



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 879



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 mean and standard deviation are calculated using all reported data when at least 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into three sections: Consensus Values, Indicative Values and Values for Information. The division is made on the reliability of the data. Consensus Values are based on at least 16 results while the coefficient of variation is smaller than 25 %. Indicative Values are based on at least 8 and less than 16 results or a coefficient of variation between 25 % and 50 %. Other values, based on more than 2 and less than 8 results or a coefficient of variation higher than 50 %, are given for information only.

In the sections with Consensus Values and Indicative Values the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median and MAD (Median of Absolute Deviation) and the uncertainty in the consensus values. The confidence limits (at 95 % probability) are calculated for these determinands.

In the section with Information Values the following parameters are given: median, MAD and number of results. For determinands which have at least 5 results reported as smaller than (<) the median of these 'smaller than results' is calculated. In some cases this median of '<' values is much smaller than median and mean of the indicative values. This may be caused by a too optimistic (too low) value for the detection limit reported by a (small) majority of participating laboratories who report '<' -values.

All values, expressed on a weight basis (kg or %), are reported in oven dry (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 879 of Clay from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 6 periods (or rounds). Only results from the last 5 periods are used. In this way the consensus values will reflect the latest 'state of the art' in the analytical techniques used in 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
2023	4	2
2022	2	2
2018	4	2
2016	1	3
2013	3	4



Consensus Values ISE 879



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Al	g/kg	56.1	1.47	2.6	91	56.1	1.01	0.19	55.79	- 56.40
As	mg/kg	14.9	1.20	8.1	78	15.0	0.85	0.17	14.58	- 15.13
Ba	mg/kg	271	16.3	6.0	84	271	11.2	2.2	267.9	- 274.9
Br	mg/kg	18.0	1.10	6.1	40	17.7	0.75	0.22	17.60	- 18.31
Ca	g/kg	40.8	2.13	5.2	100	40.8	1.50	0.27	40.4	- 41.2
Cd	mg/kg	0.285	0.0644	22.6	37	0.290	0.0440	0.0132	0.264	- 0.307
Co	mg/kg	10.2	1.12	11.0	74	10.4	0.78	0.16	9.99	- 10.51
Cr	mg/kg	80.5	8.81	10.9	98	79.5	6.33	1.11	78.8	- 82.3
Cu	mg/kg	18.9	2.56	13.5	88	19.0	1.80	0.34	18.4	- 19.5
Fe	g/kg	32.3	0.87	2.7	101	32.2	0.60	0.11	32.10	- 32.45
Ga	mg/kg	14.0	2.09	14.9	51	14.1	1.50	0.37	13.4	- 14.6
I	mg/kg	12.5	1.40	11.2	21	12.3	1.00	0.38	11.9	- 13.1
K	mg/kg	18700	600	3.2	106	18700	420	70	18598	- 18831
Li	mg/kg	50.4	7.41	14.7	17	49.7	5.20	2.25	46.6	- 54.2
Mg	mg/kg	10400	580	5.6	96	10400	410	70	10263	- 10498
Mn	mg/kg	851	47.4	5.6	100	850	32.0	5.9	841	- 860
Mo	mg/kg	0.582	0.1061	18.2	31	0.606	0.0800	0.0238	0.543	- 0.621
Na	mg/kg	5470	352	6.4	82	5430	245	49	5394	- 5549
Ni	mg/kg	32.1	2.02	6.3	92	32.2	1.45	0.26	31.7	- 32.5
P	mg/kg	787	51.5	6.5	89	785	37.0	6.8	776	- 798
Pb	mg/kg	36.8	2.43	6.6	90	36.8	1.70	0.32	36.3	- 37.4
Rb	mg/kg	105	4.5	4.3	63	104	3.0	0.7	103.4	- 105.7
S	mg/kg	2070	459	22.2	86	2050	324	62	1968	- 2164
Si	g/kg	290	5.7	2.0	73	290	4.0	0.8	288.8	- 291.4
Sn	mg/kg	4.11	0.594	14.5	39	4.10	0.400	0.119	3.91	- 4.30
Sr	mg/kg	155	5.9	3.8	73	156	4.0	0.9	154.0	- 156.8
Y	mg/kg	24.1	1.27	5.3	57	24.0	0.90	0.21	23.79	- 24.47
Zn	mg/kg	95.3	4.37	4.6	98	95.3	3.01	0.55	94.5	- 96.2
Zr	mg/kg	227	11.8	5.2	55	227	8.0	2.0	223.5	- 229.8
C - elementary	g/kg	28.9	0.75	2.6	131	28.9	0.51	0.08	28.77	- 29.03
Be	mg/kg	1.83	0.221	12.1	18	1.81	0.148	0.065	1.72	- 1.94
Tl	mg/kg	0.637	0.1396	21.9	21	0.653	0.1030	0.0381	0.574	- 0.700
V	mg/kg	82.2	5.02	6.1	85	81.5	3.50	0.68	81.1	- 83.3
Ti	mg/kg	3630	143	4.0	90	3620	97	19	3596	- 3656
N - elementary	g/kg	1.69	0.124	7.3	245	1.69	0.087	0.010	1.67	- 1.71
Ce	mg/kg	59.8	5.01	8.4	47	60.8	3.38	0.91	58.4	- 61.3
La	mg/kg	29.6	3.28	11.1	47	30.0	2.23	0.60	28.6	- 30.5



Consensus Values ISE 879



(cont.)

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Nb	mg/kg	12.8	1.05	8.2	43	13.0	0.70	0.20	12.49	- 13.14
Nd	mg/kg	26.9	3.76	14.0	30	27.2	2.60	0.86	25.5	- 28.3
Th	mg/kg	9.65	0.440	4.6	37	9.70	0.300	0.090	9.50	- 9.80
Hg	µg/kg	96.8	8.19	8.5	62	97.0	5.65	1.30	94.7	- 98.9

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
As	mg/kg	13.0	1.45	11.1	96	13.1	1.00	0.19	12.74	- 13.33
Ca	g/kg	38.6	2.73	7.1	76	38.3	1.90	0.39	38.0	- 39.2
Cd	mg/kg	0.278	0.0332	11.9	90	0.280	0.0223	0.0044	0.271	- 0.285
Co	mg/kg	8.86	0.940	10.6	105	8.87	0.650	0.115	8.68	- 9.04
Cr	mg/kg	42.2	7.56	17.9	121	42.0	5.00	0.86	40.8	- 43.6
Cu	mg/kg	16.9	1.69	10.0	134	16.9	1.17	0.18	16.63	- 17.21
Fe	g/kg	28.3	3.61	12.8	82	28.4	2.51	0.50	27.5	- 29.1
Li	mg/kg	35.9	8.12	22.6	17	36.3	5.82	2.46	31.8	- 40.1
Mg	mg/kg	8710	824	9.5	77	8640	569	117	8522	- 8897
Mn	mg/kg	799	72.0	9.0	91	796	51.1	9.4	784	- 814
N	g/kg	1.66	0.130	7.8	141	1.67	0.090	0.014	1.64	- 1.68
Ni	mg/kg	27.3	2.76	10.1	118	27.3	1.90	0.32	26.8	- 27.8
P	mg/kg	717	67.1	9.4	105	709	48.2	8.2	704	- 730
Pb	mg/kg	30.5	3.48	11.4	122	30.5	2.40	0.39	29.9	- 31.1
S	mg/kg	2330	175	7.5	62	2320	120	28	2284	- 2373
Sn	mg/kg	2.68	0.436	16.2	51	2.62	0.300	0.076	2.56	- 2.81
Zn	mg/kg	85.1	8.49	10.0	130	84.5	5.75	0.93	83.6	- 86.5
V	mg/kg	46.0	7.89	17.2	63	46.6	5.37	1.24	44.0	- 48.0
Be	mg/kg	1.15	0.240	20.9	51	1.14	0.166	0.042	1.08	- 1.22
Hg	µg/kg	92.9	13.27	14.3	68	92.4	9.35	2.01	89.7	- 96.1

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Al	g/kg	22.6	3.76	16.6	93	22.6	2.60	0.49	21.9	- 23.4
As	mg/kg	13.1	0.92	7.0	113	13.0	0.61	0.11	12.92	- 13.27
Ba	mg/kg	48.0	8.95	18.7	42	49.7	5.85	1.73	45.2	- 50.8
Be	mg/kg	1.18	0.120	10.2	45	1.18	0.080	0.022	1.14	- 1.21
Ca	g/kg	38.4	2.39	6.2	99	38.7	1.70	0.30	37.9	- 38.9
Cd	mg/kg	0.275	0.0395	14.3	127	0.278	0.0280	0.0044	0.268	- 0.282
Co	mg/kg	8.87	0.638	7.2	108	8.91	0.425	0.077	8.75	- 8.99



Consensus Values ISE 879



Method: Aqua Regia (ISO 11466)

(cont.)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Cr	mg/kg	42.2	5.35	12.7	148	42.2	3.64	0.55	41.3	- 43.1
Cu	mg/kg	17.3	1.72	9.9	153	17.3	1.17	0.17	17.04	- 17.59
Fe	g/kg	27.9	2.30	8.2	114	28.0	1.61	0.27	27.5	- 28.4
Hg	µg/kg	97.9	8.71	8.9	65	97.8	5.80	1.35	95.7	- 100.0
K	mg/kg	5690	897	15.8	97	5660	622	114	5507	- 5869
Li	mg/kg	34.4	5.25	15.3	25	33.9	3.70	1.31	32.2	- 36.6
Mg	mg/kg	8660	675	7.8	102	8620	472	84	8530	- 8795
Mn	mg/kg	782	57.9	7.4	115	786	38.4	6.7	771	- 793
Na	mg/kg	225	37.1	16.5	81	227	26.0	5.1	217	- 233
Ni	mg/kg	27.4	2.57	9.4	152	27.5	1.78	0.26	27.0	- 27.8
P	mg/kg	706	39.5	5.6	95	701	27.0	5.1	698	- 714
Pb	mg/kg	31.1	3.49	11.2	152	31.4	2.40	0.35	30.6	- 31.7
S	mg/kg	2350	142	6.0	76	2340	97	20	2319	- 2384
Sb	mg/kg	0.310	0.0483	15.6	28	0.320	0.0345	0.0114	0.292	- 0.329
Sn	mg/kg	2.71	0.369	13.6	30	2.74	0.260	0.084	2.57	- 2.85
Sr	mg/kg	102	11.1	10.9	33	101	7.9	2.4	98.1	- 105.9
Ti	mg/kg	357	82.9	23.2	32	352	55.0	18.3	328	- 387
Tl	mg/kg	0.265	0.0492	18.6	28	0.267	0.0335	0.0116	0.246	- 0.284
U	mg/kg	0.863	0.0746	8.7	22	0.869	0.0498	0.0199	0.829	- 0.896
V	mg/kg	45.9	4.10	8.9	65	46.0	2.80	0.64	44.8	- 46.9
Zn	mg/kg	85.8	4.40	5.1	153	85.7	3.05	0.44	85.1	- 86.6

Method: Extraction with boiling 2M HNO3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Cd	mg/kg	0.277	0.0316	11.4	68	0.277	0.0220	0.0048	0.270	- 0.285
Co	mg/kg	8.23	0.472	5.7	69	8.20	0.330	0.071	8.12	- 8.34
Cr	mg/kg	24.3	2.25	9.3	79	24.3	1.56	0.32	23.8	- 24.8
Cu	mg/kg	16.4	1.05	6.4	79	16.4	0.71	0.15	16.14	- 16.61
Hg	µg/kg	83.1	11.04	13.3	59	81.9	7.77	1.80	80.2	- 85.9
Ni	mg/kg	23.0	1.94	8.4	79	22.9	1.35	0.27	22.6	- 23.5
Pb	mg/kg	31.2	1.75	5.6	79	31.2	1.18	0.25	30.85	- 31.64
Tl	mg/kg	0.126	0.0089	7.0	19	0.124	0.0061	0.0025	0.122	- 0.130
Zn	mg/kg	76.3	4.43	5.8	79	76.3	3.00	0.62	75.3	- 77.3



Consensus Values ISE 879



Method: Extraction with 0.1M NaNO3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cu	µg/kg	100	9.0	9.0	30	101	6.1	2.1	96.8	-	103.6
Ni	µg/kg	26.7	1.60	6.0	22	27.1	1.15	0.43	26.0	-	27.4

Method: Extraction with 0.01M CaCl2 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
K	mg/kg	132	8.4	6.4	35	132	5.7	1.8	128.9	-	134.7
Mg	mg/kg	117	10.7	9.1	28	117	7.0	2.5	113	-	121
N - NH4 (as N)	mg/kg	11.6	1.38	11.9	39	11.5	1.04	0.28	11.2	-	12.1
N - NO3 (as N)	mg/kg	9.50	0.709	7.5	38	9.49	0.495	0.144	9.26	-	9.73
Na	mg/kg	26.3	1.21	4.6	20	26.3	0.86	0.34	25.7	-	26.9
P	mg/kg	1.35	0.205	15.2	33	1.38	0.150	0.045	1.28	-	1.42

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
pH - H2O	...	7.68	0.248	3.2	453	7.67	0.170	0.015	7.66	-	7.70
pH - KCl	...	7.21	0.233	3.2	196	7.21	0.160	0.021	7.18	-	7.24
pH - CaCl2	...	7.36	0.143	1.9	167	7.35	0.099	0.014	7.34	-	7.38
TIC=Tot.Inorg C(as CaCO3)	%	9.38	0.955	10.2	147	9.29	0.661	0.098	9.23	-	9.54
EC-SC (ISO 11265)	mS/m	29.7	2.40	8.1	181	29.7	1.70	0.22	29.34	-	30.05
Fraction < 63 µm	%	90.8	3.06	3.4	93	90.5	2.20	0.40	90.2	-	91.4
Org.matter (L.O.I.)	%	5.24	0.655	12.5	173	5.20	0.450	0.062	5.14	-	5.34
Fraction < 16 µm	%	59.2	5.87	9.9	44	58.1	3.94	1.11	57.4	-	61.0
TC=Total C (org.+inorg.)	g/kg	28.7	0.94	3.3	185	28.7	0.65	0.09	28.54	-	28.81
TOC=Total Org. C	g/kg	17.3	1.24	7.2	187	17.3	0.86	0.11	17.13	-	17.49
C - org others (W&B a.o.)	g/kg	18.3	2.48	13.5	247	18.6	1.72	0.20	18.02	-	18.65

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Moisture-content	%	2.83	0.319	11.2	183	2.80	0.220	0.029	2.79	-	2.88
delta 13C	‰ V-PDB	-16.2	0.16	1.0	19	-16.2	0.11	0.05	-16.27	-	-16.12
delta 15N	‰ Air	6.60	0.296	4.5	19	6.60	0.200	0.085	6.45	-	6.74

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
CEC	cmol+/kg	18.8	3.46	18.4	167	18.7	2.36	0.33	18.3	-	19.4
K	cmol+/kg	0.821	0.1031	12.6	251	0.817	0.0720	0.0081	0.808	-	0.834
Mg	cmol+/kg	1.80	0.304	16.9	250	1.81	0.211	0.024	1.76	-	1.84



Consensus Values ISE 879



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	95 % confidence limits		
CEC	cmol+/kg	22.6	5.24	23.2	28	23.0	3.65	1.24	20.5	-	24.6
K	cmol+/kg	0.850	0.1506	17.7	16	0.825	0.1045	0.0471	0.770	-	0.930
Mg	cmol+/kg	1.60	0.276	17.2	16	1.57	0.185	0.086	1.46	-	1.75
Ca	cmol+/kg	21.1	3.89	18.4	16	21.0	2.80	1.22	19.0	-	23.2

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
CEC	cmol+/kg	22.4	1.34	6.0	41	22.4	0.93	0.26	22.0	-	22.8
Na	cmol+/kg	0.135	0.0158	11.7	34	0.134	0.0110	0.0034	0.129	-	0.140
K	cmol+/kg	0.811	0.0343	4.2	37	0.810	0.0240	0.0070	0.799	-	0.822
Ca	cmol+/kg	22.4	1.06	4.7	37	22.4	0.72	0.22	22.05	-	22.76
Mg	cmol+/kg	1.63	0.071	4.4	37	1.63	0.050	0.015	1.61	-	1.65

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B	mg/kg	3.33	0.259	7.8	57	3.35	0.182	0.043	3.26	-	3.40
Ca	mg/kg	7130	819	11.5	96	7080	564	105	6960	-	7292
Cu	mg/kg	4.89	0.465	9.5	93	4.91	0.315	0.060	4.79	-	4.98
Fe	mg/kg	457	57.4	12.6	93	454	39.0	7.4	445	-	469
K	mg/kg	313	14.6	4.7	96	312	10.1	1.9	310.2	-	316.1
Mg	mg/kg	245	20.0	8.2	95	246	13.2	2.6	240	-	249
Mn	mg/kg	143	12.7	8.9	93	143	8.3	1.7	140.0	-	145.3
Na	mg/kg	36.6	4.82	13.1	57	36.8	3.47	0.80	35.4	-	37.9
P	mg/kg	90.3	6.86	7.6	112	89.9	4.79	0.81	89.0	-	91.6
Zn	mg/kg	8.14	1.040	12.8	91	8.21	0.720	0.136	7.92	-	8.35
Al	mg/kg	296	68.9	23.2	58	291	47.4	11.3	278	-	314

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cu	mg/kg	3.69	0.552	14.9	78	3.70	0.385	0.078	3.57	-	3.82
Mn	mg/kg	34.4	5.67	16.5	78	34.2	3.81	0.80	33.1	-	35.7
Zn	mg/kg	3.28	0.567	17.3	77	3.21	0.390	0.081	3.15	-	3.41



Consensus Values ISE 879



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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
N - NH4 (as N)	mg/kg	22.2	2.20	9.9	45	22.4	1.56	0.41	21.6	-	22.9
N - NO3 (as N)	mg/kg	9.60	1.722	17.9	59	9.80	1.200	0.280	9.15	-	10.1

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
P - Olsen (as P)	mg/kg	62.1	9.46	15.2	192	62.3	6.50	0.85	60.8	-	63.5
Al - Ox	mg/kg	650	86.6	13.3	20	662	64.2	24.2	610	-	691
Fe - Ox	mg/kg	4630	304	6.6	20	4660	225	85	4486	-	4769
P - Ox	mg/kg	430	22.5	5.2	18	436	15.6	6.6	419	-	441
P - AL (as P)	mg/kg	167	17.1	10.2	42	167	12.2	3.3	162	-	173

Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
P - NaHCO3 (1/20)	mg/l	50.3	5.81	11.5	61	51.0	4.00	0.93	48.8	-	51.8
K - NH4NO3 (1/5)	mg/l	280	25.3	9.0	65	281	18.0	3.9	273	-	286
Mg - NH4NO3 (1/5)	mg/l	164	17.8	10.8	65	166	12.3	2.8	160	-	169
pH - H2O (2/5)	...	7.69	0.149	1.9	63	7.70	0.100	0.023	7.66	-	7.73



Indicative Values ISE 879



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Sb	mg/kg	0.745	0.2257	30.3	27	0.720	0.1530	0.0543	0.656	- 0.834
Bi	mg/kg	3.86	0.912	23.6	9	3.67	0.630	0.380	3.17	- 4.55
Sc	mg/kg	11.3	2.92	25.8	22	10.9	2.04	0.78	10.0	- 12.6
U	mg/kg	2.44	0.639	26.1	26	2.56	0.450	0.157	2.19	- 2.70
Cs	mg/kg	6.94	1.860	26.8	20	7.35	1.342	0.520	6.07	- 7.81
W	mg/kg	1.99	0.895	45.0	19	2.08	0.620	0.257	1.56	- 2.42

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Al	g/kg	23.5	7.19	30.6	68	23.0	4.86	1.09	21.8	- 25.3
B	mg/kg	36.9	15.33	41.6	37	35.4	10.22	3.15	31.7	- 42.0
Ba	mg/kg	51.4	15.10	29.4	66	51.9	10.40	2.32	47.7	- 55.1
K	mg/kg	5540	1908	34.4	77	5650	1297	272	5110	- 5980
Mo	mg/kg	0.450	0.1367	30.4	40	0.506	0.0989	0.0270	0.407	- 0.494
Na	mg/kg	240	89.9	37.4	62	252	61.9	14.3	218	- 263
Sr	mg/kg	106	5.8	5.5	15	107	3.5	1.9	102.5	- 108.9
Tl	mg/kg	0.303	0.0836	27.6	15	0.331	0.0490	0.0270	0.257	- 0.349
Ag	mg/kg	0.124	0.0533	43.1	8	0.141	0.0417	0.0236	0.0802	- 0.167
Ti	mg/kg	304	130.5	43.0	17	324	88.5	39.6	237	- 370
La	mg/kg	15.5	3.18	20.5	8	15.5	2.20	1.41	12.9	- 18.1
U	mg/kg	0.883	0.1023	11.6	10	0.861	0.0703	0.0404	0.811	- 0.955

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Ag	µg/kg	90.8	9.91	10.9	12	90.9	7.43	3.58	84.5	- 97.0
B	mg/kg	32.0	8.49	26.5	36	32.3	5.71	1.77	29.2	- 34.9
Bi	mg/kg	0.264	0.0299	11.3	12	0.260	0.0210	0.0108	0.245	- 0.282
La	mg/kg	15.8	3.06	19.4	8	15.7	2.15	1.35	13.3	- 18.3
Mo	mg/kg	0.476	0.1460	30.6	47	0.504	0.1040	0.0266	0.434	- 0.519
Se	mg/kg	0.305	0.0995	32.7	38	0.324	0.0739	0.0202	0.272	- 0.337

Method: Extraction with boiling 2M HNO3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Mo	mg/kg	0.155	0.0409	26.5	31	0.165	0.0290	0.0092	0.140	- 0.170



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Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B	µg/kg	640	74.8	11.7	15	650	54.2	24.2	599	-	681
Cu	µg/kg	106	21.6	20.3	13	108	15.5	7.5	93.4	-	119
Mn	mg/kg	2.50	0.281	11.2	15	2.49	0.190	0.091	2.34	-	2.65
N total soluble	mg/kg	33.5	8.10	24.2	12	34.3	5.59	2.92	28.4	-	38.6

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Fraction < 2 µm	%	28.9	8.69	30.1	143	29.7	6.10	0.91	27.5	-	30.3
Fraction > 63 µm	%	9.14	2.738	30.0	80	9.10	1.900	0.383	8.53	-	9.75
Active Lime (as CaCO ₃)	%	3.20	0.948	29.7	12	3.35	0.657	0.342	2.60	-	3.79

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
B - Hot water	mg/kg	1.65	0.768	46.5	48	1.69	0.535	0.138	1.43	-	1.87

Method: Fluoride (Swiss standard procedure)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
F - Total	mg/kg	473	71.7	15.2	15	472	43.0	23.1	433	-	512

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Na	cmol+/kg	0.175	0.0561	32.1	203	0.180	0.0400	0.0049	0.167	-	0.183
Ca	cmol+/kg	36.9	12.78	34.7	237	36.6	8.84	1.04	35.2	-	38.5
Al	cmol+/kg	0.0280	0.0133	47.7	9	0.0300	0.0100	0.0056	0.0179	-	0.0381

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	95 % confidence limits		
Na	cmol+/kg	0.159	0.0535	33.6	15	0.178	0.0380	0.0173	0.130	-	0.189

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Na	cmol+/kg	0.150	0.0364	24.3	14	0.149	0.0245	0.0122	0.129	-	0.171
K	cmol+/kg	0.820	0.0605	7.4	15	0.840	0.0400	0.0195	0.787	-	0.853
Mg	cmol+/kg	1.70	0.192	11.3	15	1.75	0.135	0.062	1.59	-	1.80
Ca	cmol+/kg	24.3	1.88	7.8	15	24.5	1.30	0.61	23.2	-	25.3
Mn	cmol+/kg	0.0352	0.0052	14.9	10	0.0360	0.0040	0.0021	0.0315	-	0.0388



Indicative Values ISE 879



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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
CEC	cmol+/kg	24.6	1.70	6.9	8	24.3	1.22	0.75	23.2	-	26.0
Na	cmol+/kg	0.138	0.0282	20.5	8	0.140	0.0200	0.0124	0.115	-	0.160
K	cmol+/kg	0.918	0.0518	5.6	8	0.925	0.0355	0.0229	0.875	-	0.960
Mg	cmol+/kg	1.72	0.071	4.1	8	1.73	0.045	0.031	1.66	-	1.78
Ca	cmol+/kg	25.5	0.59	2.3	8	25.5	0.43	0.26	25.0	-	26.0

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
CEC	cmol+/kg	23.3	2.11	9.0	11	23.1	1.46	0.79	21.9	-	24.7
Na	cmol+/kg	0.120	0.0117	9.7	14	0.120	0.0080	0.0039	0.113	-	0.127
K	cmol+/kg	0.643	0.0252	3.9	14	0.643	0.0151	0.0084	0.629	-	0.658
Ca	cmol+/kg	21.1	1.83	8.6	14	20.8	1.24	0.61	20.1	-	22.2
Mg	cmol+/kg	1.61	0.126	7.8	14	1.61	0.093	0.042	1.54	-	1.68
Mn	cmol+/kg	0.0200	0.0014	7.0	13	0.0200	0.0010	0.0005	0.0192	-	0.0209

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Mn	cmol+/kg	0.0105	0.0013	12.4	13	0.0110	0.0010	0.0005	0.0098	-	0.0113

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Fe	mg/kg	60.5	20.95	34.6	80	59.3	14.15	2.93	55.8	-	65.1

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
P - w (as P)	mg/l soil	16.7	4.69	28.1	15	17.8	3.32	1.51	14.1	-	19.3

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
SO ₄	mg/kg	255	34.1	13.4	12	256	22.7	12.3	234	-	277



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Method: Real totals

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
B	mg/kg	68.6	7.30	4		
F	mg/kg	886	333.0	7		
Se	mg/kg	1.40	0.603	11	2.50	14
Ag	mg/kg	0.458	0.0750	6	2.000	15
Ge	mg/kg	1.25	0.950	8	3.00	7

Method: Acid extractable (So-called totals)

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Rb	mg/kg	54.2	3.90	6		
Se	mg/kg	0.670	0.3640	25	1.500	25
Y	mg/kg	12.3	0.39	5		
Zr	mg/kg	12.7	0.11	4		
Sb	mg/kg	0.360	0.2300	21	1.000	32
Bi	mg/kg	0.250	0.0100	3		
Ce	mg/kg	40.3	0.35	3		
Th	mg/kg	6.72	0.328	3		
Te	mg/kg	1.59	1.541	4	2.00	13

Method: Aqua Regia (ISO 11466)

Element	Unit	Median	MAD	N
Ce	mg/kg	32.8	4.50	5
Nd	mg/kg	16.3	0.19	3
Rb	mg/kg	27.8	3.84	3
Sc	mg/kg	3.84	0.360	5
Si	g/kg	1.38	1.242	3
Th	mg/kg	4.98	0.390	6
Y	mg/kg	10.3	0.10	5

Method: Extraction with 0.1M NaNO3

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Cd	µg/kg	0.440	0.0600	3	5.000	29
Pb	µg/kg	0.130	-	3	25.000	26
Zn	µg/kg	5.22	2.930	4	50.00	28



Indicative Values ISE 879

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Co	µg/kg	4.80	0.212	5	10.00	5
Fe	mg/kg	1.60	0.850	7	2.00	5
SO ₄	mg/kg	225	26.1	7		
Zn	µg/kg	83.8	17.75	6	103.0	8

Method: Other determinations

Element	Unit	Median	MAD	N
CN - Total	mg/kg	0.470	0.2200	4

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
CEC	cmol+/kg	20.0	2.44	4		
Al	cmol+/kg	-	-	0	0.0900	6
Fe	cmol+/kg	-	-	0	0.0010	7

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

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Al	cmol+/kg	0.0825	0.0590	4	0.0605	6
Fe	cmol+/kg	0.0110	0.0105	5	0.0200	8

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

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Al	cmol+/kg	0.0056	0.0035	6	0.0300	8
Fe	cmol+/kg	0.0009	0.0007	5		

Method: Mehlich-3

Element	Unit	Median	MAD	N
As	mg/kg	1.93	0.586	3
Cd	mg/kg	0.168	0.0120	5
Cr	mg/kg	0.170	0.0090	3
Pb	mg/kg	6.46	1.524	4
Co	mg/kg	0.547	0.1170	3

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



Indicative Values ISE 879



Element	Unit	Median	MAD	N
F	mg/kg	8.95	3.375	4

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

Element	Unit	Median	MAD	N
Cl	mg/kg	13.3	3.38	6
N - NO3 (as N)	mg/kg	10.00	1.000	7

Method: Phosphorus and related analysis

Element	Unit	Median	MAD	N
P - Bray (as P)	mg/kg	25.1	18.23	120

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

Element	Unit	Median	MAD	N
Br	mg/kg	1.51	0.060	3
Cl	mg/kg	8.30	1.500	3

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

Element	Unit	Median	MAD	N
Cr	mg/kg	2.48	0.384	3
Cu	mg/kg	10.6	1.04	5
Zn	mg/kg	25.8	2.75	5
Al	g/kg	1.43	0.034	3
Fe	g/kg	4.65	0.956	5
K	mg/kg	411	23.0	5
Mg	mg/kg	2890	28	5
Mn	mg/kg	655	9.5	5
P	mg/kg	437	58.4	5
Na	mg/kg	98.7	5.30	5
S	mg/kg	177	104.8	6

(cont.)