28	0.372	16.3	19	2.36	0.238	0.107	4.67
N - NH ₄ (as N)	mg/kg	4.29	0.796	18.5	45	4.22	0.434	0.148	3.45
N - NO ₃ (as N)	mg/kg	1.45	0.400	27.6	35	1.48	0.280	0.085	5.82
Na	mg/kg	7.75	1.09	14.1	29	7.90	0.680	0.254	3.27
P	mg/kg	3.75	0.482	12.8	34	3.63	0.355	0.103	2.75



Consensus Values ISE 920



Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	7.67	0.298	3.9	458	7.64	0.200	0.017	0.227
pH - KCl	...	7.54	0.243	3.2	187	7.53	0.170	0.022	0.295
pH - CaCl ₂	...	7.07	0.169	2.4	142	7.06	0.115	0.018	0.250
TIC=Tot.Inorg C(as CaCO ₃)	%	0.609	0.309	50.7	128	0.643	0.160	0.034	5.60
EC-SC (ISO 11265)	mS/m	10.4	2.65	25.5	188	10.4	1.65	0.241	2.32
Fraction < 63 µm	%	6.37	2.41	37.8	87	6.68	1.64	0.323	5.07
Fraction > 63 µm	%	93.0	2.22	2.4	81	92.8	1.42	0.308	0.331
Org.matter (L.O.I.)	%	1.54	0.186	12.1	171	1.54	0.120	0.018	1.15
TC=Total C (org.+inorg.)	g/kg	7.95	0.830	10.4	191	7.99	0.490	0.075	0.944
TOC=Total Org. C	g/kg	7.19	1.09	15.1	216	7.18	0.680	0.092	1.29
C - org others (W&B a.o.)	g/kg	7.05	1.33	18.8	223	7.14	0.860	0.111	1.58

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	0.345	0.104	30.1	208	0.360	0.066	0.009	2.61
delta 13C	‰ V-PDB	-24.7	0.447	1.8	14	-24.8	0.371	0.149	0.604
delta 15N	‰ Air	6.06	0.373	6.2	14	5.96	0.226	0.125	2.06

Method: Fluoride (Swiss standard procedure)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	67.0	8.62	12.9	16	67.2	4.78	2.69	4.02

Method: Pot. CEC using 1M NH₄-acetate at pH=7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	3.07	1.83	59.4	160	3.20	1.13	0.180	5.87
Na	cmol+/kg	0.082	0.032	39.7	204	0.087	0.023	0.003	3.47
K	cmol+/kg	0.153	0.038	25.0	256	0.156	0.024	0.003	1.95
Mg	cmol+/kg	0.346	0.085	24.6	252	0.356	0.055	0.007	1.93
Ca	cmol+/kg	8.82	2.37	26.8	245	8.82	1.58	0.189	2.14

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
K	cmol+/kg	0.160	0.005	3.0	15	0.160	0.002	0.002	0.980
Mg	cmol+/kg	0.358	0.047	13.0	14	0.360	0.030	0.016	4.36



Consensus Values ISE 920

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	3.59	0.689	19.2	41	3.50	0.409	0.135	3.75
Na	cmol+/kg	0.039	0.007	18.8	30	0.040	0.005	0.002	4.29
K	cmol+/kg	0.145	0.018	12.3	35	0.147	0.011	0.004	2.59
Ca	cmol+/kg	4.03	0.774	19.2	37	3.94	0.431	0.159	3.94
Mg	cmol+/kg	0.292	0.029	10.0	36	0.296	0.016	0.006	2.09

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	0.534	0.152	28.4	52	0.555	0.095	0.026	4.93
Ca	mg/kg	2228	351	15.7	95	2231	219	45.0	2.02
Cu	mg/kg	0.808	0.262	32.5	84	0.805	0.175	0.036	4.43
Fe	mg/kg	345	55.6	16.1	99	339	32.8	6.98	2.03
K	mg/kg	64.0	8.21	12.8	100	64.7	4.80	1.03	1.60
Mg	mg/kg	55.7	10.0	18.0	94	56.0	7.05	1.29	2.32
Mn	mg/kg	26.6	4.10	15.4	100	26.7	2.70	0.512	1.93
Na	mg/kg	19.1	3.96	20.8	69	19.3	2.37	0.596	3.13
P	mg/kg	145	21.1	14.5	119	144	12.8	2.42	1.67
Zn	mg/kg	8.51	1.44	16.9	99	8.58	0.950	0.180	2.12
Al	mg/kg	81.6	10.6	12.9	54	81.9	5.69	1.79	2.20

Method: Extraction with 0.01M CaCl₂ - 0.005M DTPA 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	0.401	0.141	35.2	81	0.401	0.071	0.020	4.89
Fe	mg/kg	43.0	10.6	24.6	90	43.1	6.96	1.40	3.25
Mn	mg/kg	6.93	1.40	20.2	86	6.99	0.793	0.189	2.72
Zn	mg/kg	3.85	0.481	12.5	89	3.88	0.280	0.064	1.66

Method: Extraction with 1M KCl 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NH ₄ (as N)	mg/kg	5.60	1.88	33.5	50	5.67	0.924	0.332	5.92

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	117	49.8	42.7	137	114	32.9	5.32	4.56
P - Olsen (as P)	mg/kg	43.0	10.1	23.5	174	42.0	6.27	0.957	2.22
Fe - Ox	mg/kg	566	105	18.5	14	587	71.7	35.0	6.18
P - Ox	mg/kg	197	22.8	11.6	14	198	17.9	7.63	3.88



Consensus Values ISE 920

Method: Phosphorus and related analysis									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - AL (as P)	mg/kg	172	22.0	12.8	50	169	15.3	3.90	2.26
Method: UK Soil Methods									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	51.0	9.72	19.1	60	51.3	6.31	1.57	3.07
K - NH ₄ NO ₃ (1/5)	mg/l	87.5	6.87	7.9	69	87.3	4.73	1.03	1.18
Mg - NH ₄ NO ₃ (1/5)	mg/l	54.7	7.46	13.6	69	54.4	4.60	1.12	2.05
pH - H ₂ O (2/5)	...	7.63	0.186	2.4	67	7.60	0.110	0.028	0.373
Method: PEP-Ammoniumacetate-EDTA extraction									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-Ca	mg/kg	3359	302	9.0	9	3351	143	126	3.74
AAE10-K	mg/kg	58.4	7.67	13.1	9	59.5	4.20	3.20	5.47
AAE10-P	mg/kg	167	14.5	8.7	9	166	8.97	6.04	3.62
Method: PEP-Test measurements									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH-H ₂ O	...	7.46	0.113	1.5	12	7.47	0.065	0.041	0.546



Indicative Values ISE 920



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	2.88	1.73	60.0	57	2.95	1.12	0.286	9.94
Ga	mg/kg	3.66	1.61	43.8	43	4.00	1.10	0.306	8.35
I	mg/kg	1.35	0.120	8.9	6	1.39	0.070	0.061	4.53
Mo	mg/kg	0.281	0.141	50.2	30	0.322	0.101	0.032	11.5
S	mg/kg	161	77.9	48.4	69	166	48.0	11.7	7.28
Se	mg/kg	0.381	0.539	141.6	13	0.400	0.344	0.187	49.1
Sn	mg/kg	0.642	0.327	50.9	20	0.690	0.225	0.091	14.2
Sb	mg/kg	0.308	0.161	52.3	18	0.310	0.084	0.047	15.4
Be	mg/kg	0.368	0.099	26.9	14	0.368	0.062	0.033	8.99
Ce	mg/kg	14.8	5.53	37.4	38	14.6	3.40	1.12	7.59
La	mg/kg	7.75	2.47	31.9	36	7.54	1.92	0.516	6.65
Nb	mg/kg	2.95	1.90	64.3	27	3.00	1.31	0.456	15.5
Nd	mg/kg	5.94	2.17	36.5	27	6.12	1.24	0.522	8.79
Sc	mg/kg	2.09	1.07	51.3	25	2.02	0.890	0.268	12.8
Th	mg/kg	1.97	0.704	35.6	27	2.10	0.450	0.169	8.57
U	mg/kg	0.694	0.194	28.0	25	0.711	0.139	0.049	6.99
Cs	mg/kg	1.52	1.52	99.7	13	1.80	0.940	0.525	34.6
W	mg/kg	0.906	0.801	88.4	10	0.950	0.550	0.317	35.0
Yb	mg/kg	0.611	0.273	44.7	7	0.590	0.185	0.129	21.1
Sm	mg/kg	1.54	0.701	45.5	9	1.39	0.371	0.292	19.0
Pr	mg/kg	1.71	0.786	45.9	6	1.86	0.415	0.401	23.4
Gd	mg/kg	0.993	0.306	30.8	5	1.02	0.158	0.171	17.2
Dy	mg/kg	0.975	0.330	33.9	6	1.04	0.215	0.168	17.3

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	3.29	2.05	62.4	33	3.61	1.57	0.447	13.6
Ba	mg/kg	6.30	2.72	43.2	39	6.38	1.56	0.545	8.65
Li	mg/kg	2.82	0.447	15.9	10	2.90	0.347	0.177	6.27
Mo	mg/kg	0.200	0.073	36.6	23	0.213	0.033	0.019	9.54
Se	mg/kg	0.081	0.054	66.0	11	0.090	0.034	0.020	24.9
Si	g/kg	0.525	0.163	31.1	5	0.558	0.072	0.091	17.4
Sn	mg/kg	0.359	0.265	73.9	18	0.482	0.202	0.078	21.8
Y	mg/kg	1.88	0.505	26.8	6	1.88	0.332	0.258	13.7
Sb	mg/kg	0.122	0.072	59.2	10	0.130	0.033	0.028	23.4
Tl	mg/kg	0.062	0.019	31.1	9	0.066	0.014	0.008	13.0
Ti	mg/kg	64.9	22.5	34.7	15	69.4	11.1	7.27	11.2



Indicative Values ISE 920

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ce	mg/kg	7.57	1.79	23.6	5	7.19	0.990	1.00	13.2
La	mg/kg	3.65	1.22	33.5	8	3.41	0.573	0.541	14.8
Sc	mg/kg	0.559	0.169	30.3	5	0.564	0.086	0.095	16.9
U	mg/kg	0.283	0.045	16.0	6	0.283	0.024	0.023	8.16

(cont.)

Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	12.1	2.68	22.2	9	11.5	1.50	1.12	9.26
B	mg/kg	3.48	1.67	47.9	24	3.87	1.07	0.425	12.2
Ba	mg/kg	5.91	2.12	35.8	40	6.07	1.15	0.419	7.08
Bi	mg/kg	0.032	0.011	34.3	8	0.033	0.006	0.005	15.1
Ce	mg/kg	7.02	1.46	20.8	7	6.51	1.31	0.690	9.83
La	mg/kg	3.52	0.666	18.9	10	3.60	0.585	0.263	7.47
Li	mg/kg	2.47	0.693	28.0	24	2.47	0.455	0.177	7.15
Rb	mg/kg	2.89	0.575	19.9	4	2.96	0.310	0.359	12.4
Sc	mg/kg	0.366	0.134	36.6	5	0.356	0.054	0.075	20.5
Se	mg/kg	0.098	0.053	54.7	18	0.103	0.033	0.016	16.1
Sn	mg/kg	0.305	0.065	21.4	13	0.324	0.034	0.023	7.42
Th	mg/kg	0.728	0.137	18.9	4	0.740	0.070	0.086	11.8
Ti	mg/kg	89.9	33.0	36.7	30	87.3	15.4	7.53	8.37
Y	mg/kg	1.46	0.097	6.6	4	1.45	0.045	0.061	4.16

Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Zn	µg/kg	44.8	14.1	31.6	16	45.2	9.30	4.42	9.88

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	123	46.0	37.3	17	128	26.0	13.9	11.3
Co	µg/kg	3.45	0.931	27.0	6	3.68	0.332	0.475	13.8
Fe	mg/kg	1.10	1.24	112.7	12	1.20	0.800	0.447	40.7
N total soluble	mg/kg	15.3	2.42	15.8	5	15.9	1.30	1.35	8.82
SO ₄	mg/kg	19.6	9.48	48.4	9	19.0	5.10	3.95	20.2
Zn	µg/kg	99.3	62.8	63.2	10	140	32.5	24.8	25.0



Indicative Values ISE 920



Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fraction < 2 µm	%	2.30	1.44	62.7	118	2.45	0.950	0.166	7.22
Fraction < 16 µm	%	4.85	2.88	59.4	40	4.56	2.50	0.570	11.7

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B - Hot water	mg/kg	0.482	0.237	49.1	47	0.490	0.170	0.043	8.95

Method: Pot. CEC using 1M NH4-acetate at pH=7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.043	0.048	112.4	11	0.040	0.024	0.018	42.4

Method: Pot. CEC using 1M or 0.1M BaCl2-TEA at pH=8.1 (ISO 13536 OR BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	4.01	1.90	47.3	13	4.30	1.08	0.658	16.4
K	cmol+/kg	0.154	0.035	23.0	7	0.163	0.017	0.017	10.9
Mg	cmol+/kg	0.298	0.055	18.3	8	0.311	0.025	0.024	8.10
Ca	cmol+/kg	3.62	0.627	17.3	8	3.85	0.450	0.277	7.65

Method: Pot. CEC using 1M NH4Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.073	0.015	21.2	14	0.080	0.010	0.005	7.08
Ca	cmol+/kg	8.21	1.82	22.1	14	8.44	1.04	0.607	7.40
Mn	cmol+/kg	0.020	0.012	59.1	10	0.023	0.006	0.005	23.4
Fe	cmol+/kg	0.005	0.002	46.2	7	0.005	0	0.001	21.8

Method: Act. CEC using 0.01M BaCl2 (ISO 11260)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	4.24	0.680	16.0	7	4.50	0.300	0.321	7.57
K	cmol+/kg	0.192	0.019	10.0	7	0.190	0.010	0.009	4.74
Mg	cmol+/kg	0.335	0.083	24.6	8	0.354	0.049	0.036	10.9
Ca	cmol+/kg	5.08	0.970	19.1	8	4.94	0.460	0.429	8.44

Method: Act. CEC using 0.1M BaCl2 (UNEP-UN/EC 91065A)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	4.57	0.540	11.8	4	4.56	0.359	0.338	7.38
Na	cmol+/kg	0.036	0.007	19.8	6	0.038	0.003	0.004	10.1
K	cmol+/kg	0.150	0.012	7.7	6	0.150	0.006	0.006	3.93



Indicative Values ISE 920

Method: Act. CEC using 0.1M BaCl₂ (UNEP-UN/EC 91065A)

(cont.)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	3.99	0.469	11.8	6	3.95	0.331	0.240	6.01
Mg	cmol+/kg	0.313	0.026	8.5	6	0.316	0.015	0.014	4.32
Mn	cmol+/kg	0.009	0.001	12.2	6	0.010	0.001	0.001	6.20

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mn	cmol+/kg	0.004	0.001	23.7	10	0.004	0.000	0.000	9.35

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	0.372	0.093	25.0	5	0.381	0.049	0.052	14.0
Cd	mg/kg	0.076	0.014	18.0	6	0.077	0.006	0.007	9.16
Cr	mg/kg	0.603	0.106	17.5	5	0.585	0.035	0.059	9.81
Pb	mg/kg	3.83	1.55	40.5	6	3.73	0.808	0.791	20.7
Co	mg/kg	0.213	0.050	23.6	6	0.205	0.020	0.026	12.1

Method: Water soluble 1:10 (w/v) (EN-12457-4)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F	mg/kg	1.28	0.496	38.7	4	1.24	0.252	0.310	24.2
Cl	mg/kg	7.10	5.53	77.9	9	9.25	3.63	2.31	32.5
N - NO ₃ (as N)	mg/kg	2.43	1.93	79.4	8	2.16	1.12	0.854	35.1

Method: Extraction with 1M KCl 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NO ₃ (as N)	mg/kg	1.53	0.765	50.0	50	1.62	0.450	0.135	8.84

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al - Ox	mg/kg	93.1	29.6	31.8	14	93.5	22.4	9.88	10.6
P - w (as P)	mg/l soil	18.5	7.09	38.3	15	16.9	4.40	2.29	12.3
K - AL (as K)	mg/kg	65.1	14.3	21.9	4	64.0	7.74	8.91	13.7

Method: Water soluble 1:10 (w/v) (Neth standard VPR C85-06)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cl	mg/kg	4.76	2.19	46.0	4	5.43	1.16	1.37	28.7
SO ₄	mg/kg	12.2	10.2	83.7	14	12.8	7.07	3.41	28.0

Indicative Values ISE 920

Method: Extraction with dilute nitric acid (0.43 Mol/l) ISO 17586

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	1.23	0.242	19.7	7	1.25	0.150	0.114	9.30
Zn	mg/kg	10.1	0.808	8.0	7	10.3	0.550	0.382	3.77
Fe	g/kg	0.432	0.055	12.8	7	0.430	0.038	0.026	6.05
K	mg/kg	73.6	8.65	11.8	7	70.0	8.30	4.08	5.55
Mg	mg/kg	175	12.6	7.2	7	174	6.00	5.93	3.39
Mn	mg/kg	36.3	1.93	5.3	7	36.0	0.800	0.914	2.52
P	mg/kg	238	9.32	3.9	6	240	7.15	4.76	2.00
Na	mg/kg	23.0	2.46	10.7	7	22.1	1.90	1.16	5.05
S	mg/kg	17.7	10.3	58.4	5	16.7	6.30	5.78	32.7
Ca	g/kg	3.43	0.181	5.3	7	3.41	0.107	0.085	2.49

Method: PEP-Ammoniumacetate-EDTA extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-Mg	mg/kg	62.5	10.2	16.3	9	64.2	4.80	4.25	6.80

Method: PEP-Water extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
H2O10-Mg	mg/kg	10.6	0.512	4.8	7	10.6	0.200	0.242	2.28
H2O10-K	mg/kg	34.1	3.51	10.3	7	34.7	1.68	1.66	4.86
H2O10-P	mg/kg	8.57	0.591	6.9	7	8.65	0.550	0.279	3.26

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CO2-K	K-test	4.21	0.189	4.5	7	4.23	0.150	0.089	2.12
CO2-P	P-test	53.9	3.71	6.9	7	54.7	2.20	1.75	3.25
CC-Mg	Mg-test	3.42	0.517	15.1	7	3.52	0.306	0.244	7.13
CaCO3	%	0.754	0.406	53.8	7	0.770	0.214	0.192	25.4
pH-CC	...	6.91	0.181	2.6	4	6.91	0.092	0.113	1.64

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ton (clay)	%	2.65	1.02	38.6	6	2.95	0.500	0.522	19.7
Schluff (silt)	%	2.01	0.970	48.3	6	2.01	0.465	0.495	24.6
Sand	%	93.3	4.11	4.4	6	93.0	2.53	2.10	2.25
C-org	%	0.746	0.183	24.5	8	0.763	0.090	0.081	10.8
Humus	%	1.26	0.188	14.9	8	1.28	0.086	0.083	6.57
TOC_400	%	0.631	0.116	18.5	7	0.620	0.040	0.055	8.72



Indicative Values ISE 920

Method: PEP-Cation Exchange Capacity

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	3.78	1.83	48.4	5	4.02	1.03	1.02	27.1
Mg	cmol+/kg	0.333	0.027	8.0	5	0.325	0.015	0.015	4.49
K	cmol+/kg	0.170	0.085	49.8	5	0.190	0.060	0.047	27.8
KAK	cmol+/kg	4.43	1.31	29.6	4	4.49	0.855	0.821	18.5
S-Wert	cmol+/kg	4.07	1.08	26.5	4	4.08	0.800	0.673	16.5
BAS	%	92.2	3.07	3.3	4	92.5	1.41	1.92	2.08