



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 864



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 864 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	3	1
2025	2	3
2025	1	2
2023	3	2
2021	3	3



Consensus Values ISE 864



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	20.4	1.40	6.9	77	20.4	0.720	0.199	0.979
As	mg/kg	4.93	1.01	20.6	62	5.12	0.653	0.161	3.27
Ba	mg/kg	192	14.4	7.5	73	194	9.00	2.10	1.09
Br	mg/kg	10.2	1.68	16.4	41	10.3	1.10	0.327	3.21
Ca	g/kg	3.31	0.274	8.3	80	3.32	0.169	0.038	1.16
Cd	mg/kg	0.253	0.045	17.7	30	0.255	0.029	0.010	4.04
Co	mg/kg	1.49	0.377	25.3	48	1.53	0.210	0.068	4.57
Cr	mg/kg	47.0	10.6	22.5	86	47.3	7.00	1.42	3.03
Cu	mg/kg	17.2	3.06	17.8	79	17.2	2.16	0.430	2.50
Fe	g/kg	5.86	0.497	8.5	92	5.83	0.295	0.065	1.11
I	mg/kg	3.25	0.407	12.6	8	3.29	0.150	0.180	5.55
K	mg/kg	9422	472	5.0	96	9344	299	60.2	0.639
Mg	mg/kg	851	137	16.1	73	853	73.4	20.1	2.36
Mn	mg/kg	213	34.6	16.3	86	209	23.5	4.67	2.20
Na	mg/kg	5189	442	8.5	71	5182	285	65.6	1.26
Ni	mg/kg	6.73	2.16	32.0	72	6.85	1.09	0.318	4.72
P	mg/kg	1417	200	14.1	79	1400	125	28.1	1.98
Pb	mg/kg	26.8	2.85	10.6	78	27.0	1.70	0.404	1.51
Rb	mg/kg	40.7	2.44	6.0	52	40.8	1.50	0.423	1.04
S	mg/kg	346	92.4	26.7	77	345	51.0	13.2	3.80
Si	g/kg	402	11.5	2.9	72	400	5.51	1.69	0.420
Sr	mg/kg	53.5	4.68	8.8	66	53.9	2.80	0.721	1.35
Y	mg/kg	10.2	1.73	17.0	42	10.1	1.12	0.333	3.28
Zn	mg/kg	46.7	4.85	10.4	90	46.8	3.06	0.639	1.37
Zr	mg/kg	399	42.4	10.6	52	397	28.3	7.35	1.84
C-elementary	g/kg	28.0	1.71	6.1	181	28.1	1.13	0.159	0.567
Tl	mg/kg	0.356	0.046	12.9	14	0.355	0.030	0.015	4.30
V	mg/kg	27.7	4.18	15.1	73	27.4	2.66	0.611	2.20
Ti	mg/kg	1856	143	7.7	74	1861	94.2	20.8	1.12
N - elementary	g/kg	2.11	0.165	7.8	270	2.11	0.094	0.013	0.596
Ce	mg/kg	25.9	5.30	20.4	39	26.5	2.91	1.06	4.09
La	mg/kg	12.1	2.94	24.3	39	12.4	2.03	0.588	4.87
Nb	mg/kg	7.37	1.88	25.5	34	7.00	1.30	0.403	5.46
Th	mg/kg	4.10	0.953	23.2	29	4.15	0.550	0.221	5.39
Hg	µg/kg	52.8	6.72	12.7	77	52.7	4.61	0.957	1.81



Consensus Values ISE 864



Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	5.39	1.31	24.3	62	5.39	0.945	0.208	3.86
As	mg/kg	3.85	0.530	13.8	92	3.85	0.333	0.069	1.79
Ba	mg/kg	15.9	2.73	17.2	55	16.2	1.65	0.460	2.90
Ca	g/kg	2.46	0.239	9.7	85	2.44	0.147	0.032	1.32
Cd	mg/kg	0.240	0.032	13.3	94	0.240	0.020	0.004	1.72
Co	mg/kg	1.15	0.157	13.6	68	1.16	0.095	0.024	2.07
Cr	mg/kg	23.1	4.63	20.1	112	23.3	3.25	0.547	2.37
Cu	mg/kg	16.4	1.48	9.0	126	16.4	0.900	0.164	1.00
Fe	g/kg	4.69	0.495	10.5	77	4.63	0.319	0.070	1.50
K	mg/kg	806	204	25.4	83	794	135	28.0	3.48
Mg	mg/kg	633	107	16.9	78	627	78.9	15.1	2.39
Mn	mg/kg	176	20.5	11.7	86	175	13.3	2.77	1.57
Mo	mg/kg	0.808	0.167	20.6	61	0.807	0.092	0.027	3.30
N	g/kg	2.02	0.235	11.6	131	2.00	0.130	0.026	1.27
Ni	mg/kg	5.52	0.666	12.1	103	5.50	0.364	0.082	1.49
P	mg/kg	1325	149	11.3	107	1315	95.0	18.1	1.36
Pb	mg/kg	22.2	1.89	8.5	116	22.3	1.32	0.219	0.990
Rb	mg/kg	10.3	0.745	7.2	8	10.3	0.318	0.329	3.19
S	mg/kg	356	34.9	9.8	69	358	21.4	5.25	1.48
Sr	mg/kg	15.2	2.56	16.9	26	14.8	1.50	0.629	4.14
Zn	mg/kg	42.8	3.80	8.9	126	42.6	2.38	0.423	0.989
V	mg/kg	19.4	2.51	12.9	67	19.6	1.72	0.383	1.97
Tl	mg/kg	0.146	0.027	18.8	21	0.152	0.019	0.007	5.12
U	mg/kg	0.635	0.069	10.9	11	0.650	0.030	0.026	4.12
Hg	µg/kg	50.1	7.96	15.9	58	49.7	4.08	1.31	2.61

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	52.4	7.95	15.2	11	53.0	5.00	3.00	5.72
Al	g/kg	4.63	0.763	16.5	101	4.68	0.494	0.095	2.05
As	mg/kg	3.74	0.381	10.2	114	3.73	0.227	0.045	1.19
Ba	mg/kg	15.8	1.76	11.1	37	16.0	1.09	0.362	2.29
Be	mg/kg	0.091	0.020	21.5	26	0.093	0.012	0.005	5.27
Ca	g/kg	2.40	0.225	9.4	93	2.37	0.120	0.029	1.22
Cd	mg/kg	0.248	0.025	10.3	129	0.250	0.019	0.003	1.13
Co	mg/kg	1.12	0.142	12.6	96	1.13	0.093	0.018	1.61
Cr	mg/kg	20.9	2.50	11.9	153	21.0	1.53	0.252	1.21



Consensus Values ISE 864



Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	16.8	1.29	7.7	151	16.8	0.900	0.131	0.779
Fe	g/kg	4.53	0.389	8.6	117	4.52	0.250	0.045	0.992
Hg	µg/kg	52.0	7.90	15.2	60	51.1	5.65	1.28	2.45
K	mg/kg	780	103	13.2	95	783	58.0	13.3	1.70
Li	mg/kg	4.28	0.778	18.2	19	4.24	0.490	0.223	5.21
Mg	mg/kg	606	69.2	11.4	97	607	41.0	8.79	1.45
Mn	mg/kg	168	10.6	6.3	127	168	6.30	1.18	0.701
Mo	mg/kg	0.825	0.097	11.8	68	0.826	0.060	0.015	1.79
Na	mg/kg	41.3	14.9	36.2	58	43.2	8.45	2.45	5.94
Ni	mg/kg	5.48	0.585	10.7	145	5.47	0.374	0.061	1.11
P	mg/kg	1324	106	8.0	97	1330	74.8	13.5	1.02
Pb	mg/kg	22.2	2.06	9.3	156	22.2	1.35	0.206	0.930
S	mg/kg	353	25.0	7.1	73	352	17.0	3.66	1.04
Sb	mg/kg	0.324	0.044	13.7	29	0.326	0.029	0.010	3.17
Se	mg/kg	0.342	0.086	25.2	32	0.352	0.050	0.019	5.57
Sn	mg/kg	0.914	0.111	12.2	25	0.930	0.076	0.028	3.04
Sr	mg/kg	15.0	1.86	12.4	27	15.3	1.26	0.449	2.99
Tl	mg/kg	0.117	0.021	18.3	23	0.115	0.011	0.006	4.77
U	mg/kg	0.590	0.065	11.0	21	0.590	0.039	0.018	3.00
V	mg/kg	19.3	1.47	7.6	67	19.6	0.960	0.224	1.16
Zn	mg/kg	43.4	3.19	7.3	154	43.7	2.10	0.321	0.740

Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.251	0.024	9.5	82	0.254	0.016	0.003	1.31
Co	mg/kg	0.779	0.063	8.1	68	0.773	0.042	0.010	1.23
Cr	mg/kg	11.1	0.832	7.5	89	11.1	0.536	0.110	0.995
Cu	mg/kg	16.3	1.22	7.5	89	16.3	0.841	0.161	0.989
Hg	µg/kg	48.9	5.77	11.8	69	49.0	4.08	0.868	1.77
Mo	mg/kg	0.313	0.046	14.6	65	0.315	0.028	0.007	2.27
Ni	mg/kg	2.36	0.228	9.7	80	2.36	0.138	0.032	1.35
Pb	mg/kg	22.7	1.82	8.0	90	22.8	1.04	0.240	1.06
Tl	mg/kg	0.041	0.005	11.9	20	0.041	0.002	0.001	3.32
Zn	mg/kg	39.2	2.93	7.5	90	39.2	1.80	0.386	0.987



Consensus Values ISE 864



Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	379	36.6	9.7	27	386	27.0	8.81	2.33
Ni	µg/kg	55.2	3.12	5.6	26	54.9	1.82	0.764	1.38
Zn	µg/kg	575	41.0	7.1	27	570	27.0	9.85	1.71

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	92.4	19.6	21.2	19	92.6	13.6	5.62	6.09
Co	µg/kg	24.9	0.327	1.3	11	24.9	0.100	0.123	0.495
Cu	µg/kg	275	14.5	5.3	22	275	8.30	3.87	1.41
K	mg/kg	138	7.57	5.5	38	138	4.16	1.53	1.11
Mg	mg/kg	137	7.98	5.8	29	137	4.29	1.85	1.35
Mn	mg/kg	8.63	0.458	5.3	20	8.60	0.300	0.128	1.48
N - NH ₄ (as N)	mg/kg	177	22.6	12.7	32	175	12.9	4.99	2.81
N - NO ₃ (as N)	mg/kg	29.4	2.63	9.0	38	29.5	1.58	0.534	1.82
Na	mg/kg	8.88	0.803	9.0	33	8.91	0.391	0.175	1.97
P	mg/kg	13.0	1.62	12.5	35	13.0	1.04	0.343	2.64
SO ₄	mg/kg	264	35.2	13.3	14	256	20.0	11.8	4.45
Zn	µg/kg	1527	130	8.5	22	1503	51.5	34.7	2.27

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	6.15	0.169	2.7	482	6.17	0.103	0.010	0.156
pH - KCl	...	5.62	0.127	2.3	223	5.62	0.080	0.011	0.189
pH - CaCl ₂	...	5.61	0.092	1.6	143	5.61	0.060	0.010	0.171
Fraction < 2 µm	%	5.76	2.17	37.6	147	5.86	1.46	0.224	3.88
EC-SC (ISO 11265)	mS/m	30.4	4.23	13.9	202	30.2	2.35	0.372	1.22
Fraction < 63 µm	%	30.6	6.15	20.1	100	30.4	4.01	0.769	2.52
Fraction > 63 µm	%	69.2	5.30	7.7	88	69.3	3.45	0.707	1.02
Org.matter (L.O.I.)	%	5.16	0.293	5.7	203	5.17	0.180	0.026	0.498
Fraction < 16 µm	%	14.4	4.85	33.7	52	14.9	4.88	0.840	5.85
TC=Total C (org.+inorg.)	g/kg	27.8	1.59	5.7	211	27.8	1.06	0.136	0.491
TOC=Total Org. C	g/kg	27.3	2.25	8.3	260	27.2	1.34	0.174	0.640
C - org others (W&B a.o.)	g/kg	26.4	4.08	15.4	229	26.4	2.64	0.337	1.28



Consensus Values ISE 864



Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	1.10	0.194	17.6	231	1.10	0.110	0.016	1.45
delta 13C	‰ V-PDB	-27.2	0.240	0.9	16	-27.2	0.155	0.075	0.275
delta 15N	‰ Air	7.90	0.301	3.8	16	7.86	0.142	0.094	1.19

Method: Fluoride (Swiss standard procedure)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	93.1	6.85	7.4	15	94.0	6.00	2.21	2.37

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	9.82	2.00	20.3	156	9.86	1.20	0.200	2.03
Na	cmol+/kg	0.056	0.029	50.7	197	0.060	0.019	0.003	4.52
K	cmol+/kg	0.546	0.072	13.2	264	0.544	0.044	0.006	1.02
Mg	cmol+/kg	1.27	0.177	14.0	263	1.27	0.110	0.014	1.08
Ca	cmol+/kg	6.53	1.07	16.4	250	6.55	0.577	0.085	1.30

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	15.4	2.25	14.6	14	15.9	1.25	0.751	4.88

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
K	cmol+/kg	0.600	0.004	0.7	14	0.600	0.002	0.001	0.243
Mg	cmol+/kg	1.40	0.016	1.1	14	1.40	0.005	0.005	0.375
Ca	cmol+/kg	6.17	0.343	5.5	14	6.22	0.219	0.114	1.85

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
K	cmol+/kg	0.594	0.060	10.1	10	0.590	0.035	0.024	4.01
Mg	cmol+/kg	1.36	0.143	10.5	10	1.37	0.065	0.056	4.16

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	8.32	1.07	12.9	47	8.37	0.637	0.196	2.35
Na	cmol+/kg	0.044	0.010	22.7	29	0.044	0.005	0.002	5.26
K	cmol+/kg	0.465	0.050	10.8	37	0.462	0.030	0.010	2.21
Ca	cmol+/kg	6.30	0.622	9.9	40	6.25	0.369	0.123	1.95

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mg	cmol+/kg	1.27	0.149	11.8	40	1.26	0.075	0.030	2.33
Mn	cmol+/kg	0.032	0.004	12.9	10	0.032	0.003	0.002	5.08

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	mg/kg	1703	153	9.0	94	1706	87.9	19.8	1.16
Cu	mg/kg	2.05	0.335	16.3	97	2.07	0.190	0.043	2.07
Fe	mg/kg	592	96.4	16.3	109	592	65.3	11.5	1.95
K	mg/kg	231	22.0	9.5	96	231	14.1	2.80	1.21
Mg	mg/kg	175	14.6	8.3	97	175	8.07	1.85	1.06
Mn	mg/kg	35.6	5.42	15.2	111	35.3	2.99	0.643	1.81
Na	mg/kg	12.8	3.80	29.8	67	13.0	2.32	0.580	4.54
P	mg/kg	768	112	14.6	127	753	68.0	12.4	1.62
Zn	mg/kg	20.4	3.07	15.0	111	20.1	1.78	0.364	1.78
Al	mg/kg	855	82.3	9.6	56	857	43.6	13.8	1.61

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	3.12	0.725	23.2	89	3.17	0.427	0.096	3.08
Fe	mg/kg	196	50.1	25.6	90	197	29.1	6.60	3.37
Mn	mg/kg	18.5	4.29	23.1	89	18.9	2.48	0.568	3.07
Zn	mg/kg	13.4	2.40	17.9	90	13.5	1.44	0.317	2.36

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NH4 (as N)	mg/kg	230	46.3	20.1	67	225	27.5	7.07	3.07
N - NO3 (as N)	mg/kg	27.3	7.41	27.2	77	28.0	4.70	1.06	3.87

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Olsen (as P)	mg/kg	142	28.1	19.8	176	143	15.9	2.65	1.86
Al - Ox	mg/kg	1004	94.6	9.4	14	993	44.0	31.6	3.15
Fe - Ox	mg/kg	2192	131	6.0	13	2190	61.0	45.4	2.07
P - Ox	mg/kg	1236	46.7	3.8	13	1221	27.0	16.2	1.31
P - AL (as P)	mg/kg	581	85.6	14.7	54	571	44.5	14.6	2.50



Consensus Values ISE 864



Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	154	22.2	14.4	60	154	17.0	3.58	2.32
K - NH ₄ NO ₃ (1/5)	mg/l	264	22.6	8.6	71	263	12.6	3.36	1.27
Mg - NH ₄ NO ₃ (1/5)	mg/l	175	20.7	11.8	68	178	12.4	3.14	1.80
pH - H ₂ O (2/5)	...	6.15	0.145	2.4	68	6.15	0.091	0.022	0.357

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	11.1	1.44	12.9	11	11.0	0.550	0.542	4.88
Zn	mg/kg	27.3	2.45	9.0	10	27.2	1.47	0.968	3.54
Fe	g/kg	1.11	0.131	11.8	9	1.13	0.085	0.054	4.91
Mg	mg/kg	189	22.7	12.0	10	185	14.1	8.96	4.74
Mn	mg/kg	69.3	6.28	9.1	10	70.2	2.65	2.48	3.58
P	mg/kg	856	98.4	11.5	9	843	60.0	41.0	4.79
Ca	g/kg	1.97	0.070	3.6	10	1.97	0.035	0.028	1.41

Method: PEP-Ammoniumacetate-EDTA extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-Ca	mg/kg	1755	188	10.7	20	1726	111	52.6	3.00
AAE10-Mg	mg/kg	166	9.29	5.6	20	165	5.55	2.60	1.57
AAE10-K	mg/kg	221	12.5	5.7	20	222	8.17	3.50	1.58
AAE10-P	mg/kg	449	53.5	11.9	17	447	24.1	16.2	3.61

Method: PEP-Water extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
H ₂ O10-Mg	mg/kg	22.6	1.12	4.9	14	22.6	0.689	0.373	1.65
H ₂ O10-K	mg/kg	79.2	3.82	4.8	14	79.7	2.95	1.28	1.61
H ₂ O10-P	mg/kg	32.1	1.51	4.7	14	32.0	1.25	0.505	1.57

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CO ₂ -K	K-test	8.21	0.314	3.8	14	8.22	0.225	0.105	1.28
CO ₂ -P	P-test	96.4	4.39	4.6	14	96.3	2.44	1.47	1.52
CC-Mg	Mg-test	13.7	1.13	8.2	14	13.6	0.658	0.377	2.76
pH-H ₂ O	...	6.19	0.066	1.1	20	6.20	0.050	0.018	0.296



Consensus Values ISE 864

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Schluff (silt)	%	14.3	2.06	14.5	15	14.8	1.09	0.666	4.66
Sand	%	73.3	2.48	3.4	13	73.3	1.40	0.858	1.17
C-org	%	2.33	0.230	9.9	17	2.37	0.127	0.070	2.99
Humus	%	4.01	0.351	8.8	16	4.09	0.210	0.110	2.74
TOC_400	%	2.47	0.177	7.2	13	2.45	0.110	0.061	2.49

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ga	mg/kg	5.15	1.79	34.7	46	5.50	1.25	0.330	6.40
Li	mg/kg	11.7	0.751	6.4	5	11.7	0.300	0.420	3.58
Mo	mg/kg	1.00	0.326	32.5	32	1.09	0.185	0.072	7.19
Se	mg/kg	0.897	0.595	66.3	10	1.15	0.470	0.235	26.2
Sn	mg/kg	1.65	0.547	33.1	21	1.81	0.360	0.149	9.03
Sb	mg/kg	0.765	0.264	34.5	16	0.775	0.171	0.082	10.8
Be	mg/kg	0.510	0.111	21.8	9	0.530	0.060	0.046	9.08
Nd	mg/kg	10.5	2.96	28.1	27	10.8	1.95	0.713	6.77
Sc	mg/kg	2.77	1.46	52.7	24	2.99	0.900	0.372	13.4
U	mg/kg	1.59	0.411	25.8	26	1.65	0.249	0.101	6.32
Cs	mg/kg	1.23	0.855	69.5	13	1.41	0.480	0.296	24.1
W	mg/kg	1.75	0.408	23.4	17	1.65	0.447	0.124	7.08
Yb	mg/kg	1.19	0.419	35.1	9	1.18	0.194	0.175	14.6
Sm	mg/kg	1.82	1.24	68.2	10	2.15	0.637	0.490	27.0
Pr	mg/kg	2.29	1.70	74.1	7	2.70	1.61	0.803	35.0
Gd	mg/kg	2.98	1.78	59.9	9	3.00	1.18	0.743	24.9
Dy	mg/kg	1.85	0.265	14.3	6	1.82	0.185	0.135	7.31

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	3.56	1.46	41.0	30	3.89	0.790	0.333	9.36
Li	mg/kg	4.88	1.56	32.0	28	4.97	1.10	0.369	7.56
Na	mg/kg	52.3	27.9	53.4	57	57.8	22.5	4.63	8.84
Se	mg/kg	0.372	0.115	30.9	27	0.402	0.088	0.028	7.43
Si	g/kg	1.36	3.06	225.6	9	2.20	1.84	1.28	94.0
Sn	mg/kg	0.895	0.272	30.4	34	0.893	0.144	0.058	6.51
Y	mg/kg	2.22	0.426	19.2	10	2.37	0.319	0.168	7.59
Sb	mg/kg	0.390	0.155	39.8	20	0.400	0.098	0.043	11.1
Be	mg/kg	0.103	0.038	37.0	25	0.110	0.030	0.009	9.25
Ag	mg/kg	0.066	0.066	101.0	10	0.058	0.038	0.026	39.9
Ti	mg/kg	92.9	47.2	50.8	23	103	28.9	12.3	13.2
Bi	mg/kg	0.115	0.031	27.0	4	0.122	0.017	0.019	16.9
Ce	mg/kg	15.4	5.53	35.9	7	15.0	2.22	2.61	17.0
La	mg/kg	7.63	1.56	20.4	11	7.37	0.965	0.587	7.70
Sc	mg/kg	0.842	0.252	30.0	6	0.894	0.141	0.129	15.3
Th	mg/kg	2.09	0.297	14.2	4	2.17	0.158	0.185	8.86



Indicative Values ISE 864

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	3.76	1.88	49.9	35	4.05	0.840	0.396	10.5
Bi	mg/kg	0.086	0.016	19.2	5	0.083	0.010	0.009	10.7
Ce	mg/kg	13.7	0.889	6.5	5	13.7	0.620	0.497	3.62
La	mg/kg	7.05	0.322	4.6	5	7.00	0.270	0.180	2.55
Rb	mg/kg	8.34	0.883	10.6	6	8.62	0.665	0.450	5.40
Ti	mg/kg	96.5	34.4	35.6	30	104	20.6	7.84	8.12
Y	mg/kg	1.78	0.084	4.7	7	1.78	0.049	0.040	2.24

Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Pb	µg/kg	13.1	7.25	55.2	6	28.5	3.17	3.70	28.1

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fe	mg/kg	3.84	1.05	27.4	20	3.80	0.670	0.294	7.67
N total soluble	mg/kg	265	5.75	2.2	5	264	3.40	3.21	1.21

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TIC=Tot.Inorg C(as CaCO ₃)	%	0.167	0.227	136.0	68	0.278	0.218	0.034	20.6
Fraction 2 - 50 µm (USDA)	%	15.4	9.93	64.4	6	14.2	5.60	5.07	32.9
Fraction > 50 µm (USDA)	%	76.2	9.66	12.7	4	76.6	5.90	6.04	7.92

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B - Hot water	mg/kg	0.404	0.224	55.5	58	0.425	0.149	0.037	9.10

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. %
Na	cmol+/kg	0.106	0.033	31.5	5	0.104	0.019	0.019	17.6
K	cmol+/kg	0.532	0.311	58.4	6	0.592	0.130	0.159	29.8
Mg	cmol+/kg	1.14	0.260	22.8	6	1.22	0.145	0.133	11.7
Ca	cmol+/kg	7.51	1.85	24.7	6	8.00	1.32	0.946	12.6



Indicative Values ISE 864

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	10.3	0.408	3.9	4	10.2	0.215	0.255	2.46
Na	cmol+/kg	0.080	0.032	40.4	12	0.100	0.012	0.012	14.6
Mn	cmol+/kg	0.071	0.037	52.5	9	0.080	0.027	0.016	21.9
Fe	cmol+/kg	0.021	0.003	16.3	7	0.022	0.002	0.002	7.71

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	9.39	2.17	23.1	9	9.10	1.10	0.904	9.62
Ca	cmol+/kg	8.04	1.32	16.4	10	8.19	0.795	0.521	6.47

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.018	0.025	136.4	8	0.020	0.013	0.011	60.3

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	0.298	0.199	66.6	52	0.331	0.131	0.034	11.5
Cd	mg/kg	0.108	0.014	12.5	5	0.110	0.008	0.008	7.01
Cr	mg/kg	0.437	0.126	28.9	6	0.470	0.051	0.064	14.8
Pb	mg/kg	1.92	1.09	57.1	8	1.73	0.576	0.484	25.2
Co	mg/kg	0.149	0.073	48.7	11	0.150	0.050	0.027	18.4

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NO ₃ (as N)	mg/kg	27.3	2.19	8.0	7	27.0	1.10	1.04	3.79

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	439	294	67.1	119	456	233	33.7	7.68
P - w (as P)	mg/l soil	58.8	10.4	17.8	11	58.0	5.76	3.94	6.70
K - AL (as K)	mg/kg	206	44.7	21.7	7	209	35.2	21.1	10.3

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
SO ₄	mg/kg	174	143	82.0	9	196	101	59.4	34.2



Indicative Values ISE 864

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	1.11	0.088	7.9	5	1.13	0.055	0.049	4.44
Cd	mg/kg	0.219	0.023	10.4	6	0.221	0.011	0.012	5.30
Co	mg/kg	0.386	0.035	9.2	6	0.393	0.027	0.018	4.68
Cr	mg/kg	3.30	0.279	8.5	6	3.38	0.194	0.142	4.31
Ni	mg/kg	0.887	0.119	13.5	6	0.919	0.078	0.061	6.87
Pb	mg/kg	20.6	9.04	43.9	6	20.6	3.44	4.61	22.4
Al	g/kg	0.981	0.057	5.8	4	0.994	0.030	0.035	3.61
K	mg/kg	236	46.6	19.7	9	248	31.5	19.4	8.23
Na	mg/kg	11.5	2.14	18.6	8	12.3	1.25	0.948	8.21
S	mg/kg	98.0	16.0	16.3	8	101	9.90	7.07	7.21

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CaCO ₃	%	0.257	0.231	90.1	8	0.290	0.185	0.102	39.8
pH-CC	...	5.70	0.092	1.6	7	5.70	0.073	0.043	0.759

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ton (clay)	%	7.42	2.63	35.4	15	7.69	1.39	0.848	11.4
ROC_600	%	0.285	0.062	21.8	7	0.280	0.033	0.029	10.3
ROC_900	%	0.161	0.076	47.2	4	0.170	0.035	0.048	29.5
TIC_900B	%	0.192	0.011	5.7	6	0.190	0.005	0.006	2.92

Method: PEP-Cation Exchange Capacity

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	6.35	1.60	25.3	7	6.01	1.45	0.758	11.9
Mg	cmol+/kg	1.32	0.104	7.9	7	1.33	0.040	0.049	3.73
K	cmol+/kg	0.615	0.069	11.2	7	0.590	0.040	0.033	5.31
H	cmol+/kg	7.96	0.625	7.9	7	7.91	0.420	0.295	3.71
KAK	cmol+/kg	16.1	1.71	10.6	7	15.8	1.40	0.808	5.01
S-Wert	cmol+/kg	8.28	1.79	21.6	7	7.95	1.36	0.844	10.2
BAS	%	51.0	6.41	12.6	7	50.2	2.72	3.03	5.93