EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 3, Czech Hydrometeorological Institute, Praha (Czech Republic)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.273	0.267	0.273	0.029	0.008	S
H2		0.413	0.412	0.41	0.037	0.085	S
H3		0.243	0.243	0.25	0.027	-0.281	S
H4		0.334	0.328	0.33	0.044	0.089	S
H1	Cd *µg/l*	0.037	0.034	0.037	0.013	0.03	S
H2		0.023	0.024	0.029	0.014	-0.387	S
H3		0.03	0.029	0.032	0.013	-0.126	S
H4		0.033	0.033	0.036	0.013	-0.264	S
H1	Cr *µg/l*	0.285	0.291	0.279	0.069	0.093	S
H2		0.358	0.364	0.351	0.081	0.092	S
H3		0.236	0.243	0.238	0.065	-0.026	S
H4		0.322	0.328	0.321	0.071	0.02	S
H1	Cu *µg/l*	0.319	0.315	0.295	0.089	0.268	S
H2		0.442	0.437	0.397	0.098	0.454	S
H3		0.367	0.364	0.335	0.087	0.365	S
H4		0.459	0.459	0.436	0.106	0.217	S
H1	Ni *µg/l*	0.335	0.34	0.357	0.121	-0.182	S
H2		0.356	0.364	0.367	0.138	-0.08	S
H3		0.386	0.388	0.395	0.136	-0.065	S
H4		0.646	0.655	0.662	0.164	-0.095	S
H1	Pb *µg/l*	1.203	1.21	1.118	0.215	0.396	S
H2		1.054	1.07	1.119	0.904	-0.072	S
H3		1.097	1.12	1.087	0.386	0.026	S
H4		1.474	1.51	1.537	0.709	-0.089	S
H1	Zn *µg/l*	5.066	4.85	5.181	0.463	-0.249	S
H2		5.309	5.09	5.294	0.851	0.017	S
H3		5.499	5.34	5.561	0.442	-0.139	S
H4		6.464	6.22	6.544	0.614	-0.13	S

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***** Z score in unitless

¤ EMEP quality norm; letters indicate:

S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 4, Aarhus University, Department of Environmental Science (Denmark)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As µg/l	0.22	0.267	0.273	0.029	-1.849	S
H2		0.36	0.412	0.41	0.037	-1.343	S
H3		0.21	0.243	0.25	0.027	-1.52	S
H4		0.29	0.328	0.33	0.044	-0.916	S
H1	Cd µg/l	< 0.040	0.034	0.037	0.013		B
H2		< 0.040	0.024	0.029	0.014		B
H3		< 0.040	0.029	0.032	0.013		B
H4		< 0.040	0.033	0.036	0.013		B
H1	Cr µg/l	0.29	0.291	0.279	0.069	0.165	S
H2		0.36	0.364	0.351	0.081	0.117	S
H3		0.24	0.243	0.238	0.065	0.035	S
H4		0.33	0.328	0.321	0.071	0.133	S
H1	Cu µg/l	< 0.360	0.315	0.295	0.089		B
H2		0.43	0.437	0.397	0.098	0.332	S
H3		< 0.360	0.364	0.335	0.087	-1.792	U
H4		0.48	0.459	0.436	0.106	0.415	S
H1	Ni µg/l	0.32	0.34	0.357	0.121	-0.306	S
H2		0.34	0.364	0.367	0.138	-0.196	S
H3		0.36	0.388	0.395	0.136	-0.257	S
H4		0.62	0.655	0.662	0.164	-0.253	S
H1	Pb µg/l	1.12	1.21	1.118	0.215	0.01	S
H2		0.99	1.07	1.119	0.904	-0.143	S
H3		1.01	1.12	1.087	0.386	-0.199	S
H4		1.41	1.51	1.537	0.709	-0.179	S
H1	Zn µg/l	5.14	4.85	5.181	0.463	-0.089	S
H2		5.29	5.09	5.294	0.851	-0.005	S
H3		5.69	5.34	5.561	0.442	0.293	S
H4		6.46	6.22	6.544	0.614	-0.137	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 5, Finnish Meteorological Institute, Atmospheric Composition, Air Quality (Finland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.266	0.267	0.273	0.029	-0.248	S
H2		0.404	0.412	0.41	0.037	-0.152	S
H3		0.248	0.243	0.25	0.027	-0.089	S
H4		0.331	0.328	0.33	0.044	0.027	S
H1	Cd *µg/l*	0.035	0.034	0.037	0.013	-0.112	S
H2		0.024	0.024	0.029	0.014	-0.325	S
H3		0.029	0.029	0.032	0.013	-0.188	S
H4		0.032	0.033	0.036	0.013	-0.319	S
H1	Cr *µg/l*	0.29	0.291	0.279	0.069	0.168	S
H2		0.357	0.364	0.351	0.081	0.081	S
H3		0.236	0.243	0.238	0.065	-0.027	S
H4		0.324	0.328	0.321	0.071	0.047	S
H1	Cu *µg/l*	0.323	0.315	0.295	0.089	0.309	S
H2		0.41	0.437	0.397	0.098	0.13	S
H3		0.353	0.364	0.335	0.087	0.201	S
H4		0.466	0.459	0.436	0.106	0.282	S
H1	Ni *µg/l*	0.329	0.34	0.357	0.121	-0.23	S
H2		0.339	0.364	0.367	0.138	-0.206	S
H3		0.371	0.388	0.395	0.136	-0.178	S
H4		0.652	0.655	0.662	0.164	-0.06	S
H1	Pb *µg/l*	1.227	1.21	1.118	0.215	0.507	S
H2		1.057	1.07	1.119	0.904	-0.069	S
H3		1.123	1.12	1.087	0.386	0.094	S
H4		1.507	1.51	1.537	0.709	-0.042	S
H1	Zn *µg/l*	4.843	4.85	5.181	0.463	-0.731	S
H2		4.878	5.09	5.294	0.851	-0.489	S
H3		5.23	5.34	5.561	0.442	-0.748	S
H4		6.257	6.22	6.544	0.614	-0.468	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 6, SGS France - EHS (France)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.25	0.267	0.273	0.029	-0.798	S
H2		0.42	0.412	0.41	0.037	0.274	S
H3		0.23	0.243	0.25	0.027	-0.769	S
H4		0.32	0.328	0.33	0.044	-0.231	S
H1	Cd *µg/l*	< 0.100	0.034	0.037	0.013		B
H2		< 0.100	0.024	0.029	0.014		B
H3		< 0.100	0.029	0.032	0.013		B
H4		< 0.100	0.033	0.036	0.013		B
H1	Cr *µg/l*	< 0.500	0.291	0.279	0.069		B
H2		< 0.500	0.364	0.351	0.081		B
H3		< 0.500	0.243	0.238	0.065		B
H4		< 0.500	0.328	0.321	0.071		B
H1	Cu *µg/l*	< 0.500	0.315	0.295	0.089		B
H2		< 0.500	0.437	0.397	0.098		B
H3		< 0.500	0.364	0.335	0.087		B
H4		< 0.500	0.459	0.436	0.106		B
H1	Ni *µg/l*	< 1.000	0.34	0.357	0.121		B
H2		< 1.000	0.364	0.367	0.138		B
H3		< 1.000	0.388	0.395	0.136		B
H4		< 1.000	0.655	0.662	0.164		B
H1	Pb *µg/l*	1.15	1.21	1.118	0.215	0.15	S
H2		1.01	1.07	1.119	0.904	-0.121	S
H3		1.06	1.12	1.087	0.386	-0.07	S
H4		1.42	1.51	1.537	0.709	-0.165	S
H1	Zn *µg/l*	< 10.000	4.85	5.181	0.463		B
H2		< 10.000	5.09	5.294	0.851		B
H3		< 10.000	5.34	5.561	0.442		B
H4		< 10.000	6.22	6.544	0.614		B

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 8, Umweltbundesamt, Langen (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.271	0.267	0.273	0.029	-0.062	S
H2		0.423	0.412	0.41	0.037	0.354	S
H3		0.248	0.243	0.25	0.027	-0.093	S
H4		0.335	0.328	0.33	0.044	0.112	S
H1	Cd *µg/l*	0.035	0.034	0.037	0.013	-0.12	S
H2		0.025	0.024	0.029	0.014	-0.248	S
H3		0.029	0.029	0.032	0.013	-0.204	S
H4		0.033	0.033	0.036	0.013	-0.264	S
H1	Cr *µg/l*	0.292	0.291	0.279	0.069	0.194	S
H2		0.266	0.364	0.351	0.081	-1.049	Q
H3		0.239	0.243	0.238	0.065	0.02	S
H4		0.328	0.328	0.321	0.071	0.104	S
H1	Cu *µg/l*	0.337	0.315	0.295	0.089	0.471	S
H2		0.448	0.437	0.397	0.098	0.515	S
H3		0.383	0.364	0.335	0.087	0.549	S
H4		0.472	0.459	0.436	0.106	0.34	S
H1	Ni *µg/l*	0.346	0.34	0.357	0.121	-0.092	S
H2		0.368	0.364	0.367	0.138	0.007	S
H3		0.384	0.388	0.395	0.136	-0.08	S
H4		0.647	0.655	0.662	0.164	-0.089	S
H1	Pb *µg/l*	1.175	1.21	1.118	0.215	0.266	S
H2		1.031	1.07	1.119	0.904	-0.097	S
H3		1.073	1.12	1.087	0.386	-0.036	S
H4		1.457	1.51	1.537	0.709	-0.113	S
H1	Zn *µg/l*	4.828	4.85	5.181	0.463	-0.763	S
H2		5.094	5.09	5.294	0.851	-0.235	S
H3		5.249	5.34	5.561	0.442	-0.705	S
H4		6.166	6.22	6.544	0.614	-0.616	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 10, Air Quality Reference Centre (Hungary)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	< 0.300	0.267	0.273	0.029		B
H2		0.323	0.412	0.41	0.037	-2.341	S
H3		< 0.300	0.243	0.25	0.027		B
H4		< 0.300	0.328	0.33	0.044	-4.115	U
H1	Cd *µg/l*	< 0.050	0.034	0.037	0.013		B
H2		< 0.050	0.024	0.029	0.014		B
H3		< 0.050	0.029	0.032	0.013		B
H4		< 0.050	0.033	0.036	0.013		B
H1	Cr *µg/l*	-999	0.291	0.279	0.069		B
H2		-999	0.364	0.351	0.081		B
H3		-999	0.243	0.238	0.065		B
H4		-999	0.328	0.321	0.071		B
H1	Cu *µg/l*	-999	0.315	0.295	0.089		B
H2		-999	0.437	0.397	0.098		B
H3		-999	0.364	0.335	0.087		B
H4		-999	0.459	0.436	0.106		B
H1	Ni *µg/l*	< 1.300	0.34	0.357	0.121		B
H2		< 1.300	0.364	0.367	0.138		B
H3		< 1.300	0.388	0.395	0.136		B
H4		< 1.300	0.655	0.662	0.164		B
H1	Pb *µg/l*	0.689	1.21	1.118	0.215	-1.99	U
H2		< 0.500	1.07	1.119	0.904	-0.961	U
H3		0.53	1.12	1.087	0.386	-1.444	U
H4		1.084	1.51	1.537	0.709	-0.639	Q
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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***** Z score in unitless

¤ EMEP quality norm; letters indicate:

S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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B – Blank: You reported either no value or the detection limit

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 15, NILU (Norway)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.26	0.267	0.273	0.029	-0.448	S
H2		0.39	0.412	0.41	0.037	-0.535	S
H3		0.23	0.243	0.25	0.027	-0.769	S
H4		0.31	0.328	0.33	0.044	-0.459	S
H1	Cd *µg/l*	0.034	0.034	0.037	0.013	-0.195	S
H2		0.024	0.024	0.029	0.014	-0.318	S
H3		0.03	0.029	0.032	0.013	-0.126	S
H4		0.033	0.033	0.036	0.013	-0.264	S
H1	Cr *µg/l*	0.28	0.291	0.279	0.069	0.02	S
H2		0.35	0.364	0.351	0.081	-0.007	S
H3		0.23	0.243	0.238	0.065	-0.118	S
H4		0.32	0.328	0.321	0.071	-0.008	S
H1	Cu *µg/l*	0.3	0.315	0.295	0.089	0.053	S
H2		0.43	0.437	0.397	0.098	0.332	S
H3		0.35	0.364	0.335	0.087	0.169	S
H4		0.45	0.459	0.436	0.106	0.133	S
H1	Ni *µg/l*	0.33	0.34	0.357	0.121	-0.224	S
H2		0.35	0.364	0.367	0.138	-0.124	S
H3		0.38	0.388	0.395	0.136	-0.11	S
H4		0.65	0.655	0.662	0.164	-0.071	S
H1	Pb *µg/l*	1.22	1.21	1.118	0.215	0.475	S
H2		1.06	1.07	1.119	0.904	-0.065	S
H3		1.11	1.12	1.087	0.386	0.06	S
H4		1.51	1.51	1.537	0.709	-0.038	S
H1	Zn *µg/l*	4.72	4.85	5.181	0.463	-0.996	S
H2		4.95	5.09	5.294	0.851	-0.405	S
H3		5.19	5.34	5.561	0.442	-0.839	S
H4		6.07	6.22	6.544	0.614	-0.772	S

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Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: https://emep-ccc.nilu.no/intercomparison

EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 16, Institute of Meteorology and Water Management, Warsaw (Poland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	0.022	0.034	0.037	0.013	-1.094	Q
H2		0.015	0.024	0.029	0.014	-0.942	Q
H3		0.02	0.029	0.032	0.013	-0.905	Q
H4		0.03	0.033	0.036	0.013	-0.499	S
H1	Cr *µg/l*	0.121	0.291	0.279	0.069	-2.294	U
H2		0.143	0.364	0.351	0.081	-2.576	U
H3		0.105	0.243	0.238	0.065	-2.028	U
H4		0.128	0.328	0.321	0.071	-2.705	U
H1	Cu *µg/l*	0.093	0.315	0.295	0.089	-2.286	U
H2		0.105	0.437	0.397	0.098	-2.968	U
H3		0.096	0.364	0.335	0.087	-2.761	U
H4		0.149	0.459	0.436	0.106	-2.703	U
H1	Ni *µg/l*	0.144	0.34	0.357	0.121	-1.761	U
H2		0.21	0.364	0.367	0.138	-1.135	Q
H3		0.189	0.388	0.395	0.136	-1.517	U
H4		0.552	0.655	0.662	0.164	-0.669	S
H1	Pb *µg/l*	0.973	1.21	1.118	0.215	-0.672	Q
H2		0.938	1.07	1.119	0.904	-0.2	S
H3		0.979	1.12	1.087	0.386	-0.28	S
H4		1.198	1.51	1.537	0.709	-0.478	Q
H1	Zn *µg/l*	1.99	4.85	5.181	0.463	-6.896	U
H2		1.72	5.09	5.294	0.851	-4.198	U
H3		1.91	5.34	5.561	0.442	-8.266	U
H4		2.08	6.22	6.544	0.614	-7.274	U

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 20, Swedish Environmental Research Institute IVL, Gothenburg (Sweden)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As µg/l	0.278	0.267	0.273	0.029	0.183	S
H2		0.431	0.412	0.41	0.037	0.57	S
H3		0.254	0.243	0.25	0.027	0.132	S
H4		0.345	0.328	0.33	0.044	0.34	S
H1	Cd µg/l	0.035	0.034	0.037	0.013	-0.082	S
H2		0.025	0.024	0.029	0.014	-0.22	S
H3		0.031	0.029	0.032	0.013	-0.055	S
H4		0.034	0.033	0.036	0.013	-0.186	S
H1	Cr µg/l	0.297	0.291	0.279	0.069	0.267	S
H2		0.367	0.364	0.351	0.081	0.204	S
H3		0.242	0.243	0.238	0.065	0.068	S
H4		0.327	0.328	0.321	0.071	0.09	S
H1	Cu µg/l	0.324	0.315	0.295	0.089	0.324	S
H2		0.444	0.437	0.397	0.098	0.475	S
H3		0.37	0.364	0.335	0.087	0.399	S
H4		0.467	0.459	0.436	0.106	0.293	S
H1	Ni µg/l	0.345	0.34	0.357	0.121	-0.1	S
H2		0.368	0.364	0.367	0.138	0.007	S
H3		0.389	0.388	0.395	0.136	-0.043	S
H4		0.662	0.655	0.662	0.164	0.003	S
H1	Pb µg/l	1.19	1.21	1.118	0.215	0.335	S
H2		1.05	1.07	1.119	0.904	-0.076	S
H3		1.09	1.12	1.087	0.386	0.008	S
H4		1.49	1.51	1.537	0.709	-0.066	S
H1	Zn µg/l	5.31	4.85	5.181	0.463	0.279	S
H2		5.46	5.09	5.294	0.851	0.194	S
H3		5.69	5.34	5.561	0.442	0.293	S
H4		6.74	6.22	6.544	0.614	0.319	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 22, Institute of Global Climate and Ecology (Russian Federation)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	0.036	0.034	0.037	0.013	-0.045	S
H2		0.023	0.024	0.029	0.014	-0.387	S
H3		0.032	0.029	0.032	0.013	0.03	S
H4		0.032	0.033	0.036	0.013	-0.342	S
H1	Cr *µg/l*	-999	0.291	0.279	0.069		B
H2		-999	0.364	0.351	0.081		B
H3		-999	0.243	0.238	0.065		B
H4		-999	0.328	0.321	0.071		B
H1	Cu *µg/l*	0.274	0.315	0.295	0.089	-0.241	S
H2		0.374	0.437	0.397	0.098	-0.236	S
H3		0.348	0.364	0.335	0.087	0.146	S
H4		0.438	0.459	0.436	0.106	0.02	S
H1	Ni *µg/l*	-999	0.34	0.357	0.121		B
H2		-999	0.364	0.367	0.138		B
H3		-999	0.388	0.395	0.136		B
H4		-999	0.655	0.662	0.164		B
H1	Pb *µg/l*	1.02	1.21	1.118	0.215	-0.454	Q
H2		0.939	1.07	1.119	0.904	-0.199	S
H3		0.964	1.12	1.087	0.386	-0.318	S
H4		1.23	1.51	1.537	0.709	-0.433	Q
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 24, Serbian Environmental Protection Agency (Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.192	0.267	0.273	0.029	-2.83	Q
H2		0.354	0.412	0.41	0.037	-1.505	S
H3		0.196	0.243	0.25	0.027	-2.045	S
H4		0.225	0.328	0.33	0.044	-2.401	Q
H1	Cd *µg/l*	0.05	0.034	0.037	0.013	1.004	Q
H2		0.041	0.024	0.029	0.014	0.862	U
H3		0.049	0.029	0.032	0.013	1.356	U
H4		0.058	0.033	0.036	0.013	1.693	U
H1	Cr *µg/l*	0.154	0.291	0.279	0.069	-1.81	Q
H2		0.256	0.364	0.351	0.081	-1.173	Q
H3		0.141	0.243	0.238	0.065	-1.481	Q
H4		0.194	0.328	0.321	0.071	-1.777	Q
H1	Cu *µg/l*	-999	0.315	0.295	0.089		B
H2		-999	0.437	0.397	0.098		B
H3		-999	0.364	0.335	0.087		B
H4		-999	0.459	0.436	0.106		B
H1	Ni *µg/l*	0.277	0.34	0.357	0.121	-0.661	S
H2		0.25	0.364	0.367	0.138	-0.849	Q
H3		0.335	0.388	0.395	0.136	-0.442	S
H4		0.501	0.655	0.662	0.164	-0.977	S
H1	Pb *µg/l*	0.544	1.21	1.118	0.215	-2.664	U
H2		0.305	1.07	1.119	0.904	-0.9	U
H3		0.355	1.12	1.087	0.386	-1.897	U
H4		0.591	1.51	1.537	0.709	-1.333	U
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
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***** Z score in unitless

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S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 31, Slovak Hydrometeorological Institute (Slovakia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.256	0.267	0.273	0.029	-0.588	S
H2		0.242	0.412	0.41	0.037	-4.524	Q
H3		0.194	0.243	0.25	0.027	-2.12	S
H4		0.194	0.328	0.33	0.044	-3.11	Q
H1	Cd *µg/l*	0.03	0.034	0.037	0.013	-0.494	S
H2		0.028	0.024	0.029	0.014	-0.04	S
H3		0.027	0.029	0.032	0.013	-0.359	S
H4		0.031	0.033	0.036	0.013	-0.421	S
H1	Cr *µg/l*	0.244	0.291	0.279	0.069	-0.503	S
H2		0.291	0.364	0.351	0.081	-0.739	S
H3		0.221	0.243	0.238	0.065	-0.256	S
H4		0.279	0.328	0.321	0.071	-0.583	S
H1	Cu *µg/l*	0.449	0.315	0.295	0.089	1.736	Q
H2		0.373	0.437	0.397	0.098	-0.246	S
H3		0.443	0.364	0.335	0.087	1.242	S
H4		0.441	0.459	0.436	0.106	0.048	S
H1	Ni *µg/l*	0.417	0.34	0.357	0.121	0.495	S
H2		0.322	0.364	0.367	0.138	-0.327	S
H3		0.329	0.388	0.395	0.136	-0.486	S
H4		0.369	0.655	0.662	0.164	-1.78	Q
H1	Pb *µg/l*	0.423	1.21	1.118	0.215	-3.225	U
H2		0.477	1.07	1.119	0.904	-0.71	U
H3		0.506	1.12	1.087	0.386	-1.506	U
H4		0.512	1.51	1.537	0.709	-1.445	U
H1	Zn *µg/l*	5.202	4.85	5.181	0.463	0.045	S
H2		5.343	5.09	5.294	0.851	0.057	S
H3		5.379	5.34	5.561	0.442	-0.411	S
H4		6.138	6.22	6.544	0.614	-0.662	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 33, Latvian Environment, Geology and Meteorology Centre (Latvia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.254	0.267	0.273	0.029	-0.658	S
H2		0.394	0.412	0.41	0.037	-0.427	S
H3		0.235	0.243	0.25	0.027	-0.581	S
H4		0.32	0.328	0.33	0.044	-0.231	S
H1	Cd *µg/l*	0.036	0.034	0.037	0.013	-0.045	S
H2		0.024	0.024	0.029	0.014	-0.318	S
H3		0.027	0.029	0.032	0.013	-0.359	S
H4		0.029	0.033	0.036	0.013	-0.577	S
H1	Cr *µg/l*	0.275	0.291	0.279	0.069	-0.053	S
H2		0.349	0.364	0.351	0.081	-0.02	S
H3		0.229	0.243	0.238	0.065	-0.133	S
H4		0.316	0.328	0.321	0.071	-0.064	S
H1	Cu *µg/l*	0.273	0.315	0.295	0.089	-0.252	S
H2		0.387	0.437	0.397	0.098	-0.104	S
H3		0.323	0.364	0.335	0.087	-0.143	S
H4		0.416	0.459	0.436	0.106	-0.188	S
H1	Ni *µg/l*	0.314	0.34	0.357	0.121	-0.356	S
H2		0.336	0.364	0.367	0.138	-0.225	S
H3		0.362	0.388	0.395	0.136	-0.243	S
H4		0.636	0.655	0.662	0.164	-0.156	S
H1	Pb *µg/l*	1.028	1.21	1.118	0.215	-0.417	Q
H2		0.907	1.07	1.119	0.904	-0.235	Q
H3		0.954	1.12	1.087	0.386	-0.344	S
H4		1.301	1.51	1.537	0.709	-0.333	S
H1	Zn *µg/l*	4.677	4.85	5.181	0.463	-1.089	S
H2		5.151	5.09	5.294	0.851	-0.168	S
H3		5.273	5.34	5.561	0.442	-0.651	S
H4		6.248	6.22	6.544	0.614	-0.482	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 34, Ministry of Environment and Urbanisation (Turkey)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.281	0.267	0.273	0.029	0.306	S
H2		0.405	0.412	0.41	0.037	-0.144	S
H3		0.249	0.243	0.25	0.027	-0.036	S
H4		0.341	0.328	0.33	0.044	0.237	S
H1	Cd *µg/l*	0.069	0.034	0.037	0.013	2.427	U
H2		0.033	0.024	0.029	0.014	0.307	Q
H3		0.04	0.029	0.032	0.013	0.654	Q
H4		0.05	0.033	0.036	0.013	1.067	U
H1	Cr *µg/l*	0.325	0.291	0.279	0.069	0.674	S
H2		0.608	0.364	0.351	0.081	3.193	U
H3		0.333	0.243	0.238	0.065	1.46	Q
H4		0.494	0.328	0.321	0.071	2.435	U
H1	Cu *µg/l*	0.259	0.315	0.295	0.089	-0.416	S
H2		0.381	0.437	0.397	0.098	-0.165	S
H3		0.302	0.364	0.335	0.087	-0.385	S
H4		0.38	0.459	0.436	0.106	-0.531	S
H1	Ni *µg/l*	0.735	0.34	0.357	0.121	3.12	U
H2		1.066	0.364	0.367	0.138	5.067	U
H3		1.077	0.388	0.395	0.136	5.028	U
H4		1.44	0.655	0.662	0.164	4.733	U
H1	Pb *µg/l*	1.003	1.21	1.118	0.215	-0.533	Q
H2		1.234	1.07	1.119	0.904	0.128	Q
H3		1.753	1.12	1.087	0.386	1.727	U
H4		3.371	1.51	1.537	0.709	2.585	U
H1	Zn *µg/l*	6.31	4.85	5.181	0.463	2.44	Q
H2		6.592	5.09	5.294	0.851	1.524	Q
H3		6.845	5.34	5.561	0.442	2.909	Q
H4		8.086	6.22	6.544	0.614	2.513	Q

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 35, Meteorological and Hydrological Service of Croatia (Croatia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.324	0.267	0.273	0.029	1.795	S
H2		0.479	0.412	0.41	0.037	1.864	S
H3		0.289	0.243	0.25	0.027	1.447	S
H4		0.385	0.328	0.33	0.044	1.254	S
H1	Cd *µg/l*	0.045	0.034	0.037	0.013	0.629	Q
H2		0.056	0.024	0.029	0.014	1.903	U
H3		0.034	0.029	0.032	0.013	0.186	S
H4		0.042	0.033	0.036	0.013	0.44	Q
H1	Cr *µg/l*	-999	0.291	0.279	0.069		B
H2		-999	0.364	0.351	0.081		B
H3		-999	0.243	0.238	0.065		B
H4		-999	0.328	0.321	0.071		B
H1	Cu *µg/l*	-999	0.315	0.295	0.089		B
H2		-999	0.437	0.397	0.098		B
H3		-999	0.364	0.335	0.087		B
H4		-999	0.459	0.436	0.106		B
H1	Ni *µg/l*	0.399	0.34	0.357	0.121	0.346	S
H2		0.411	0.364	0.367	0.138	0.318	S
H3		0.432	0.388	0.395	0.136	0.274	S
H4		0.719	0.655	0.662	0.164	0.349	S
H1	Pb *µg/l*	1.408	1.21	1.118	0.215	1.348	Q
H2		1.198	1.07	1.119	0.904	0.087	S
H3		1.24	1.12	1.087	0.386	0.397	S
H4		1.718	1.51	1.537	0.709	0.255	S
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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Laboratory 36, Slovenian Environment Agency (Slovenia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.269	0.267	0.273	0.029	-0.132	S
H2		0.423	0.412	0.41	0.037	0.354	S
H3		0.25	0.243	0.25	0.027	-0.018	S
H4		0.334	0.328	0.33	0.044	0.089	S
H1	Cd *µg/l*	0.035	0.034	0.037	0.013	-0.12	S
H2		0.024	0.024	0.029	0.014	-0.318	S
H3		0.028	0.029	0.032	0.013	-0.282	S
H4		0.034	0.033	0.036	0.013	-0.186	S
H1	Cr *µg/l*	< 0.300	0.291	0.279	0.069		B
H2		0.359	0.364	0.351	0.081	0.105	S
H3		< 0.300	0.243	0.238	0.065		B
H4		0.326	0.328	0.321	0.071	0.076	S
H1	Cu *µg/l*	< 0.300	0.315	0.295	0.089	-1.642	U
H2		0.408	0.437	0.397	0.098	0.109	S
H3		0.335	0.364	0.335	0.087	-0.004	S
H4		0.434	0.459	0.436	0.106	-0.018	S
H1	Ni *µg/l*	0.334	0.34	0.357	0.121	-0.191	S
H2		0.365	0.364	0.367	0.138	-0.015	S
H3		0.384	0.388	0.395	0.136	-0.08	S
H4		0.677	0.655	0.662	0.164	0.094	S
H1	Pb *µg/l*	1.21	1.21	1.118	0.215	0.428	S
H2		1.07	1.07	1.119	0.904	-0.054	S
H3		1.11	1.12	1.087	0.386	0.06	S
H4		1.51	1.51	1.537	0.709	-0.038	S
H1	Zn *µg/l*	4.84	4.85	5.181	0.463	-0.737	S
H2		5.06	5.09	5.294	0.851	-0.275	S
H3		5.26	5.34	5.561	0.442	-0.681	S
H4		6.26	6.22	6.544	0.614	-0.463	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 39, Central Environmental Analysis Laboratory - CentLab (Poland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.28	0.267	0.273	0.029	0.253	S
H2		0.43	0.412	0.41	0.037	0.543	S
H3		0.246	0.243	0.25	0.027	-0.168	S
H4		0.337	0.328	0.33	0.044	0.158	S
H1	Cd *µg/l*	0.031	0.034	0.037	0.013	-0.419	S
H2		0.023	0.024	0.029	0.014	-0.387	S
H3		0.027	0.029	0.032	0.013	-0.359	S
H4		0.03	0.033	0.036	0.013	-0.499	S
H1	Cr *µg/l*	0.284	0.291	0.279	0.069	0.078	S
H2		0.359	0.364	0.351	0.081	0.105	S
H3		0.241	0.243	0.238	0.065	0.051	S
H4		0.327	0.328	0.321	0.071	0.09	S
H1	Cu *µg/l*	0.309	0.315	0.295	0.089	0.155	S
H2		0.444	0.437	0.397	0.098	0.475	S
H3		0.344	0.364	0.335	0.087	0.1	S
H4		0.433	0.459	0.436	0.106	-0.027	S
H1	Ni *µg/l*	0.308	0.34	0.357	0.121	-0.405	S
H2		0.332	0.364	0.367	0.138	-0.254	S
H3		0.354	0.388	0.395	0.136	-0.302	S
H4		0.602	0.655	0.662	0.164	-0.363	S
H1	Pb *µg/l*	1.08	1.21	1.118	0.215	-0.175	S
H2		0.924	1.07	1.119	0.904	-0.216	S
H3		0.965	1.12	1.087	0.386	-0.316	S
H4		1.33	1.51	1.537	0.709	-0.292	S
H1	Zn *µg/l*	4.83	4.85	5.181	0.463	-0.759	S
H2		5.09	5.09	5.294	0.851	-0.24	S
H3		5.24	5.34	5.561	0.442	-0.726	S
H4		6.16	6.22	6.544	0.614	-0.626	S

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If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, ½ DL is taken as the reported value in further calculations.

***** Z score in unitless

¤ EMEP quality norm; letters indicate:

S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

Q – Questionable: Your result deviates between ±25-50% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and between ±15-30% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

U – Unsatisfactory: Your result deviates more than ±50% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and more than ±30% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 41, Micropolluants Technologie SAS (France)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As µg/l	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd µg/l	0.1	0.034	0.037	0.013	4.749	U
H2		0.1	0.024	0.029	0.014	4.955	U
H3		0.1	0.029	0.032	0.013	5.332	U
H4		0.1	0.033	0.036	0.013	4.98	U
H1	Cr µg/l	0.5	0.291	0.279	0.069	3.216	U
H2		0.5	0.364	0.351	0.081	1.853	Q
H3		0.5	0.243	0.238	0.065	4.018	U
H4		0.5	0.328	0.321	0.071	2.519	U
H1	Cu µg/l	0.5	0.315	0.295	0.089	2.313	U
H2		0.5	0.437	0.397	0.098	1.043	S
H3		0.5	0.364	0.335	0.087	1.899	Q
H4		0.5	0.459	0.436	0.106	0.604	S
H1	Ni µg/l	0.5	0.34	0.357	0.121	1.18	Q
H2		0.5	0.364	0.367	0.138	0.964	Q
H3		0.5	0.388	0.395	0.136	0.775	Q
H4		0.6	0.655	0.662	0.164	-0.375	S
H1	Pb µg/l	1.2	1.21	1.118	0.215	0.382	S
H2		1.05	1.07	1.119	0.904	-0.076	S
H3		1.1	1.12	1.087	0.386	0.034	S
H4		1.51	1.51	1.537	0.709	-0.038	S
H1	Zn µg/l	5.7	4.85	5.181	0.463	1.121	S
H2		5.7	5.09	5.294	0.851	0.476	S
H3		5.97	5.34	5.561	0.442	0.927	S
H4		7.05	6.22	6.544	0.614	0.825	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 42, Environment Reference Laboratory, Environment Agency (Moldova)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	0.026	0.034	0.037	0.013	-0.824	S
H2		0.017	0.024	0.029	0.014	-0.782	Q
H3		0.017	0.029	0.032	0.013	-1.178	Q
H4		0.028	0.033	0.036	0.013	-0.687	S
H1	Cr *µg/l*	0.427	0.291	0.279	0.069	2.161	Q
H2		0.482	0.364	0.351	0.081	1.636	Q
H3		0.339	0.243	0.238	0.065	1.547	Q
H4		0.466	0.328	0.321	0.071	2.048	Q
H1	Cu *µg/l*	0.128	0.315	0.295	0.089	-1.889	U
H2		0.127	0.437	0.397	0.098	-2.745	U
H3		0.066	0.364	0.335	0.087	-3.111	U
H4		0.142	0.459	0.436	0.106	-2.765	U
H1	Ni *µg/l*	0.765	0.34	0.357	0.121	3.364	U
H2		0.477	0.364	0.367	0.138	0.8	Q
H3		0.587	0.388	0.395	0.136	1.414	U
H4		0.834	0.655	0.662	0.164	1.047	Q
H1	Pb *µg/l*	1.456	1.21	1.118	0.215	1.57	Q
H2		1.212	1.07	1.119	0.904	0.103	S
H3		1.185	1.12	1.087	0.386	0.254	S
H4		1.854	1.51	1.537	0.709	0.447	Q
H1	Zn *µg/l*	5.349	4.85	5.181	0.463	0.363	S
H2		6.038	5.09	5.294	0.851	0.873	S
H3		5.153	5.34	5.561	0.442	-0.923	S
H4		7.135	6.22	6.544	0.614	0.963	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 43, Air, Water and Soil Analyses Laboratory, LEPL National Environmental Agency (Georgia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.152	0.267	0.273	0.029	-4.232	Q
H2		0.256	0.412	0.41	0.037	-4.146	Q
H3		0.105	0.243	0.25	0.027	-5.462	U
H4		0.161	0.328	0.33	0.044	-3.863	U
H1	Cd *µg/l*	0.026	0.034	0.037	0.013	-0.794	S
H2		0.017	0.024	0.029	0.014	-0.803	Q
H3		0.022	0.029	0.032	0.013	-0.749	S
H4		0.023	0.033	0.036	0.013	-1.047	Q
H1	Cr *µg/l*	0.163	0.291	0.279	0.069	-1.68	Q
H2		0.195	0.364	0.351	0.081	-1.93	Q
H3		0.131	0.243	0.238	0.065	-1.634	Q
H4		0.179	0.328	0.321	0.071	-1.987	Q
H1	Cu *µg/l*	0.158	0.315	0.295	0.089	-1.552	Q
H2		0.233	0.437	0.397	0.098	-1.668	Q
H3		0.204	0.364	0.335	0.087	-1.515	Q
H4		0.282	0.459	0.436	0.106	-1.45	Q
H1	Ni *µg/l*	-999	0.34	0.357	0.121		B
H2		-999	0.364	0.367	0.138		B
H3		-999	0.388	0.395	0.136		B
H4		-999	0.655	0.662	0.164		B
H1	Pb *µg/l*	0.779	1.21	1.118	0.215	-1.573	U
H2		0.656	1.07	1.119	0.904	-0.512	U
H3		0.684	1.12	1.087	0.386	-1.044	U
H4		0.941	1.51	1.537	0.709	-0.84	U
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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Laboratory 47, Jelenia Gora (Poland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.277	0.267	0.273	0.029	0.148	S
H2		0.395	0.412	0.41	0.037	-0.4	S
H3		0.252	0.243	0.25	0.027	0.057	S
H4		0.345	0.328	0.33	0.044	0.34	S
H1	Cd *µg/l*	0.034	0.034	0.037	0.013	-0.195	S
H2		0.023	0.024	0.029	0.014	-0.387	S
H3		0.026	0.029	0.032	0.013	-0.437	S
H4		0.033	0.033	0.036	0.013	-0.264	S
H1	Cr *µg/l*	0.304	0.291	0.279	0.069	0.369	S
H2		0.378	0.364	0.351	0.081	0.34	S
H3		0.251	0.243	0.238	0.065	0.204	S
H4		0.335	0.328	0.321	0.071	0.203	S
H1	Cu *µg/l*	0.323	0.315	0.295	0.089	0.313	S
H2		0.452	0.437	0.397	0.098	0.556	S
H3		0.368	0.364	0.335	0.087	0.376	S
H4		0.496	0.459	0.436	0.106	0.566	S
H1	Ni *µg/l*	0.354	0.34	0.357	0.121	-0.026	S
H2		0.385	0.364	0.367	0.138	0.13	S
H3		0.407	0.388	0.395	0.136	0.089	S
H4		0.689	0.655	0.662	0.164	0.167	S
H1	Pb *µg/l*	1.216	1.21	1.118	0.215	0.456	S
H2		1.068	1.07	1.119	0.904	-0.057	S
H3		1.101	1.12	1.087	0.386	0.037	S
H4		1.522	1.51	1.537	0.709	-0.021	S
H1	Zn *µg/l*	5.009	4.85	5.181	0.463	-0.372	S
H2		5.268	5.09	5.294	0.851	-0.031	S
H3		5.479	5.34	5.561	0.442	-0.185	S
H4		6.458	6.22	6.544	0.614	-0.14	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 48, Monitoring waterkwaliteit Labovestiging Gent, VMM (Belgium)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.271	0.267	0.273	0.029	-0.062	S
H2		0.423	0.412	0.41	0.037	0.354	S
H3		0.251	0.243	0.25	0.027	0.02	S
H4		0.332	0.328	0.33	0.044	0.043	S
H1	Cd *µg/l*	0.035	0.034	0.037	0.013	-0.12	S
H2		0.028	0.024	0.029	0.014	-0.04	S
H3		0.033	0.029	0.032	0.013	0.108	S
H4		0.035	0.033	0.036	0.013	-0.107	S
H1	Cr *µg/l*	0.293	0.291	0.279	0.069	0.209	S
H2		0.363	0.364	0.351	0.081	0.154	S
H3		0.236	0.243	0.238	0.065	-0.026	S
H4		0.333	0.328	0.321	0.071	0.175	S
H1	Cu *µg/l*	0.311	0.315	0.295	0.089	0.177	S
H2		0.447	0.437	0.397	0.098	0.505	S
H3		0.379	0.364	0.335	0.087	0.503	S
H4		0.491	0.459	0.436	0.106	0.519	S
H1	Ni *µg/l*	0.371	0.34	0.357	0.121	0.115	S
H2		0.384	0.364	0.367	0.138	0.123	S
H3		0.42	0.388	0.395	0.136	0.185	S
H4		0.663	0.655	0.662	0.164	0.009	S
H1	Pb *µg/l*	1.326	1.21	1.118	0.215	0.967	S
H2		1.149	1.07	1.119	0.904	0.033	S
H3		1.214	1.12	1.087	0.386	0.33	S
H4		1.64	1.51	1.537	0.709	0.145	S
H1	Zn *µg/l*	5.568	4.85	5.181	0.463	0.836	S
H2		5.867	5.09	5.294	0.851	0.672	S
H3		6.06	5.34	5.561	0.442	1.131	S
H4		7.16	6.22	6.544	0.614	1.004	S

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***** Z score in unitless

¤ EMEP quality norm; letters indicate:

S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 49, The Cyprus Institute (CyI) (Cyprus)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.346	0.267	0.273	0.029	2.565	Q
H2		0.561	0.412	0.41	0.037	4.074	Q
H3		0.323	0.243	0.25	0.027	2.723	Q
H4		0.429	0.328	0.33	0.044	2.259	Q
H1	Cd *µg/l*	0.037	0.034	0.037	0.013	0.03	S
H2		0.027	0.024	0.029	0.014	-0.109	S
H3		0.033	0.029	0.032	0.013	0.108	S
H4		0.038	0.033	0.036	0.013	0.127	S
H1	Cr *µg/l*	0.269	0.291	0.279	0.069	-0.14	S
H2		0.365	0.364	0.351	0.081	0.179	S
H3		0.228	0.243	0.238	0.065	-0.148	S
H4		0.322	0.328	0.321	0.071	0.02	S
H1	Cu *µg/l*	0.336	0.315	0.295	0.089	0.46	S
H2		0.506	0.437	0.397	0.098	1.104	S
H3		0.419	0.364	0.335	0.087	0.965	S
H4		0.526	0.459	0.436	0.106	0.849	S
H1	Ni *µg/l*	0.191	0.34	0.357	0.121	-1.371	Q
H2		0.237	0.364	0.367	0.138	-0.943	Q
H3		0.258	0.388	0.395	0.136	-1.01	Q
H4		0.563	0.655	0.662	0.164	-0.6	S
H1	Pb *µg/l*	1.08	1.21	1.118	0.215	-0.175	S
H2		0.943	1.07	1.119	0.904	-0.195	S
H3		1.003	1.12	1.087	0.386	-0.217	S
H4		1.358	1.51	1.537	0.709	-0.252	S
H1	Zn *µg/l*	6.462	4.85	5.181	0.463	2.768	Q
H2		7.334	5.09	5.294	0.851	2.395	Q
H3		7.529	5.34	5.561	0.442	4.457	Q
H4		9.094	6.22	6.544	0.614	4.155	Q

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***** Z score in unitless

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Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: https://emep-ccc.nilu.no/intercomparison

EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 51, TERA Environnement (France)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.328	0.267	0.273	0.029	1.935	S
H2		0.493	0.412	0.41	0.037	2.241	S
H3		0.305	0.243	0.25	0.027	2.047	Q
H4		0.436	0.328	0.33	0.044	2.419	Q
H1	Cd *µg/l*	0.042	0.034	0.037	0.013	0.404	S
H2		0.03	0.024	0.029	0.014	0.099	S
H3		0.037	0.029	0.032	0.013	0.42	Q
H4		0.044	0.033	0.036	0.013	0.597	Q
H1	Cr *µg/l*	0.309	0.291	0.279	0.069	0.441	S
H2		0.377	0.364	0.351	0.081	0.328	S
H3		0.266	0.243	0.238	0.065	0.434	S
H4		0.377	0.328	0.321	0.071	0.792	S
H1	Cu *µg/l*	0.343	0.315	0.295	0.089	0.539	S
H2		0.47	0.437	0.397	0.098	0.739	S
H3		0.413	0.364	0.335	0.087	0.896	S
H4		0.546	0.459	0.436	0.106	1.037	S
H1	Ni *µg/l*	0.377	0.34	0.357	0.121	0.164	S
H2		0.401	0.364	0.367	0.138	0.246	S
H3		0.471	0.388	0.395	0.136	0.562	S
H4		0.784	0.655	0.662	0.164	0.745	S
H1	Pb *µg/l*	1.325	1.21	1.118	0.215	0.962	S
H2		1.189	1.07	1.119	0.904	0.077	S
H3		1.288	1.12	1.087	0.386	0.521	S
H4		1.814	1.51	1.537	0.709	0.391	Q
H1	Zn *µg/l*	5.616	4.85	5.181	0.463	0.94	S
H2		5.835	5.09	5.294	0.851	0.635	S
H3		6.42	5.34	5.561	0.442	1.946	S
H4		8.082	6.22	6.544	0.614	2.506	Q

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 54, Central Research Laboratory; Division in Lublin (Poland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.298	0.267	0.273	0.029	0.884	S
H2		0.44	0.412	0.41	0.037	0.813	S
H3		0.275	0.243	0.25	0.027	0.921	S
H4		0.339	0.328	0.33	0.044	0.203	S
H1	Cd *µg/l*	0.032	0.034	0.037	0.013	-0.345	S
H2		0.025	0.024	0.029	0.014	-0.248	S
H3		0.027	0.029	0.032	0.013	-0.359	S
H4		0.033	0.033	0.036	0.013	-0.264	S
H1	Cr *µg/l*	0.248	0.291	0.279	0.069	-0.445	S
H2		0.324	0.364	0.351	0.081	-0.33	S
H3		0.225	0.243	0.238	0.065	-0.194	S
H4		0.295	0.328	0.321	0.071	-0.359	S
H1	Cu *µg/l*	< 0.500	0.315	0.295	0.089		B
H2		< 0.500	0.437	0.397	0.098		B
H3		< 0.500	0.364	0.335	0.087		B
H4		< 0.500	0.459	0.436	0.106		B
H1	Ni *µg/l*	< 0.200	0.34	0.357	0.121	-2.122	U
H2		< 0.200	0.364	0.367	0.138	-1.936	U
H3		0.21	0.388	0.395	0.136	-1.364	Q
H4		0.465	0.655	0.662	0.164	-1.196	Q
H1	Pb *µg/l*	1.15	1.21	1.118	0.215	0.15	S
H2		1.05	1.07	1.119	0.904	-0.076	S
H3		1.05	1.12	1.087	0.386	-0.096	S
H4		1.49	1.51	1.537	0.709	-0.066	S
H1	Zn *µg/l*	4.45	4.85	5.181	0.463	-1.58	S
H2		4.65	5.09	5.294	0.851	-0.757	S
H3		4.78	5.34	5.561	0.442	-1.768	S
H4		5.65	6.22	6.544	0.614	-1.457	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 110, Th ringer Landesamt f r Landwirtschaft und l„ndlichen Raum (TLLLR) (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.28	0.267	0.273	0.029	0.253	S
H2		0.42	0.412	0.41	0.037	0.274	S
H3		0.236	0.243	0.25	0.027	-0.543	S
H4		0.335	0.328	0.33	0.044	0.112	S
H1	Cd *µg/l*	0.03	0.034	0.037	0.013	-0.494	S
H2		0.024	0.024	0.029	0.014	-0.318	S
H3		0.027	0.029	0.032	0.013	-0.359	S
H4		0.032	0.033	0.036	0.013	-0.342	S
H1	Cr *µg/l*	0.311	0.291	0.279	0.069	0.47	S
H2		0.378	0.364	0.351	0.081	0.34	S
H3		0.231	0.243	0.238	0.065	-0.102	S
H4		0.334	0.328	0.321	0.071	0.189	S
H1	Cu *µg/l*	0.197	0.315	0.295	0.089	-1.111	Q
H2		0.315	0.437	0.397	0.098	-0.835	Q
H3		0.249	0.364	0.335	0.087	-0.996	Q
H4		0.352	0.459	0.436	0.106	-0.79	S
H1	Ni *µg/l*	0.31	0.34	0.357	0.121	-0.389	S
H2		0.37	0.364	0.367	0.138	0.021	S
H3		0.39	0.388	0.395	0.136	-0.036	S
H4		0.663	0.655	0.662	0.164	0.009	S
H1	Pb *µg/l*	1.21	1.21	1.118	0.215	0.428	S
H2		1.06	1.07	1.119	0.904	-0.065	S
H3		1.11	1.12	1.087	0.386	0.06	S
H4		1.5	1.51	1.537	0.709	-0.052	S
H1	Zn *µg/l*	4.7	4.85	5.181	0.463	-1.04	S
H2		4.8	5.09	5.294	0.851	-0.581	S
H3		5.1	5.34	5.561	0.442	-1.043	S
H4		5.96	6.22	6.544	0.614	-0.952	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 112, Nordwestdeutsche Forstliche Versuchsanstalt (NFV) (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.292	0.267	0.273	0.029	0.673	S
H2		0.453	0.412	0.41	0.037	1.163	S
H3		0.267	0.243	0.25	0.027	0.621	S
H4		0.35	0.328	0.33	0.044	0.455	S
H1	Cd *µg/l*	0.037	0.034	0.037	0.013	0.03	S
H2		0.027	0.024	0.029	0.014	-0.116	S
H3		0.031	0.029	0.032	0.013	-0.04	S
H4		0.038	0.033	0.036	0.013	0.159	S
H1	Cr *µg/l*	0.277	0.291	0.279	0.069	-0.023	S
H2		0.346	0.364	0.351	0.081	-0.057	S
H3		0.228	0.243	0.238	0.065	-0.148	S
H4		0.316	0.328	0.321	0.071	-0.064	S
H1	Cu *µg/l*	0.312	0.315	0.295	0.089	0.188	S
H2		0.429	0.437	0.397	0.098	0.322	S
H3		0.36	0.364	0.335	0.087	0.284	S
H4		0.581	0.459	0.436	0.106	1.367	Q
H1	Ni *µg/l*	0.335	0.34	0.357	0.121	-0.182	S
H2		0.353	0.364	0.367	0.138	-0.102	S
H3		0.377	0.388	0.395	0.136	-0.132	S
H4		0.932	0.655	0.662	0.164	1.645	Q
H1	Pb *µg/l*	1.255	1.21	1.118	0.215	0.637	S
H2		1.098	1.07	1.119	0.904	-0.023	S
H3		1.152	1.12	1.087	0.386	0.169	S
H4		1.581	1.51	1.537	0.709	0.062	S
H1	Zn *µg/l*	5.79	4.85	5.181	0.463	1.316	S
H2		6.031	5.09	5.294	0.851	0.865	S
H3		6.308	5.34	5.561	0.442	1.693	S
H4		7.701	6.22	6.544	0.614	1.885	S

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Org.no. SE: 559442-9580

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, ½ DL is taken as the reported value in further calculations.

***** Z score in unitless

¤ EMEP quality norm; letters indicate:

S – Satisfactory: Your results deviates less than ±25% of the expected value for theoretical values of Pb, Ni, Cr and As <1 µg/l, Cd <0,5µg/l, Zn<10 µg/l and Cu<2 µg/l and less than ±15% of the expected value for theoretical values of Pb, Ni, Cr and As >1 µg/l, Cd >0,5µg/l, Zn>10 µg/l and Cu>2 µg/l

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Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: https://emep-ccc.nilu.no/intercomparison

EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 115, Bayerische Landesanstalt f. Wald- und Forstwirtshaft (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.29	0.267	0.273	0.029	0.603	S
H2		0.454	0.412	0.41	0.037	1.19	S
H3		0.266	0.243	0.25	0.027	0.583	S
H4		0.34	0.328	0.33	0.044	0.226	S
H1	Cd *µg/l*	0.035	0.034	0.037	0.013	-0.12	S
H2		0.027	0.024	0.029	0.014	-0.109	S
H3		0.029	0.029	0.032	0.013	-0.204	S
H4		0.034	0.033	0.036	0.013	-0.186	S
H1	Cr *µg/l*	0.305	0.291	0.279	0.069	0.383	S
H2		0.379	0.364	0.351	0.081	0.353	S
H3		0.244	0.243	0.238	0.065	0.097	S
H4		0.328	0.328	0.321	0.071	0.104	S
H1	Cu *µg/l*	0.331	0.315	0.295	0.089	0.403	S
H2		0.443	0.437	0.397	0.098	0.464	S
H3		0.359	0.364	0.335	0.087	0.273	S
H4		0.457	0.459	0.436	0.106	0.199	S
H1	Ni *µg/l*	0.35	0.34	0.357	0.121	-0.059	S
H2		0.37	0.364	0.367	0.138	0.021	S
H3		0.38	0.388	0.395	0.136	-0.11	S
H4		0.664	0.655	0.662	0.164	0.015	S
H1	Pb *µg/l*	1.144	1.21	1.118	0.215	0.122	S
H2		1.007	1.07	1.119	0.904	-0.124	S
H3		1.037	1.12	1.087	0.386	-0.129	S
H4		1.4	1.51	1.537	0.709	-0.193	S
H1	Zn *µg/l*	5.37	4.85	5.181	0.463	0.408	S
H2		5.36	5.09	5.294	0.851	0.077	S
H3		5.66	5.34	5.561	0.442	0.225	S
H4		6.35	6.22	6.544	0.614	-0.316	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 120, Landwirtschaftliche Untersuchungs- und Forschungsanstalt LUFA (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.28	0.267	0.273	0.029	0.253	S
H2		0.43	0.412	0.41	0.037	0.543	S
H3		0.248	0.243	0.25	0.027	-0.093	S
H4		0.331	0.328	0.33	0.044	0.02	S
H1	Cd *µg/l*	0.038	0.034	0.037	0.013	0.105	S
H2		0.026	0.024	0.029	0.014	-0.179	S
H3		0.031	0.029	0.032	0.013	-0.048	S
H4		0.034	0.033	0.036	0.013	-0.17	S
H1	Cr *µg/l*	0.291	0.291	0.279	0.069	0.18	S
H2		0.371	0.364	0.351	0.081	0.253	S
H3		0.241	0.243	0.238	0.065	0.051	S
H4		0.338	0.328	0.321	0.071	0.245	S
H1	Cu *µg/l*	0.316	0.315	0.295	0.089	0.234	S
H2		0.434	0.437	0.397	0.098	0.373	S
H3		0.351	0.364	0.335	0.087	0.18	S
H4		0.452	0.459	0.436	0.106	0.151	S
H1	Ni *µg/l*	0.292	0.34	0.357	0.121	-0.537	S
H2		0.314	0.364	0.367	0.138	-0.385	S
H3		0.339	0.388	0.395	0.136	-0.412	S
H4		0.604	0.655	0.662	0.164	-0.35	S
H1	Pb *µg/l*	1.205	1.21	1.118	0.215	0.405	S
H2		1.046	1.07	1.119	0.904	-0.081	S
H3		1.093	1.12	1.087	0.386	0.016	S
H4		1.485	1.51	1.537	0.709	-0.073	S
H1	Zn *µg/l*	5.555	4.85	5.181	0.463	0.808	S
H2		5.747	5.09	5.294	0.851	0.531	S
H3		6.093	5.34	5.561	0.442	1.206	S
H4		7.06	6.22	6.544	0.614	0.841	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 121, Landeslabor Schleswig-Holstein (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	< 0.200	0.267	0.273	0.029	-6.053	U
H2		0.316	0.412	0.41	0.037	-2.529	S
H3		< 0.200	0.243	0.25	0.027	-5.65	U
H4		0.286	0.328	0.33	0.044	-1.008	S
H1	Cd *µg/l*	< 0.050	0.034	0.037	0.013		B
H2		< 0.050	0.024	0.029	0.014		B
H3		< 0.050	0.029	0.032	0.013		B
H4		< 0.050	0.033	0.036	0.013		B
H1	Cr *µg/l*	0.294	0.291	0.279	0.069	0.223	S
H2		0.351	0.364	0.351	0.081	0.005	S
H3		< 0.250	0.243	0.238	0.065		B
H4		0.305	0.328	0.321	0.071	-0.218	S
H1	Cu *µg/l*	0.374	0.315	0.295	0.089	0.889	S
H2		0.496	0.437	0.397	0.098	1.003	S
H3		0.423	0.364	0.335	0.087	1.011	S
H4		0.527	0.459	0.436	0.106	0.858	S
H1	Ni *µg/l*	0.359	0.34	0.357	0.121	0.016	S
H2		0.39	0.364	0.367	0.138	0.166	S
H3		0.407	0.388	0.395	0.136	0.089	S
H4		0.689	0.655	0.662	0.164	0.167	S
H1	Pb *µg/l*	1.107	1.21	1.118	0.215	-0.05	S
H2		0.952	1.07	1.119	0.904	-0.185	S
H3		1.015	1.12	1.087	0.386	-0.186	S
H4		1.363	1.51	1.537	0.709	-0.245	S
H1	Zn *µg/l*	4.915	4.85	5.181	0.463	-0.575	S
H2		4.985	5.09	5.294	0.851	-0.363	S
H3		5.7	5.34	5.561	0.442	0.316	S
H4		6.275	6.22	6.544	0.614	-0.438	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 125, Bayerisches Landesamt f r Umwelt (Germany)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.286	0.267	0.273	0.029	0.463	S
H2		0.427	0.412	0.41	0.037	0.473	S
H3		0.255	0.243	0.25	0.027	0.174	S
H4		0.36	0.328	0.33	0.044	0.676	S
H1	Cd *µg/l*	0.032	0.034	0.037	0.013	-0.36	S
H2		0.023	0.024	0.029	0.014	-0.359	S
H3		0.03	0.029	0.032	0.013	-0.149	S
H4		0.032	0.033	0.036	0.013	-0.342	S
H1	Cr *µg/l*	0.213	0.291	0.279	0.069	-0.958	Q
H2		0.285	0.364	0.351	0.081	-0.815	S
H3		0.162	0.243	0.238	0.065	-1.153	Q
H4		0.248	0.328	0.321	0.071	-1.013	S
H1	Cu *µg/l*	0.287	0.315	0.295	0.089	-0.091	S
H2		0.406	0.437	0.397	0.098	0.093	S
H3		0.335	0.364	0.335	0.087	-0.005	S
H4		0.434	0.459	0.436	0.106	-0.016	S
H1	Ni *µg/l*	0.334	0.34	0.357	0.121	-0.194	S
H2		0.363	0.364	0.367	0.138	-0.031	S
H3		0.385	0.388	0.395	0.136	-0.077	S
H4		0.651	0.655	0.662	0.164	-0.066	S
H1	Pb *µg/l*	1.189	1.21	1.118	0.215	0.331	S
H2		1.087	1.07	1.119	0.904	-0.036	S
H3		1.135	1.12	1.087	0.386	0.125	S
H4		1.502	1.51	1.537	0.709	-0.05	S
H1	Zn *µg/l*	5.09	4.85	5.181	0.463	-0.196	S
H2		5.434	5.09	5.294	0.851	0.164	S
H3		5.52	5.34	5.561	0.442	-0.092	S
H4		6.427	6.22	6.544	0.614	-0.191	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 129, Ecole Nationale d'Ingenieurs de Sfax (Tunisia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	5	0.034	0.037	0.013	371.782	U
H2		5	0.024	0.029	0.014	344.912	U
H3		5	0.029	0.032	0.013	387.379	U
H4		5	0.033	0.036	0.013	388.473	U
H1	Cr *µg/l*	7.85	0.291	0.279	0.069	109.991	U
H2		13.43	0.364	0.351	0.081	162.223	U
H3		18.41	0.243	0.238	0.065	278.363	U
H4		16.38	0.328	0.321	0.071	225.47	U
H1	Cu *µg/l*	3.83	0.315	0.295	0.089	39.939	U
H2		4.69	0.437	0.397	0.098	43.594	U
H3		7.4	0.364	0.335	0.087	81.494	U
H4		4.88	0.459	0.436	0.106	41.86	U
H1	Ni *µg/l*	4.93	0.34	0.357	0.121	37.753	U
H2		14.06	0.364	0.367	0.138	99.273	U
H3		9.04	0.388	0.395	0.136	63.773	U
H4		10	0.655	0.662	0.164	56.815	U
H1	Pb *µg/l*	50	1.21	1.118	0.215	226.934	U
H2		50	1.07	1.119	0.904	54.045	U
H3		7.79	1.12	1.087	0.386	17.376	U
H4		50	1.51	1.537	0.709	68.318	U
H1	Zn *µg/l*	3.34	4.85	5.181	0.463	-3.979	Q
H2		1361	5.09	5.294	0.851	1592.206	U
H3		4.99	5.34	5.561	0.442	-1.292	S
H4		5.57	6.22	6.544	0.614	-1.587	S

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: https://emep-ccc.nilu.no/intercomparison

EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 146, Luxembourg Institute of Science and Technology (LIST) (Luxembourg)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.273	0.267	0.273	0.029	0.008	S
H2		0.414	0.412	0.41	0.037	0.112	S
H3		0.256	0.243	0.25	0.027	0.208	S
H4		0.34	0.328	0.33	0.044	0.226	S
H1	Cd *µg/l*	0.032	0.034	0.037	0.013	-0.345	S
H2		< 0.026	0.024	0.029	0.014		B
H3		0.028	0.029	0.032	0.013	-0.282	S
H4		0.029	0.033	0.036	0.013	-0.577	S
H1	Cr *µg/l*	0.277	0.291	0.279	0.069	-0.023	S
H2		0.347	0.364	0.351	0.081	-0.044	S
H3		0.241	0.243	0.238	0.065	0.051	S
H4		0.33	0.328	0.321	0.071	0.133	S
H1	Cu *µg/l*	0.306	0.315	0.295	0.089	0.121	S
H2		0.419	0.437	0.397	0.098	0.221	S
H3		0.343	0.364	0.335	0.087	0.088	S
H4		0.436	0.459	0.436	0.106	0.001	S
H1	Ni *µg/l*	0.35	0.34	0.357	0.121	-0.059	S
H2		0.368	0.364	0.367	0.138	0.007	S
H3		0.404	0.388	0.395	0.136	0.067	S
H4		0.658	0.655	0.662	0.164	-0.022	S
H1	Pb *µg/l*	1.178	1.21	1.118	0.215	0.28	S
H2		1.047	1.07	1.119	0.904	-0.08	S
H3		1.092	1.12	1.087	0.386	0.013	S
H4		1.48	1.51	1.537	0.709	-0.08	S
H1	Zn *µg/l*	4.887	4.85	5.181	0.463	-0.636	S
H2		5.003	5.09	5.294	0.851	-0.342	S
H3		5.321	5.34	5.561	0.442	-0.542	S
H4		6.228	6.22	6.544	0.614	-0.515	S

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***** Z score in unitless

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 166, Forest Research Institute, Laboratory of Natural Environment Chemistry (Poland)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	< 0.500	0.034	0.037	0.013		B
H2		< 0.500	0.024	0.029	0.014		B
H3		< 0.500	0.029	0.032	0.013		B
H4		< 0.500	0.033	0.036	0.013		B
H1	Cr *µg/l*	-999	0.291	0.279	0.069		B
H2		-999	0.364	0.351	0.081		B
H3		-999	0.243	0.238	0.065		B
H4		-999	0.328	0.321	0.071		B
H1	Cu *µg/l*	< 9.000	0.315	0.295	0.089		B
H2		< 9.000	0.437	0.397	0.098		B
H3		< 9.000	0.364	0.335	0.087		B
H4		< 9.000	0.459	0.436	0.106		B
H1	Ni *µg/l*	-999	0.34	0.357	0.121		B
H2		-999	0.364	0.367	0.138		B
H3		-999	0.388	0.395	0.136		B
H4		-999	0.655	0.662	0.164		B
H1	Pb *µg/l*	< 10.000	1.21	1.118	0.215		B
H2		< 10.000	1.07	1.119	0.904		B
H3		< 10.000	1.12	1.087	0.386		B
H4		< 10.000	1.51	1.537	0.709		B
H1	Zn *µg/l*	5.267	4.85	5.181	0.463	0.186	S
H2		5.434	5.09	5.294	0.851	0.164	S
H3		5.687	5.34	5.561	0.442	0.286	S
H4		6.857	6.22	6.544	0.614	0.51	S

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***** Z score in unitless

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: https://emep-ccc.nilu.no/intercomparison

EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 169, Lancaster Environment Centre, United Kingdom Centre for Ecology and Hydrology (United Kingdom)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.269	0.267	0.273	0.029	-0.143	S
H2		0.407	0.412	0.41	0.037	-0.077	S
H3		0.242	0.243	0.25	0.027	-0.303	S
H4		0.324	0.328	0.33	0.044	-0.14	S
H1	Cd *µg/l*	0.031	0.034	0.037	0.013	-0.419	S
H2		0.023	0.024	0.029	0.014	-0.373	S
H3		0.03	0.029	0.032	0.013	-0.102	S
H4		0.032	0.033	0.036	0.013	-0.311	S
H1	Cr *µg/l*	0.244	0.291	0.279	0.069	-0.503	S
H2		0.337	0.364	0.351	0.081	-0.168	S
H3		0.206	0.243	0.238	0.065	-0.485	S
H4		0.293	0.328	0.321	0.071	-0.387	S
H1	Cu *µg/l*	0.277	0.315	0.295	0.089	-0.204	S
H2		0.392	0.437	0.397	0.098	-0.051	S
H3		0.349	0.364	0.335	0.087	0.163	S
H4		0.434	0.459	0.436	0.106	-0.022	S
H1	Ni *µg/l*	0.329	0.34	0.357	0.121	-0.232	S
H2		0.355	0.364	0.367	0.138	-0.088	S
H3		0.368	0.388	0.395	0.136	-0.198	S
H4		0.668	0.655	0.662	0.164	0.039	S
H1	Pb *µg/l*	1.206	1.21	1.118	0.215	0.41	S
H2		1.092	1.07	1.119	0.904	-0.03	S
H3		1.107	1.12	1.087	0.386	0.052	S
H4		1.491	1.51	1.537	0.709	-0.065	S
H1	Zn *µg/l*	4.897	4.85	5.181	0.463	-0.614	S
H2		5.137	5.09	5.294	0.851	-0.185	S
H3		5.473	5.34	5.561	0.442	-0.198	S
H4		6.341	6.22	6.544	0.614	-0.331	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 171, IMT Nord Europe (France)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.259	0.267	0.273	0.029	-0.483	S
H2		0.391	0.412	0.41	0.037	-0.508	S
H3		0.231	0.243	0.25	0.027	-0.731	S
H4		0.31	0.328	0.33	0.044	-0.459	S
H1	Cd *µg/l*	0.03	0.034	0.037	0.013	-0.494	S
H2		0.021	0.024	0.029	0.014	-0.526	S
H3		0.026	0.029	0.032	0.013	-0.437	S
H4		0.029	0.033	0.036	0.013	-0.577	S
H1	Cr *µg/l*	0.28	0.291	0.279	0.069	0.02	S
H2		0.35	0.364	0.351	0.081	-0.007	S
H3		0.233	0.243	0.238	0.065	-0.072	S
H4		0.316	0.328	0.321	0.071	-0.064	S
H1	Cu *µg/l*	0.292	0.315	0.295	0.089	-0.038	S
H2		0.401	0.437	0.397	0.098	0.038	S
H3		0.346	0.364	0.335	0.087	0.123	S
H4		0.428	0.459	0.436	0.106	-0.075	S
H1	Ni *µg/l*	0.314	0.34	0.357	0.121	-0.356	S
H2		0.339	0.364	0.367	0.138	-0.204	S
H3		0.362	0.388	0.395	0.136	-0.243	S
H4		0.619	0.655	0.662	0.164	-0.259	S
H1	Pb *µg/l*	1.14	1.21	1.118	0.215	0.103	S
H2		1.009	1.07	1.119	0.904	-0.122	S
H3		1.052	1.12	1.087	0.386	-0.09	S
H4		1.432	1.51	1.537	0.709	-0.148	S
H1	Zn *µg/l*	5.061	4.85	5.181	0.463	-0.26	S
H2		5.299	5.09	5.294	0.851	0.005	S
H3		5.461	5.34	5.561	0.442	-0.225	S
H4		6.453	6.22	6.544	0.614	-0.148	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 178, Limnological Institute Russian Academy of Sciences (Russian Federation)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.274	0.267	0.273	0.029	0.043	S
H2		0.394	0.412	0.41	0.037	-0.427	S
H3		0.263	0.243	0.25	0.027	0.47	S
H4		0.308	0.328	0.33	0.044	-0.505	S
H1	Cd *µg/l*	0.038	0.034	0.037	0.013	0.105	S
H2		0.026	0.024	0.029	0.014	-0.179	S
H3		0.029	0.029	0.032	0.013	-0.204	S
H4		0.031	0.033	0.036	0.013	-0.421	S
H1	Cr *µg/l*	0.276	0.291	0.279	0.069	-0.038	S
H2		0.34	0.364	0.351	0.081	-0.131	S
H3		0.25	0.243	0.238	0.065	0.189	S
H4		0.312	0.328	0.321	0.071	-0.12	S
H1	Cu *µg/l*	0.339	0.315	0.295	0.089	0.494	S
H2		0.456	0.437	0.397	0.098	0.596	S
H3		0.374	0.364	0.335	0.087	0.446	S
H4		0.471	0.459	0.436	0.106	0.33	S
H1	Ni *µg/l*	0.343	0.34	0.357	0.121	-0.116	S
H2		0.357	0.364	0.367	0.138	-0.073	S
H3		0.395	0.388	0.395	0.136	0.001	S
H4		0.591	0.655	0.662	0.164	-0.429	S
H1	Pb *µg/l*	1.197	1.21	1.118	0.215	0.368	S
H2		1.04	1.07	1.119	0.904	-0.087	S
H3		1.129	1.12	1.087	0.386	0.109	S
H4		1.349	1.51	1.537	0.709	-0.265	S
H1	Zn *µg/l*	4.74	4.85	5.181	0.463	-0.953	S
H2		4.71	5.09	5.294	0.851	-0.686	S
H3		5.54	5.34	5.561	0.442	-0.047	S
H4		5.89	6.22	6.544	0.614	-1.066	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 183, Public health institute Uzice (Republic of Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	-999	0.267	0.273	0.029		B
H2		-999	0.412	0.41	0.037		B
H3		-999	0.243	0.25	0.027		B
H4		-999	0.328	0.33	0.044		B
H1	Cd *µg/l*	0.043	0.034	0.037	0.013	0.479	Q
H2		0.034	0.024	0.029	0.014	0.376	Q
H3		0.036	0.029	0.032	0.013	0.342	S
H4		0.044	0.033	0.036	0.013	0.597	Q
H1	Cr *µg/l*	0.323	0.291	0.279	0.069	0.645	S
H2		0.413	0.364	0.351	0.081	0.774	S
H3		0.248	0.243	0.238	0.065	0.158	S
H4		0.352	0.328	0.321	0.071	0.441	S
H1	Cu *µg/l*	0.479	0.315	0.295	0.089	2.075	U
H2		0.562	0.437	0.397	0.098	1.673	Q
H3		0.395	0.364	0.335	0.087	0.688	S
H4		0.535	0.459	0.436	0.106	0.933	S
H1	Ni *µg/l*	0.434	0.34	0.357	0.121	0.635	Q
H2		0.398	0.364	0.367	0.138	0.224	S
H3		0.341	0.388	0.395	0.136	-0.397	S
H4		0.692	0.655	0.662	0.164	0.185	S
H1	Pb *µg/l*	1.347	1.21	1.118	0.215	1.064	S
H2		1.186	1.07	1.119	0.904	0.074	S
H3		1.062	1.12	1.087	0.386	-0.064	S
H4		1.573	1.51	1.537	0.709	0.051	S
H1	Zn *µg/l*	5	4.85	5.181	0.463	-0.391	S
H2		5.38	5.09	5.294	0.851	0.1	S
H3		5.37	5.34	5.561	0.442	-0.431	S
H4		6.38	6.22	6.544	0.614	-0.267	S

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 187, Public Health Institute - Nis, Department for Sanitary Chemistry (Republic of Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.251	0.267	0.273	0.029	-0.763	S
H2		0.398	0.412	0.41	0.037	-0.319	S
H3		0.256	0.243	0.25	0.027	0.208	S
H4		0.332	0.328	0.33	0.044	0.043	S
H1	Cd *µg/l*	0.029	0.034	0.037	0.013	-0.569	S
H2		0.033	0.024	0.029	0.014	0.307	Q
H3		0.032	0.029	0.032	0.013	0.03	S
H4		0.039	0.033	0.036	0.013	0.206	S
H1	Cr *µg/l*	-999	0.291	0.279	0.069		B
H2		-999	0.364	0.351	0.081		B
H3		-999	0.243	0.238	0.065		B
H4		-999	0.328	0.321	0.071		B
H1	Cu *µg/l*	0.31	0.315	0.295	0.089	0.166	S
H2		0.328	0.437	0.397	0.098	-0.703	S
H3		0.348	0.364	0.335	0.087	0.146	S
H4		0.627	0.459	0.436	0.106	1.8	Q
H1	Ni *µg/l*	0.423	0.34	0.357	0.121	0.544	S
H2		0.324	0.364	0.367	0.138	-0.312	S
H3		0.354	0.388	0.395	0.136	-0.302	S
H4		0.519	0.655	0.662	0.164	-0.868	S
H1	Pb *µg/l*	34.41	1.21	1.118	0.215	154.558	U
H2		6.53	1.07	1.119	0.904	5.983	U
H3		3	1.12	1.087	0.386	4.959	U
H4		5.098	1.51	1.537	0.709	5.02	U
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 203, The Public Health Institute Vranje (Republic of Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.244	0.267	0.273	0.029	-1.008	S
H2		0.397	0.412	0.41	0.037	-0.346	S
H3		0.281	0.243	0.25	0.027	1.146	S
H4		0.346	0.328	0.33	0.044	0.363	S
H1	Cd *µg/l*	0.028	0.034	0.037	0.013	-0.644	S
H2		0.042	0.024	0.029	0.014	0.931	U
H3		0.034	0.029	0.032	0.013	0.186	S
H4		0.046	0.033	0.036	0.013	0.753	Q
H1	Cr *µg/l*	< 1.000	0.291	0.279	0.069		B
H2		< 1.000	0.364	0.351	0.081		B
H3		< 1.000	0.243	0.238	0.065		B
H4		< 1.000	0.328	0.321	0.071		B
H1	Cu *µg/l*	< 10.000	0.315	0.295	0.089		B
H2		< 10.000	0.437	0.397	0.098		B
H3		< 10.000	0.364	0.335	0.087		B
H4		< 10.000	0.459	0.436	0.106		B
H1	Ni *µg/l*	0.411	0.34	0.357	0.121	0.445	S
H2		0.32	0.364	0.367	0.138	-0.341	S
H3		0.36	0.388	0.395	0.136	-0.257	S
H4		0.61	0.655	0.662	0.164	-0.314	S
H1	Pb *µg/l*	< 10.000	1.21	1.118	0.215		B
H2		< 10.000	1.07	1.119	0.904		B
H3		< 10.000	1.12	1.087	0.386		B
H4		< 10.000	1.51	1.537	0.709		B
H1	Zn *µg/l*	< 20.000	4.85	5.181	0.463		B
H2		< 20.000	5.09	5.294	0.851		B
H3		< 20.000	5.34	5.561	0.442		B
H4		< 20.000	6.22	6.544	0.614		B

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 209, PHIB - Public Health Institute of Belgrade (Republic of Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.258	0.267	0.273	0.029	-0.518	S
H2		0.399	0.412	0.41	0.037	-0.292	S
H3		0.232	0.243	0.25	0.027	-0.694	S
H4		0.318	0.328	0.33	0.044	-0.277	S
H1	Cd *µg/l*	0.031	0.034	0.037	0.013	-0.419	S
H2		0.024	0.024	0.029	0.014	-0.318	S
H3		0.029	0.029	0.032	0.013	-0.204	S
H4		0.032	0.033	0.036	0.013	-0.342	S
H1	Cr *µg/l*	0.29	0.291	0.279	0.069	0.165	S
H2		0.366	0.364	0.351	0.081	0.191	S
H3		0.244	0.243	0.238	0.065	0.097	S
H4		0.329	0.328	0.321	0.071	0.118	S
H1	Cu *µg/l*	0.284	0.315	0.295	0.089	-0.128	S
H2		0.407	0.437	0.397	0.098	0.099	S
H3		0.327	0.364	0.335	0.087	-0.097	S
H4		0.43	0.459	0.436	0.106	-0.056	S
H1	Ni *µg/l*	0.335	0.34	0.357	0.121	-0.182	S
H2		0.328	0.364	0.367	0.138	-0.283	S
H3		0.348	0.388	0.395	0.136	-0.346	S
H4		0.627	0.655	0.662	0.164	-0.21	S
H1	Pb *µg/l*	1.201	1.21	1.118	0.215	0.387	S
H2		1.05	1.07	1.119	0.904	-0.076	S
H3		1.096	1.12	1.087	0.386	0.024	S
H4		1.501	1.51	1.537	0.709	-0.051	S
H1	Zn *µg/l*	-999	4.85	5.181	0.463		B
H2		-999	5.09	5.294	0.851		B
H3		-999	5.34	5.561	0.442		B
H4		-999	6.22	6.544	0.614		B

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EMEP – Analytical intercomparison of heavy metals in precipitation 2025

Laboratory 211, Eurofins Omegam B.V. (The Netherlands)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm ¤
H1	As *µg/l*	0.279	0.267	0.273	0.029	0.218	S
H2		0.415	0.412	0.41	0.037	0.139	S
H3		0.253	0.243	0.25	0.027	0.095	S
H4		0.332	0.328	0.33	0.044	0.043	S
H1	Cd *µg/l*	0.032	0.034	0.037	0.013	-0.367	S
H2		0.026	0.024	0.029	0.014	-0.186	S
H3		0.028	0.029	0.032	0.013	-0.25	S
H4		0.035	0.033	0.036	0.013	-0.139	S
H1	Cr *µg/l*	0.284	0.291	0.279	0.069	0.078	S
H2		0.367	0.364	0.351	0.081	0.204	S
H3		0.242	0.243	0.238	0.065	0.066	S
H4		0.314	0.328	0.321	0.071	-0.092	S
H1	Cu *µg/l*	0.265	0.315	0.295	0.089	-0.343	S
H2		0.41	0.437	0.397	0.098	0.129	S
H3		0.326	0.364	0.335	0.087	-0.108	S
H4		0.446	0.459	0.436	0.106	0.095	S
H1	Ni *µg/l*	0.346	0.34	0.357	0.121	-0.092	S
H2		0.369	0.364	0.367	0.138	0.014	S
H3		0.422	0.388	0.395	0.136	0.2	S
H4		0.661	0.655	0.662	0.164	-0.004	S
H1	Pb *µg/l*	1.239	1.21	1.118	0.215	0.563	S
H2		1.094	1.07	1.119	0.904	-0.028	S
H3		1.166	1.12	1.087	0.386	0.205	S
H4		1.541	1.51	1.537	0.709	0.006	S
H1	Zn *µg/l*	5.421	4.85	5.181	0.463	0.518	S
H2		5.474	5.09	5.294	0.851	0.211	S
H3		5.747	5.34	5.561	0.442	0.422	S
H4		6.789	6.22	6.544	0.614	0.399	S

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