

Soils



Pedological parameters

IRMM-443-1 to IRMM-443-7 are representative for major European soil types. They are available in units of 200 g and are certified for the following pedological parameters:

- K_p of atrazine according OECD Testguideline 106
- $1/n$ of atrazine according OECD Testguideline 106
- K_p of 2,4-D according OECD Testguideline 106
- $1/n$ of 2,4-D according OECD Testguideline 106
- K_p of lindane according OECD Testguideline 106
- $1/n$ of lindane according OECD Testguideline 106
- pH in water according to ISO 10390
- pH in 0.01M $CaCl_2$ according to ISO 10390

Rare earth elements

		Certified values			
ERM-CC690 calcareous soil 70 g	Ce	49.1	±	2.5	mg/kg
	Dy	2.90	±	0.28	mg/kg
	Gd	3.2	±	0.4	mg/kg
	La	24.4	±	1.7	mg/kg
	Nd	19.1	±	2.2	mg/kg
	Sc	7.9	±	0.9	mg/kg
	Sm	3.5	±	0.4	mg/kg
	Tb	0.50	±	0.07	mg/kg
	Th	7.6	±	0.8	mg/kg
	Tm	0.232	±	0.026	mg/kg
	U	1.90	±	0.23	mg/kg
	Yb	1.57	±	0.19	mg/kg



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Accredited CRM Producer: we are accredited to ISO Guide 34:2009 for the production of reference materials under the code BELAC 268-RM

Joint Research Centre Certified reference materials for sewage sludges, sediments and soils

Sewage sludges

		Certified values			
BCR-146R sewage sludge (industrial origin) 50 g	Total element content				
	Cd	18.8	±	0.5	mg/kg
	Co	7.39	±	0.27	mg/kg
	Cr	196	±	7	mg/kg
	Cu	838	±	16	mg/kg
	Hg	8.6	±	0.4	mg/kg
	Mn	323	±	7	mg/kg
	Ni	70	±	5	mg/kg
	Pb	609	±	14	mg/kg
	Zn	3060	±	60	mg/kg
	Aqua regia leachable				
	Cd	18.4	±	0.4	mg/kg
	Co	6.5	±	0.4	mg/kg
	Cr	174	±	7	mg/kg
Cu	831	±	16	mg/kg	
Hg	8.39	±	0.25	mg/kg	
Mn	298	±	9	mg/kg	
Ni	65.0	±	3.0	mg/kg	
Pb	583	±	17	mg/kg	
Zn	3040	±	60	mg/kg	

Dioxins and furans

		Certified values			
BCR-677 sewage sludge 40 g	Dioxins				
	D48	1.51	±	0.16	ng/kg
	D54	4.1	±	0.9	ng/kg
	D67	235	±	16	ng/kg
	D70	79	±	7	ng/kg
	D73	3500	±	400	ng/kg
	D75	12700	±	800	ng/kg
	Furans				
	F83	45	±	4	ng/kg
	F94	24.8	±	1.6	ng/kg
	F114	16.9	±	1.5	ng/kg
	F118	14.5	±	1.6	ng/kg
	F121	6.1	±	0.8	ng/kg
	F124	0.84	±	0.29	ng/kg
	F130	5.6	±	0.6	ng/kg
	F131	62	±	3	ng/kg
	F134	6.3	±	0.8	ng/kg
	F135	177	±	7	ng/kg

Total and aqua regia leachable element content

		Certified values			
BCR-145R sewage sludge (mixed origin) 40 g	Total element content				
	Cd	3.50	±	0.15	mg/kg
	Co	5.6	±	0.4	mg/kg
	Cu	696	±	12	mg/kg
	Hg	2.01	±	0.22	mg/kg
	Mn	156	±	4	mg/kg
	Ni	247	±	7	mg/kg
	Pb	286	±	5	mg/kg
	Zn	2122	±	23	mg/kg
	Aqua regia leachable				
	Cd	(3.43	±	0.17)	mg/kg
	Co	(5.3	±	0.7)	mg/kg
	Cr	307	±	13	mg/kg
	Cu	707	±	9	mg/kg
Hg	(1.99	±	0.08)	mg/kg	
Mn	(145	±	7)	mg/kg	
Ni	251	±	6	mg/kg	
Pb	282	±	9	mg/kg	
Zn	2140	±	50	mg/kg	
ERM-CC144 Sewage sludge 30 g	Total element content				
	As	7.7	±	0.7	mg/kg
	Cd	14.5	±	1.4	mg/kg
	Co	6.5	±	0.4	mg/kg
	Cr	168	±	14	mg/kg
	Cu	348	±	18	mg/kg
	Fe	32.9	±	1.6	g/kg
	Hg	5.9	±	0.6	mg/kg
	Mn	352	±	14	mg/kg
	Ni	91	±	7	mg/kg
	Pb	157	±	9	mg/kg
	Zn	0.98	±	0.04	g/kg
	Aqua regia soluble				
	As	7.7	±	0.7	mg/kg
Cd	13.3	±	0.9	mg/kg	
Co	5.9	±	0.4	mg/kg	
Cr	150	±	11	mg/kg	
Cu	346	±	15	mg/kg	
Fe	32.8	±	1.5	g/kg	
Hg	6.1	±	0.7	mg/kg	
Mn	340	±	13	mg/kg	
Ni	86	±	6	mg/kg	
Pb	156	±	7	mg/kg	
Zn	0.97	±	0.04	g/kg	

Values in brackets are indicative only

Confidence in measurements

All certificates and detailed production information can be found at <https://crm.jrc.ec.europa.eu>

Sediments



Extractable element fractions		
		Extraction media for which values are assigned
BCR-483 sewage sludge amended soil 35 g	Cd, Cr, Cu, Ni, Pb, Zn	EDTA acetic acid calcium chloride sodium nitrate ammonium nitrate
BCR-484 sewage sludge amended (terra rossa) soil	Cd, Cr, Cu, Ni, Pb, Zn	EDTA acetic acid calcium chloride sodium nitrate ammonium nitrate
BCR-700 organic-rich soil	Cd, Cr, Cu, Ni, Pb, Zn	EDTA acetic acid

Metal species content			
Certified values			
ERM-CC580 estuarine sediment 40 g	Total Hg CH ₃ Hg	132 ± 3 0.075 ± 0.004	mg/kg mg/kg
BCR-462 coastal sediment 25 g	Tributyltin Dibutyltin	54 ± 15 68 ± 12	µg/kg µg/kg
BCR-646 freshwater sediment 40 g	Tributyltin Dibutyltin Monobutyltin Triphenyltin Diphenyltin Monophenyltin	480 ± 80 770 ± 90 610 ± 120 29 ± 11 36 ± 8 69 ± 18	µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg

Extractable element fractions			
Certified values			
BCR-684 river sediment, 35 g	NaOH-extractable P HCl-extractable P Inorganic P Organic P Conc. HCl-extract. P	550 ± 21 536 ± 28 1113 ± 24 209 ± 9 1373 ± 35	mg/kg mg/kg mg/kg mg/kg mg/kg
BCR-701 lake sediment, 20 g	Cd Cr Cu Ni Pb Zn	Values according to the 3-step sequential extraction procedure; in addition, indicative values for total element contents are assigned	

Organic pollutants			
Certified values			
BCR-524 industrial soil 40 g	Pyrene benz[a]anthracene benzo[a]pyrene benzo[e]pyrene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo [b] naphtho [2,1-d]-thiophene Indeno [1,2,3-cd] pyrene Pentachlorophenol	173 ± 11 22.5 ± 1.8 8.6 ± 0.5 10.6 ± 1.4 13.5 ± 1.6 6.2 ± 0.6 3.8 ± 0.6 5.1 ± 0.4 0.034 ± 0.005	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg
BCR-481 industrial soil 25 g	PCB-101 PCB-118 PCB-128 PCB-149 PCB-153 PCB-156 PCB-170 PCB-180	37 ± 3 9.4 ± 0.7 9.1 ± 0.8 97 ± 7 137 ± 7 7.0 ± 0.5 52 ± 4 124 ± 6	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg
BCR-529 industrial (sandy) soil 50 g	3,4-dichlorophenol 2,4,5-trichlorophenol Pentachlorophenol D48 D54 D66 D67 D70 F83 F94 F114 F118 F121 F124 F130	0.23 ± 0.04 1.51 ± 0.10 0.23 ± 0.04 4.5 ± 0.6 0.44 ± 0.05 1.22 ± 0.21 5.4 ± 0.9 3.0 ± 0.4 0.078 ± 0.013 0.145 ± 0.028 0.36 ± 0.07 3.4 ± 0.5 1.09 ± 0.15 0.022 ± 0.010 0.37 ± 0.05	mg/kg mg/kg mg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg
BCR-530 industrial (clay) soil 50 g	3,4-dichlorophenol 2,4,5-trichlorophenol Pentachlorophenol Dioxins and furans: D67 D70 F94 F114 F118 F121 F130	6.0 ± 0.5 40 ± 7 0.47 ± 0.09 0.061 ± 0.011 0.0218 ± 0.0029 0.24 ± 0.04 0.62 ± 0.07 0.321 ± 0.016 0.186 ± 0.023 0.126 ± 0.012	mg/kg mg/kg mg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg

Total element content				
Certified values				
BCR-277R estuarine sediment 40 g	As Cd Co Cr Cu Hg Ni Se Sn Zn	18.3 ± 1.8 0.61 ± 0.07 22.5 ± 1.4 188 ± 14 63 ± 7 0.128 ± 0.017 130 ± 8 (0.58 ± 0.11) (6.5 ± 1.8) 178 ± 20	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	
BCR-280R lake sediment 40 g	As Cd Co Cr Cu Fe Hg Mn Ni Sc	33.4 ± 2.9 0.85 ± 0.10 16.8 ± 0.9 126 ± 7 53 ± 6 1.46 ± 0.20 69 ± 5 (0.46 ± 0.09) (9.5 ± 1.7) 224 ± 25	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	
BCR-320R channel sediment 30 g	As Cd Co Cr Cu Fe Hg Mn Ni Pb Sc Se Sn Th Tl U V Zn	21.7 ± 2.0 2.64 ± 0.18 9.7 ± 0.6 59 ± 4 46.3 ± 2.9 25700 ± 1300 0.85 ± 0.09 910 ± 50 27.1 ± 2.2 85 ± 5 5.2 ± 0.4 (0.96 ± 0.18) (9.4 ± 1.7) 5.3 ± 0.4 0.65 ± 0.08 1.56 ± 0.20 46.5 ± 2.8 318 ± 20	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	
BCR-667 estuarine sediment, 40 g	Ce Dy Er Eu Gd Ho La Lu Nd Pr Sc Sm Tb Th Tm U Yb	56.7 ± 2.5 4.01 ± 0.14 2.35 ± 0.15 1.00 ± 0.05 4.41 ± 0.12 0.80 ± 0.06 27.8 ± 1.0 0.325 ± 0.020 25.0 ± 1.4 6.1 ± 0.5 13.7 ± 0.7 4.66 ± 0.20 0.682 ± 0.017 10.0 ± 0.5 0.326 ± 0.025 2.26 ± 0.15 2.20 ± 0.09	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	

Values in brackets are indicative only.

Organic pollutants			
Certified values			
BCR-535 freshwater harbour sediment 40 g	Pyrene Benz[a]anthracene Benzo[a]pyrene Benzo[e]pyrene Benzo[b]fluoranthene Benzo[k]fluoranthene Indeno [1,2,3-cd] pyrene	2.52 ± 0.18 1.54 ± 0.10 1.16 ± 0.10 1.86 ± 0.13 2.29 ± 0.15 1.09 ± 0.15 1.56 ± 0.14	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg
BCR-536 freshwater harbour sediment 40 g	PCB-28 PCB-52 PCB-101 PCB-105 PCB-118 PCB-128 PCB-138 PCB-149 PCB-153 PCB-156 PCB-163 PCB-170 PCB-180	44 ± 5 38 ± 4 44 ± 4 3.5 ± 0.6 28 ± 3 5.4 ± 1.2 27 ± 4 49 ± 4 50 ± 4 3.0 ± 0.4 17 ± 3 13.4 ± 1.4 22 ± 2	µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg

