

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.34	0.301	0.314	0.028	0.909	S
H2		0.2	0.17	0.18	0.027	0.758	S
H3		0.08	0.084	0.09	0.02	-0.519	S
H4		0.08	0.085	0.092	0.02	-0.581	S
H1	Cd <i>µg/l</i>	0.04	0.034	0.038	0.022	0.094	S
H2		< 0.040	0.02	0.024	0.013		B
H3		< 0.040	0.011	0.014	0.008		B
H4		< 0.040	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.48	0.387	0.382	0.059	1.68	S
H2		0.33	0.238	0.243	0.029	3.049	Q
H3		0.12	0.07	0.08	0.034	1.155	U
H4		0.13	0.085	0.101	0.052	0.552	U
H1	Cu <i>µg/l</i>	0.55	0.43	0.453	0.16	0.604	Q
H2		0.51	0.408	0.502	0.414	0.02	Q
H3		< 0.360	0.154	0.211	0.161		B
H4		< 0.360	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.43	0.258	0.277	0.079	1.933	U
H2		0.21	0.17	0.186	0.072	0.329	S
H3		0.15	0.126	0.134	0.072	0.228	S
H4		0.2	0.159	0.166	0.057	0.587	Q
H1	Pb <i>µg/l</i>	0.68	0.688	0.67	0.077	0.134	S
H2		0.46	0.442	0.444	0.076	0.208	S
H3		0.35	0.35	0.358	0.053	-0.157	S
H4		0.39	0.391	0.396	0.052	-0.113	S
H1	Zn <i>µg/l</i>	2.33	2.15	2.158	0.598	0.287	S
H2		3.42	2.04	2.374	0.542	1.931	U
H3		2.04	1.68	1.824	0.577	0.374	S
H4		2.42	1.87	1.962	0.466	0.983	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.306	0.301	0.314	0.028	-0.312	S
H2		0.172	0.17	0.18	0.027	-0.274	S
H3		0.093	0.084	0.09	0.02	0.108	S
H4		0.09	0.085	0.092	0.02	-0.101	S
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.123	S
H2		0.019	0.02	0.024	0.013	-0.429	S
H3		0.013	0.011	0.014	0.008	-0.202	S
H4		0.01	0.01	0.014	0.01	-0.377	S
H1	Cr <i>µg/l</i>	0.38	0.387	0.382	0.059	-0.034	S
H2		0.238	0.238	0.243	0.029	-0.16	S
H3		0.067	0.07	0.08	0.034	-0.38	S
H4		0.079	0.085	0.101	0.052	-0.431	S
H1	Cu <i>µg/l</i>	0.446	0.43	0.453	0.16	-0.046	S
H2		0.434	0.408	0.502	0.414	-0.164	S
H3		0.154	0.154	0.211	0.161	-0.351	S
H4		0.142	0.128	0.196	0.208	-0.258	S
H1	Ni <i>µg/l</i>	0.269	0.258	0.277	0.079	-0.093	S
H2		0.173	0.17	0.186	0.072	-0.181	S
H3		0.14	0.126	0.134	0.072	0.09	S
H4		0.173	0.159	0.166	0.057	0.123	S
H1	Pb <i>µg/l</i>	0.687	0.688	0.67	0.077	0.224	S
H2		0.44	0.442	0.444	0.076	-0.055	S
H3		0.35	0.35	0.358	0.053	-0.167	S
H4		0.392	0.391	0.396	0.052	-0.071	S
H1	Zn <i>µg/l</i>	2.193	2.15	2.158	0.598	0.059	S
H2		2.124	2.04	2.374	0.542	-0.463	S
H3		1.712	1.68	1.824	0.577	-0.195	S
H4		1.885	1.87	1.962	0.466	-0.165	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.36	0.301	0.314	0.028	1.619	S
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	-999	0.034	0.038	0.022		B
H2		-999	0.02	0.024	0.013		B
H3		-999	0.011	0.014	0.008		B
H4		-999	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	-999	0.258	0.277	0.079		B
H2		-999	0.17	0.186	0.072		B
H3		-999	0.126	0.134	0.072		B
H4		-999	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.63	0.688	0.67	0.077	-0.518	S
H2		-999	0.442	0.444	0.076		B
H3		-999	0.35	0.358	0.053		B
H4		-999	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 7, SGS Analytics Germany GmbH, Niederlassung Markkleeberg (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 <i>µg/l</i>	0.345	0.301	0.314	0.028	1.086	S
H2		0.225	0.17	0.18	0.027	1.688	Q
H3		0.14	0.084	0.09	0.02	2.454	U
H4		0.115	0.085	0.092	0.02	1.166	Q
H1	Cd <i>µg/l</i>	0.03	0.034	0.038	0.022	-0.355	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.01	0.011	0.014	0.008	-0.545	S
H4		0.01	0.01	0.014	0.01	-0.35	S
H1	Cr <i>µg/l</i>	0.38	0.387	0.382	0.059	-0.029	S
H2		0.25	0.238	0.243	0.029	0.258	S
H3		0.075	0.07	0.08	0.034	-0.16	S
H4		0.095	0.085	0.101	0.052	-0.124	S
H1	Cu <i>µg/l</i>	0.42	0.43	0.453	0.16	-0.209	S
H2		0.395	0.408	0.502	0.414	-0.258	S
H3		0.11	0.154	0.211	0.161	-0.625	Q
H4		0.11	0.128	0.196	0.208	-0.413	S
H1	Ni <i>µg/l</i>	0.425	0.258	0.277	0.079	1.87	U
H2		0.185	0.17	0.186	0.072	-0.021	S
H3		0.115	0.126	0.134	0.072	-0.26	S
H4		0.17	0.159	0.166	0.057	0.062	S
H1	Pb <i>µg/l</i>	0.69	0.688	0.67	0.077	0.265	S
H2		0.445	0.442	0.444	0.076	0.011	S
H3		0.35	0.35	0.358	0.053	-0.157	S
H4		0.385	0.391	0.396	0.052	-0.209	S
H1	Zn <i>µg/l</i>	2.14	2.15	2.158	0.598	-0.031	S
H2		2.07	2.04	2.374	0.542	-0.562	S
H3		1.685	1.68	1.824	0.577	-0.242	S
H4		1.855	1.87	1.962	0.466	-0.228	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.312	0.301	0.314	0.028	-0.085	S
H2		0.175	0.17	0.18	0.027	-0.173	S
H3		0.087	0.084	0.09	0.02	-0.172	S
H4		0.09	0.085	0.092	0.02	-0.082	S
H1	Cd <i>µg/l</i>	0.036	0.034	0.038	0.022	-0.086	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.383	0.387	0.382	0.059	0.022	S
H2		0.241	0.238	0.243	0.029	-0.056	S
H3		0.075	0.07	0.08	0.034	-0.16	S
H4		0.09	0.085	0.101	0.052	-0.221	S
H1	Cu <i>µg/l</i>	0.445	0.43	0.453	0.16	-0.053	S
H2		0.41	0.408	0.502	0.414	-0.222	S
H3		0.161	0.154	0.211	0.161	-0.309	S
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.29	0.258	0.277	0.079	0.167	S
H2		0.166	0.17	0.186	0.072	-0.286	S
H3		0.124	0.126	0.134	0.072	-0.134	S
H4		0.139	0.159	0.166	0.057	-0.481	S
H1	Pb <i>µg/l</i>	0.691	0.688	0.67	0.077	0.278	S
H2		0.44	0.442	0.444	0.076	-0.055	S
H3		0.356	0.35	0.358	0.053	-0.045	S
H4		0.396	0.391	0.396	0.052	0.003	S
H1	Zn <i>µg/l</i>	2.156	2.15	2.158	0.598	-0.004	S
H2		2.112	2.04	2.374	0.542	-0.484	S
H3		1.704	1.68	1.824	0.577	-0.209	S
H4		1.882	1.87	1.962	0.466	-0.17	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

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 *	E MEP quality norm [†]
H1	As <i>µg/l</i>	0.372	0.301	0.314	0.028	2.044	S
H2		< 0.360	0.17	0.18	0.027		B
H3		< 0.360	0.084	0.09	0.02		B
H4		< 0.360	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.035	0.034	0.038	0.022		B
H2		0.091	0.02	0.024	0.013	5.023	U
H3		< 0.035	0.011	0.014	0.008		B
H4		< 0.035	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	-999	0.258	0.277	0.079		B
H2		-999	0.17	0.186	0.072		B
H3		-999	0.126	0.134	0.072		B
H4		-999	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.509	0.688	0.67	0.077	-2.097	Q
H2		< 0.500	0.442	0.444	0.076		B
H3		< 0.500	0.35	0.358	0.053		B
H4		< 0.500	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.29	0.301	0.314	0.028	-0.865	S
H2		0.17	0.17	0.18	0.027	-0.359	S
H3		0.077	0.084	0.09	0.02	-0.668	S
H4		0.079	0.085	0.092	0.02	-0.631	S
H1	Cd <i>µg/l</i>	0.034	0.034	0.038	0.022	-0.175	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.01	0.01	0.014	0.01	-0.35	S
H1	Cr <i>µg/l</i>	0.37	0.387	0.382	0.059	-0.2	S
H2		0.23	0.238	0.243	0.029	-0.439	S
H3		< 0.090	0.07	0.08	0.034		B
H4		< 0.090	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.43	0.43	0.453	0.16	-0.147	S
H2		0.41	0.408	0.502	0.414	-0.222	S
H3		0.16	0.154	0.211	0.161	-0.315	S
H4		0.14	0.128	0.196	0.208	-0.268	S
H1	Ni <i>µg/l</i>	0.26	0.258	0.277	0.079	-0.212	S
H2		0.17	0.17	0.186	0.072	-0.23	S
H3		0.15	0.126	0.134	0.072	0.228	S
H4		0.15	0.159	0.166	0.057	-0.289	S
H1	Pb <i>µg/l</i>	0.673	0.688	0.67	0.077	0.043	S
H2		0.437	0.442	0.444	0.076	-0.094	S
H3		0.347	0.35	0.358	0.053	-0.214	S
H4		0.394	0.391	0.396	0.052	-0.036	S
H1	Zn <i>µg/l</i>	2.27	2.15	2.158	0.598	0.187	S
H2		2.18	2.04	2.374	0.542	-0.359	S
H3		1.88	1.68	1.824	0.577	0.096	S
H4		2.09	1.87	1.962	0.466	0.275	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.033	0.034	0.038	0.022	-0.202	S
H2		0.019	0.02	0.024	0.013	-0.381	S
H3		0.01	0.011	0.014	0.008	-0.597	S
H4		0.008	0.01	0.014	0.01	-0.536	S
H1	Cr <i>µg/l</i>	0.334	0.387	0.382	0.059	-0.816	S
H2		0.218	0.238	0.243	0.029	-0.858	S
H3		0.072	0.07	0.08	0.034	-0.247	S
H4		0.091	0.085	0.101	0.052	-0.194	S
H1	Cu <i>µg/l</i>	0.297	0.43	0.453	0.16	-0.979	Q
H2		0.299	0.408	0.502	0.414	-0.49	Q
H3		0.123	0.154	0.211	0.161	-0.545	S
H4		0.086	0.128	0.196	0.208	-0.529	Q
H1	Ni <i>µg/l</i>	0.229	0.258	0.277	0.079	-0.603	S
H2		0.188	0.17	0.186	0.072	0.021	S
H3		0.084	0.126	0.134	0.072	-0.692	Q
H4		0.104	0.159	0.166	0.057	-1.095	Q
H1	Pb <i>µg/l</i>	0.63	0.688	0.67	0.077	-0.518	S
H2		0.403	0.442	0.444	0.076	-0.541	S
H3		0.326	0.35	0.358	0.053	-0.606	S
H4		0.352	0.391	0.396	0.052	-0.845	S
H1	Zn <i>µg/l</i>	2.456	2.15	2.158	0.598	0.498	S
H2		2.893	2.04	2.374	0.542	0.958	Q
H3		2.055	1.68	1.824	0.577	0.4	S
H4		2.172	1.87	1.962	0.466	0.451	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.312	0.301	0.314	0.028	-0.085	S
H2		0.175	0.17	0.18	0.027	-0.173	S
H3		0.08	0.084	0.09	0.02	-0.519	S
H4		0.062	0.085	0.092	0.02	-1.479	Q
H1	Cd <i>µg/l</i>	0.034	0.034	0.038	0.022	-0.175	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.01	0.01	0.014	0.01	-0.35	S
H1	Cr <i>µg/l</i>	0.383	0.387	0.382	0.059	0.022	S
H2		0.233	0.238	0.243	0.029	-0.335	S
H3		0.069	0.07	0.08	0.034	-0.335	S
H4		0.084	0.085	0.101	0.052	-0.337	S
H1	Cu <i>µg/l</i>	0.444	0.43	0.453	0.16	-0.059	S
H2		0.444	0.408	0.502	0.414	-0.139	S
H3		0.154	0.154	0.211	0.161	-0.353	S
H4		0.141	0.128	0.196	0.208	-0.264	S
H1	Ni <i>µg/l</i>	0.257	0.258	0.277	0.079	-0.25	S
H2		0.173	0.17	0.186	0.072	-0.188	S
H3		0.121	0.126	0.134	0.072	-0.176	S
H4		0.185	0.159	0.166	0.057	0.324	S
H1	Pb <i>µg/l</i>	0.723	0.688	0.67	0.077	0.695	S
H2		0.463	0.442	0.444	0.076	0.248	S
H3		0.358	0.35	0.358	0.053	-0.008	S
H4		0.398	0.391	0.396	0.052	0.041	S
H1	Zn <i>µg/l</i>	2.32	2.15	2.158	0.598	0.27	S
H2		2.99	2.04	2.374	0.542	1.137	Q
H3		1.7	1.68	1.824	0.577	-0.216	S
H4		2.02	1.87	1.962	0.466	0.125	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.02	0.034	0.038	0.022	-0.817	Q
H2		-999	0.02	0.024	0.013		B
H3		0.008	0.011	0.014	0.008	-0.828	Q
H4		0.008	0.01	0.014	0.01	-0.517	S
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.431	0.43	0.453	0.16	-0.14	S
H2		-999	0.408	0.502	0.414		B
H3		0.159	0.154	0.211	0.161	-0.322	S
H4		0.166	0.128	0.196	0.208	-0.143	Q
H1	Ni <i>µg/l</i>	-999	0.258	0.277	0.079		B
H2		-999	0.17	0.186	0.072		B
H3		-999	0.126	0.134	0.072		B
H4		-999	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.672	0.688	0.67	0.077	0.03	S
H2		-999	0.442	0.444	0.076		B
H3		0.494	0.35	0.358	0.053	2.537	Q
H4		0.451	0.391	0.396	0.052	1.063	S
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.324	0.301	0.314	0.028	0.341	S
H2		0.219	0.17	0.18	0.027	1.465	Q
H3		0.069	0.084	0.09	0.02	-1.064	S
H4		0.074	0.085	0.092	0.02	-0.88	S
H1	Cd <i>µg/l</i>	0.039	0.034	0.038	0.022	0.049	S
H2		0.038	0.02	0.024	0.013	1.028	U
H3		< 0.030	0.011	0.014	0.008		B
H4		< 0.030	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	< 0.500	0.387	0.382	0.059		B
H2		< 0.500	0.238	0.243	0.029		B
H3		< 0.500	0.07	0.08	0.034		B
H4		< 0.500	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 0.500	0.258	0.277	0.079		B
H2		< 0.500	0.17	0.186	0.072		B
H3		< 0.500	0.126	0.134	0.072		B
H4		< 0.500	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.606	0.688	0.67	0.077	-0.832	S
H2		0.424	0.442	0.444	0.076	-0.265	S
H3		0.336	0.35	0.358	0.053	-0.419	S
H4		0.376	0.391	0.396	0.052	-0.383	S
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.272	0.301	0.314	0.028	-1.504	S
H2		0.353	0.17	0.18	0.027	6.452	U
H3		0.231	0.084	0.09	0.02	6.962	U
H4		0.321	0.085	0.092	0.02	11.45	U
H1	Cd <i>µg/l</i>	0.033	0.034	0.038	0.022	-0.22	S
H2		0.027	0.02	0.024	0.013	0.199	Q
H3		0.032	0.011	0.014	0.008	2.281	U
H4		0.029	0.01	0.014	0.01	1.511	U
H1	Cr <i>µg/l</i>	0.305	0.387	0.382	0.059	-1.311	S
H2		0.239	0.238	0.243	0.029	-0.125	S
H3		0.169	0.07	0.08	0.034	2.587	U
H4		0.277	0.085	0.101	0.052	3.391	U
H1	Cu <i>µg/l</i>	0.374	0.43	0.453	0.16	-0.497	S
H2		0.383	0.408	0.502	0.414	-0.287	S
H3		0.302	0.154	0.211	0.161	0.564	U
H4		0.376	0.128	0.196	0.208	0.869	U
H1	Ni <i>µg/l</i>	0.312	0.258	0.277	0.079	0.444	S
H2		0.346	0.17	0.186	0.072	2.231	U
H3		0.301	0.126	0.134	0.072	2.331	U
H4		0.293	0.159	0.166	0.057	2.216	U
H1	Pb <i>µg/l</i>	0.512	0.688	0.67	0.077	-2.058	Q
H2		0.503	0.442	0.444	0.076	0.774	S
H3		0.609	0.35	0.358	0.053	4.689	U
H4		0.505	0.391	0.396	0.052	2.104	Q
H1	Zn <i>µg/l</i>	1.903	2.15	2.158	0.598	-0.427	S
H2		2.121	2.04	2.374	0.542	-0.468	S
H3		1.426	1.68	1.824	0.577	-0.691	S
H4		1.645	1.87	1.962	0.466	-0.679	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 32, Center for Physical Sciences and Technology (Lithuania)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm [†]
H1	As <i>µg/l</i>	0.268	0.301	0.314	0.028	-1.646	S
H2		0.186	0.17	0.18	0.027	0.237	S
H3		0.102	0.084	0.09	0.02	0.571	S
H4		0.081	0.085	0.092	0.02	-0.531	S
H1	Cd <i>µg/l</i>	0.031	0.034	0.038	0.022	-0.31	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		0.02	0.011	0.014	0.008	0.74	U
H4		0.029	0.01	0.014	0.01	1.511	U
H1	Cr <i>µg/l</i>	0.397	0.387	0.382	0.059	0.261	S
H2		0.22	0.238	0.243	0.029	-0.788	S
H3		0.142	0.07	0.08	0.034	1.798	U
H4		0.124	0.085	0.101	0.052	0.436	Q
H1	Cu <i>µg/l</i>	0.591	0.43	0.453	0.16	0.861	Q
H2		0.496	0.408	0.502	0.414	-0.014	S
H3		0.248	0.154	0.211	0.161	0.23	U
H4		0.485	0.128	0.196	0.208	1.394	U
H1	Ni <i>µg/l</i>	-999	0.258	0.277	0.079		B
H2		-999	0.17	0.186	0.072		B
H3		-999	0.126	0.134	0.072		B
H4		-999	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.951	0.688	0.67	0.077	3.67	Q
H2		0.452	0.442	0.444	0.076	0.103	S
H3		0.358	0.35	0.358	0.053	-0.008	S
H4		0.429	0.391	0.396	0.052	0.639	S
H1	Zn <i>µg/l</i>	2.91	2.15	2.158	0.598	1.257	Q
H2		2.78	2.04	2.374	0.542	0.749	Q
H3		2.91	1.68	1.824	0.577	1.882	U
H4		3.66	1.87	1.962	0.466	3.641	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.29	0.301	0.314	0.028	-0.865	S
H2		0.168	0.17	0.18	0.027	-0.433	S
H3		0.087	0.084	0.09	0.02	-0.172	S
H4		0.087	0.085	0.092	0.02	-0.231	S
H1	Cd <i>µg/l</i>	0.04	0.034	0.038	0.022	0.094	S
H2		0.034	0.02	0.024	0.013	0.727	U
H3		0.018	0.011	0.014	0.008	0.483	U
H4		0.014	0.01	0.014	0.01	0.042	Q
H1	Cr <i>µg/l</i>	0.363	0.387	0.382	0.059	-0.32	S
H2		0.309	0.238	0.243	0.029	2.316	Q
H3		0.083	0.07	0.08	0.034	0.074	S
H4		0.083	0.085	0.101	0.052	-0.356	S
H1	Cu <i>µg/l</i>	0.696	0.43	0.453	0.16	1.518	U
H2		2.117	0.408	0.502	0.414	3.904	U
H3		0.702	0.154	0.211	0.161	3.042	U
H4		0.138	0.128	0.196	0.208	-0.278	S
H1	Ni <i>µg/l</i>	0.217	0.258	0.277	0.079	-0.754	S
H2		0.359	0.17	0.186	0.072	2.412	U
H3		0.127	0.126	0.134	0.072	-0.093	S
H4		0.118	0.159	0.166	0.057	-0.849	Q
H1	Pb <i>µg/l</i>	0.772	0.688	0.67	0.077	1.335	S
H2		1.217	0.442	0.444	0.076	10.162	U
H3		0.761	0.35	0.358	0.053	7.533	U
H4		0.332	0.391	0.396	0.052	-1.231	S
H1	Zn <i>µg/l</i>	2.304	2.15	2.158	0.598	0.244	S
H2		4.766	2.04	2.374	0.542	4.416	U
H3		2.85	1.68	1.824	0.577	1.778	U
H4		1.803	1.87	1.962	0.466	-0.34	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.339	0.301	0.314	0.028	0.873	S
H2		0.174	0.17	0.18	0.027	-0.21	S
H3		0.074	0.084	0.09	0.02	-0.816	S
H4		0.069	0.085	0.092	0.02	-1.13	S
H1	Cd <i>µg/l</i>	0.03	0.034	0.038	0.022	-0.355	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.025	0.011	0.014	0.008	1.382	U
H4		0.029	0.01	0.014	0.01	1.511	U
H1	Cr <i>µg/l</i>	0.28	0.387	0.382	0.059	-1.739	Q
H2		0.27	0.238	0.243	0.029	0.956	S
H3		0.03	0.07	0.08	0.034	-1.475	U
H4		0.22	0.085	0.101	0.052	2.29	U
H1	Cu <i>µg/l</i>	0.5	0.43	0.453	0.16	0.292	S
H2		0.42	0.408	0.502	0.414	-0.197	S
H3		0.45	0.154	0.211	0.161	1.481	U
H4		0.3	0.128	0.196	0.208	0.502	U
H1	Ni <i>µg/l</i>	0.22	0.258	0.277	0.079	-0.716	S
H2		0.39	0.17	0.186	0.072	2.846	U
H3		0.42	0.126	0.134	0.072	3.989	U
H4		0.3	0.159	0.166	0.057	2.338	U
H1	Pb <i>µg/l</i>	0.45	0.688	0.67	0.077	-2.867	Q
H2		1	0.442	0.444	0.076	7.309	U
H3		0.365	0.35	0.358	0.053	0.123	S
H4		0.75	0.391	0.396	0.052	6.828	U
H1	Zn <i>µg/l</i>	1.449	2.15	2.158	0.598	-1.186	Q
H2		2.296	2.04	2.374	0.542	-0.144	S
H3		1.282	1.68	1.824	0.577	-0.94	S
H4		1.249	1.87	1.962	0.466	-1.528	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.338	0.301	0.314	0.028	0.838	S
H2		0.19	0.17	0.18	0.027	0.386	S
H3		0.094	0.084	0.09	0.02	0.175	S
H4		0.096	0.085	0.092	0.02	0.218	S
H1	Cd <i>µg/l</i>	0.037	0.034	0.038	0.022	-0.041	S
H2		0.022	0.02	0.024	0.013	-0.178	S
H3		0.012	0.011	0.014	0.008	-0.288	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.276	0.258	0.277	0.079	-0.01	S
H2		0.195	0.17	0.186	0.072	0.119	S
H3		0.142	0.126	0.134	0.072	0.116	S
H4		0.188	0.159	0.166	0.057	0.377	S
H1	Pb <i>µg/l</i>	0.707	0.688	0.67	0.077	0.486	S
H2		0.459	0.442	0.444	0.076	0.195	S
H3		0.363	0.35	0.358	0.053	0.086	S
H4		0.409	0.391	0.396	0.052	0.254	S
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.29	0.301	0.314	0.028	-0.865	S
H2		0.164	0.17	0.18	0.027	-0.582	S
H3		< 0.100	0.084	0.09	0.02		B
H4		< 0.100	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.13	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		< 0.020	0.011	0.014	0.008		B
H4		< 0.020	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.383	0.387	0.382	0.059	0.022	S
H2		< 0.300	0.238	0.243	0.029		B
H3		< 0.300	0.07	0.08	0.034		B
H4		< 0.300	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.41	0.43	0.453	0.16	-0.272	S
H2		0.394	0.408	0.502	0.414	-0.26	S
H3		< 0.300	0.154	0.211	0.161		B
H4		< 0.300	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.3	0.258	0.277	0.079	0.293	S
H2		< 0.300	0.17	0.186	0.072		B
H3		< 0.300	0.126	0.134	0.072		B
H4		< 0.300	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.662	0.688	0.67	0.077	-0.101	S
H2		0.424	0.442	0.444	0.076	-0.265	S
H3		0.338	0.35	0.358	0.053	-0.382	S
H4		0.371	0.391	0.396	0.052	-0.479	S
H1	Zn <i>µg/l</i>	1.98	2.15	2.158	0.598	-0.298	S
H2		1.89	2.04	2.374	0.542	-0.894	S
H3		1.61	1.68	1.824	0.577	-0.372	S
H4		1.68	1.87	1.962	0.466	-0.604	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 41, Micro Pollutants Technology (France)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	E MEP quality norm [†]
H1	As <i>µg/l</i>	0.298	0.301	0.314	0.028	-0.581	S
H2		0.189	0.17	0.18	0.027	0.348	S
H3		< 0.100	0.084	0.09	0.02		B
H4		< 0.100	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.100	0.034	0.038	0.022		B
H2		< 0.100	0.02	0.024	0.013		B
H3		< 0.100	0.011	0.014	0.008		B
H4		< 0.100	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	< 0.500	0.387	0.382	0.059		B
H2		< 0.500	0.238	0.243	0.029		B
H3		< 0.500	0.07	0.08	0.034		B
H4		< 0.500	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	< 0.500	0.43	0.453	0.16		B
H2		< 0.500	0.408	0.502	0.414		B
H3		< 0.500	0.154	0.211	0.161		B
H4		< 0.500	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 0.500	0.258	0.277	0.079		B
H2		< 0.500	0.17	0.186	0.072		B
H3		< 0.500	0.126	0.134	0.072		B
H4		< 0.500	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.685	0.688	0.67	0.077	0.199	S
H2		0.435	0.442	0.444	0.076	-0.12	S
H3		0.338	0.35	0.358	0.053	-0.382	S
H4		0.389	0.391	0.396	0.052	-0.132	S
H1	Zn <i>µg/l</i>	2.47	2.15	2.158	0.598	0.521	S
H2		2.53	2.04	2.374	0.542	0.288	S
H3		1.92	1.68	1.824	0.577	0.166	S
H4		2.24	1.87	1.962	0.466	0.597	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.309	0.301	0.314	0.028	-0.191	S
H2		0.108	0.17	0.18	0.027	-2.666	Q
H3		0.087	0.084	0.09	0.02	-0.172	S
H4		0.121	0.085	0.092	0.02	1.466	Q
H1	Cd <i>µg/l</i>	0.047	0.034	0.038	0.022	0.408	Q
H2		0.025	0.02	0.024	0.013	0.048	S
H3		0.018	0.011	0.014	0.008	0.483	U
H4		0.006	0.01	0.014	0.01	-0.742	Q
H1	Cr <i>µg/l</i>	0.375	0.387	0.382	0.059	-0.115	S
H2		0.195	0.238	0.243	0.029	-1.66	S
H3		0.034	0.07	0.08	0.034	-1.358	U
H4		0.05	0.085	0.101	0.052	-0.993	Q
H1	Cu <i>µg/l</i>	0.277	0.43	0.453	0.16	-1.104	Q
H2		0.293	0.408	0.502	0.414	-0.504	Q
H3		0.068	0.154	0.211	0.161	-0.885	U
H4		0.057	0.128	0.196	0.208	-0.668	U
H1	Ni <i>µg/l</i>	0.258	0.258	0.277	0.079	-0.237	S
H2		0.138	0.17	0.186	0.072	-0.678	S
H3		0.097	0.126	0.134	0.072	-0.511	S
H4		0.237	0.159	0.166	0.057	1.235	Q
H1	Pb <i>µg/l</i>	0.614	0.688	0.67	0.077	-0.727	S
H2		0.367	0.442	0.444	0.076	-1.014	S
H3		0.292	0.35	0.358	0.053	-1.243	S
H4		0.329	0.391	0.396	0.052	-1.289	S
H1	Zn <i>µg/l</i>	0.371	2.15	2.158	0.598	-2.988	U
H2		0.302	2.04	2.374	0.542	-3.826	U
H3		0.25	1.68	1.824	0.577	-2.729	U
H4		0.873	1.87	1.962	0.466	-2.334	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.308	0.301	0.314	0.028	-0.227	S
H2		0.167	0.17	0.18	0.027	-0.47	S
H3		0.083	0.084	0.09	0.02	-0.37	S
H4		0.08	0.085	0.092	0.02	-0.581	S
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.13	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.384	0.387	0.382	0.059	0.039	S
H2		0.234	0.238	0.243	0.029	-0.3	S
H3		0.082	0.07	0.08	0.034	0.045	S
H4		0.086	0.085	0.101	0.052	-0.298	S
H1	Cu <i>µg/l</i>	0.424	0.43	0.453	0.16	-0.184	S
H2		0.393	0.408	0.502	0.414	-0.263	S
H3		0.143	0.154	0.211	0.161	-0.421	S
H4		0.145	0.128	0.196	0.208	-0.244	S
H1	Ni <i>µg/l</i>	0.263	0.258	0.277	0.079	-0.174	S
H2		0.179	0.17	0.186	0.072	-0.104	S
H3		0.126	0.126	0.134	0.072	-0.107	S
H4		0.205	0.159	0.166	0.057	0.675	Q
H1	Pb <i>µg/l</i>	0.687	0.688	0.67	0.077	0.225	S
H2		0.419	0.442	0.444	0.076	-0.331	S
H3		0.336	0.35	0.358	0.053	-0.419	S
H4		0.388	0.391	0.396	0.052	-0.151	S
H1	Zn <i>µg/l</i>	2.01	2.15	2.158	0.598	-0.248	S
H2		1.89	2.04	2.374	0.542	-0.894	S
H3		1.49	1.68	1.824	0.577	-0.58	S
H4		1.82	1.87	1.962	0.466	-0.303	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

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 *	E MEP quality norm [†]
H1	As <i>µg/l</i>	0.293	0.301	0.314	0.028	-0.759	S
H2		0.162	0.17	0.18	0.027	-0.656	S
H3		0.08	0.084	0.09	0.02	-0.519	S
H4		0.081	0.085	0.092	0.02	-0.531	S
H1	Cd <i>µg/l</i>	0.034	0.034	0.038	0.022	-0.175	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.38	0.387	0.382	0.059	-0.029	S
H2		0.23	0.238	0.243	0.029	-0.439	S
H3		0.061	0.07	0.08	0.034	-0.569	S
H4		0.078	0.085	0.101	0.052	-0.452	S
H1	Cu <i>µg/l</i>	0.423	0.43	0.453	0.16	-0.19	S
H2		0.395	0.408	0.502	0.414	-0.258	S
H3		0.152	0.154	0.211	0.161	-0.365	S
H4		0.135	0.128	0.196	0.208	-0.292	S
H1	Ni <i>µg/l</i>	0.257	0.258	0.277	0.079	-0.25	S
H2		0.159	0.17	0.186	0.072	-0.384	S
H3		0.118	0.126	0.134	0.072	-0.218	S
H4		0.143	0.159	0.166	0.057	-0.411	S
H1	Pb <i>µg/l</i>	0.721	0.688	0.67	0.077	0.669	S
H2		0.459	0.442	0.444	0.076	0.195	S
H3		0.36	0.35	0.358	0.053	0.03	S
H4		0.412	0.391	0.396	0.052	0.311	S
H1	Zn <i>µg/l</i>	2.355	2.15	2.158	0.598	0.329	S
H2		2.339	2.04	2.374	0.542	-0.065	S
H3		1.921	1.68	1.824	0.577	0.167	S
H4		2.127	1.87	1.962	0.466	0.355	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 49, The Cyprus Institute (Cyl) (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 <i>µg/l</i>	0.522	0.301	0.314	0.028	7.367	U
H2		0.272	0.17	0.18	0.027	3.437	U
H3		0.14	0.084	0.09	0.02	2.454	U
H4		0.144	0.085	0.092	0.02	2.614	U
H1	Cd <i>µg/l</i>	0.045	0.034	0.038	0.022	0.318	Q
H2		0.026	0.02	0.024	0.013	0.124	Q
H3		0.012	0.011	0.014	0.008	-0.288	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.358	0.387	0.382	0.059	-0.405	S
H2		0.218	0.238	0.243	0.029	-0.858	S
H3		0.106	0.07	0.08	0.034	0.746	U
H4		0.07	0.085	0.101	0.052	-0.607	S
H1	Cu <i>µg/l</i>	0.48	0.43	0.453	0.16	0.166	S
H2		0.437	0.408	0.502	0.414	-0.156	S
H3		0.177	0.154	0.211	0.161	-0.21	S
H4		0.152	0.128	0.196	0.208	-0.211	S
H1	Ni <i>µg/l</i>	0.225	0.258	0.277	0.079	-0.653	S
H2		0.134	0.17	0.186	0.072	-0.734	S
H3		0.1	0.126	0.134	0.072	-0.469	S
H4		0.101	0.159	0.166	0.057	-1.147	Q
H1	Pb <i>µg/l</i>	0.564	0.688	0.67	0.077	-1.38	S
H2		0.311	0.442	0.444	0.076	-1.751	Q
H3		0.228	0.35	0.358	0.053	-2.44	Q
H4		0.271	0.391	0.396	0.052	-2.407	Q
H1	Zn <i>µg/l</i>	5.146	2.15	2.158	0.598	4.995	U
H2		4.322	2.04	2.374	0.542	3.596	U
H3		4.098	1.68	1.824	0.577	3.941	U
H4		3.981	1.87	1.962	0.466	4.329	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.315	0.301	0.314	0.028	0.022	S
H2		0.172	0.17	0.18	0.027	-0.284	S
H3		0.082	0.084	0.09	0.02	-0.42	S
H4		0.082	0.085	0.092	0.02	-0.481	S
H1	Cd <i>µg/l</i>	0.031	0.034	0.038	0.022	-0.31	S
H2		0.015	0.02	0.024	0.013	-0.705	Q
H3		0.008	0.011	0.014	0.008	-0.802	Q
H4		0.006	0.01	0.014	0.01	-0.742	Q
H1	Cr <i>µg/l</i>	0.376	0.387	0.382	0.059	-0.098	S
H2		0.226	0.238	0.243	0.029	-0.579	S
H3		< 0.100	0.07	0.08	0.034		B
H4		< 0.100	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.426	0.43	0.453	0.16	-0.172	S
H2		0.403	0.408	0.502	0.414	-0.238	S
H3		0.149	0.154	0.211	0.161	-0.384	S
H4		0.132	0.128	0.196	0.208	-0.307	S
H1	Ni <i>µg/l</i>	0.285	0.258	0.277	0.079	0.104	S
H2		0.22	0.17	0.186	0.072	0.469	Q
H3		0.145	0.126	0.134	0.072	0.158	S
H4		0.169	0.159	0.166	0.057	0.044	S
H1	Pb <i>µg/l</i>	0.703	0.688	0.67	0.077	0.434	S
H2		0.443	0.442	0.444	0.076	-0.015	S
H3		0.352	0.35	0.358	0.053	-0.12	S
H4		0.389	0.391	0.396	0.052	-0.132	S
H1	Zn <i>µg/l</i>	3.02	2.15	2.158	0.598	1.441	Q
H2		3.07	2.04	2.374	0.542	1.285	U
H3		2.396	1.68	1.824	0.577	0.991	Q
H4		2.424	1.87	1.962	0.466	0.991	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 53, ARPA UMBRIA multisite laboratory (Italy)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	E MEP quality norm [†]
H1	As <i>µg/l</i>	0.335	0.301	0.314	0.028	0.731	S
H2		0.18	0.17	0.18	0.027	0.013	S
H3		0.095	0.084	0.09	0.02	0.224	S
H4		0.098	0.085	0.092	0.02	0.318	S
H1	Cd <i>µg/l</i>	0.032	0.034	0.038	0.022	-0.265	S
H2		0.024	0.02	0.024	0.013	-0.027	S
H3		0.009	0.011	0.014	0.008	-0.674	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.388	0.387	0.382	0.059	0.107	S
H2		0.235	0.238	0.243	0.029	-0.265	S
H3		0.081	0.07	0.08	0.034	0.016	S
H4		0.083	0.085	0.101	0.052	-0.356	S
H1	Cu <i>µg/l</i>	0.398	0.43	0.453	0.16	-0.347	S
H2		0.393	0.408	0.502	0.414	-0.263	S
H3		0.151	0.154	0.211	0.161	-0.371	S
H4		0.129	0.128	0.196	0.208	-0.321	S
H1	Ni <i>µg/l</i>	0.266	0.258	0.277	0.079	-0.136	S
H2		0.171	0.17	0.186	0.072	-0.216	S
H3		0.136	0.126	0.134	0.072	0.033	S
H4		0.159	0.159	0.166	0.057	-0.131	S
H1	Pb <i>µg/l</i>	0.633	0.688	0.67	0.077	-0.479	S
H2		0.417	0.442	0.444	0.076	-0.357	S
H3		0.361	0.35	0.358	0.053	0.048	S
H4		0.365	0.391	0.396	0.052	-0.595	S
H1	Zn <i>µg/l</i>	1.687	2.15	2.158	0.598	-0.788	S
H2		1.667	2.04	2.374	0.542	-1.306	S
H3		1.342	1.68	1.824	0.577	-0.836	S
H4		1.553	1.87	1.962	0.466	-0.876	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.302	0.301	0.314	0.028	-0.44	S
H2		< 0.200	0.17	0.18	0.027		B
H3		< 0.200	0.084	0.09	0.02		B
H4		< 0.200	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.13	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		< 0.020	0.011	0.014	0.008		B
H4		< 0.020	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.366	0.387	0.382	0.059	-0.269	S
H2		0.225	0.238	0.243	0.029	-0.614	S
H3		< 0.100	0.07	0.08	0.034		B
H4		< 0.100	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.395	0.43	0.453	0.16	-0.366	S
H2		0.36	0.408	0.502	0.414	-0.342	S
H3		< 0.200	0.154	0.211	0.161		B
H4		< 0.200	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.205	0.258	0.277	0.079	-0.906	S
H2		< 0.200	0.17	0.186	0.072		B
H3		< 0.200	0.126	0.134	0.072		B
H4		< 0.200	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.675	0.688	0.67	0.077	0.069	S
H2		0.417	0.442	0.444	0.076	-0.357	S
H3		0.32	0.35	0.358	0.053	-0.719	S
H4		0.355	0.391	0.396	0.052	-0.788	S
H1	Zn <i>µg/l</i>	1.87	2.15	2.158	0.598	-0.482	S
H2		1.8	2.04	2.374	0.542	-1.06	S
H3		1.54	1.68	1.824	0.577	-0.493	S
H4		1.7	1.87	1.962	0.466	-0.561	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.32	0.301	0.314	0.028	0.199	S
H2		0.181	0.17	0.18	0.027	0.051	S
H3		0.088	0.084	0.09	0.02	-0.123	S
H4		0.085	0.085	0.092	0.02	-0.331	S
H1	Cd <i>µg/l</i>	0.036	0.034	0.038	0.022	-0.063	S
H2		0.021	0.02	0.024	0.013	-0.215	S
H3		0.011	0.011	0.014	0.008	-0.353	S
H4		0.01	0.01	0.014	0.01	-0.321	S
H1	Cr <i>µg/l</i>	0.357	0.387	0.382	0.059	-0.423	S
H2		0.218	0.238	0.243	0.029	-0.858	S
H3		0.067	0.07	0.08	0.034	-0.385	S
H4		0.081	0.085	0.101	0.052	-0.398	S
H1	Cu <i>µg/l</i>	0.416	0.43	0.453	0.16	-0.234	S
H2		0.39	0.408	0.502	0.414	-0.27	S
H3		0.153	0.154	0.211	0.161	-0.359	S
H4		0.135	0.128	0.196	0.208	-0.292	S
H1	Ni <i>µg/l</i>	0.319	0.258	0.277	0.079	0.532	S
H2		0.158	0.17	0.186	0.072	-0.398	S
H3		0.117	0.126	0.134	0.072	-0.232	S
H4		0.126	0.159	0.166	0.057	-0.709	S
H1	Pb <i>µg/l</i>	0.67	0.688	0.67	0.077	0.004	S
H2		0.43	0.442	0.444	0.076	-0.186	S
H3		0.341	0.35	0.358	0.053	-0.326	S
H4		0.383	0.391	0.396	0.052	-0.248	S
H1	Zn <i>µg/l</i>	2.43	2.15	2.158	0.598	0.454	S
H2		2.326	2.04	2.374	0.542	-0.089	S
H3		1.913	1.68	1.824	0.577	0.153	S
H4		2.137	1.87	1.962	0.466	0.376	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 115, Bayerische Landesanstalt für Wald- und Forstwirtschaft (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 <i>µg/l</i>	0.342	0.301	0.314	0.028	0.98	S
H2		0.174	0.17	0.18	0.027	-0.21	S
H3		0.081	0.084	0.09	0.02	-0.47	S
H4		0.101	0.085	0.092	0.02	0.467	S
H1	Cd <i>µg/l</i>	0.037	0.034	0.038	0.022	-0.041	S
H2		0.024	0.02	0.024	0.013	-0.027	S
H3		0.012	0.011	0.014	0.008	-0.288	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.422	0.387	0.382	0.059	0.689	S
H2		0.257	0.238	0.243	0.029	0.502	S
H3		0.07	0.07	0.08	0.034	-0.306	S
H4		0.086	0.085	0.101	0.052	-0.298	S
H1	Cu <i>µg/l</i>	0.482	0.43	0.453	0.16	0.179	S
H2		0.441	0.408	0.502	0.414	-0.147	S
H3		0.159	0.154	0.211	0.161	-0.322	S
H4		0.138	0.128	0.196	0.208	-0.278	S
H1	Ni <i>µg/l</i>	0.278	0.258	0.277	0.079	0.015	S
H2		0.203	0.17	0.186	0.072	0.231	S
H3		0.132	0.126	0.134	0.072	-0.023	S
H4		0.146	0.159	0.166	0.057	-0.359	S
H1	Pb <i>µg/l</i>	0.7	0.688	0.67	0.077	0.395	S
H2		0.449	0.442	0.444	0.076	0.064	S
H3		0.356	0.35	0.358	0.053	-0.045	S
H4		0.391	0.391	0.396	0.052	-0.093	S
H1	Zn <i>µg/l</i>	2.39	2.15	2.158	0.598	0.387	S
H2		2.33	2.04	2.374	0.542	-0.082	S
H3		1.9	1.68	1.824	0.577	0.131	S
H4		1.93	1.87	1.962	0.466	-0.068	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 117, SBS Standortserkundung/Bodenmonitoring (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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.025	0.034	0.038	0.022	-0.579	Q
H2		< 0.016	0.02	0.024	0.013	-1.233	U
H3		< 0.016	0.011	0.014	0.008		B
H4		< 0.016	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	< 0.500	0.387	0.382	0.059		B
H2		< 0.500	0.238	0.243	0.029		B
H3		< 0.500	0.07	0.08	0.034		B
H4		< 0.500	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.4	0.43	0.453	0.16	-0.334	S
H2		0.35	0.408	0.502	0.414	-0.367	S
H3		0.52	0.154	0.211	0.161	1.914	U
H4		0.12	0.128	0.196	0.208	-0.365	S
H1	Ni <i>µg/l</i>	< 0.500	0.258	0.277	0.079		B
H2		< 0.500	0.17	0.186	0.072		B
H3		< 0.500	0.126	0.134	0.072		B
H4		< 0.500	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	0.71	0.688	0.67	0.077	0.525	S
H2		0.46	0.442	0.444	0.076	0.208	S
H3		0.34	0.35	0.358	0.053	-0.345	S
H4		0.36	0.391	0.396	0.052	-0.691	S
H1	Zn <i>µg/l</i>	2.9	2.15	2.158	0.598	1.24	Q
H2		3	2.04	2.374	0.542	1.155	Q
H3		2.7	1.68	1.824	0.577	1.518	U
H4		2.8	1.87	1.962	0.466	1.798	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.305	0.301	0.314	0.028	-0.333	S
H2		0.159	0.17	0.18	0.027	-0.768	S
H3		0.089	0.084	0.09	0.02	-0.073	S
H4		0.085	0.085	0.092	0.02	-0.331	S
H1	Cd <i>µg/l</i>	0.034	0.034	0.038	0.022	-0.175	S
H2		0.018	0.02	0.024	0.013	-0.479	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.011	0.01	0.014	0.01	-0.252	S
H1	Cr <i>µg/l</i>	0.403	0.387	0.382	0.059	0.364	S
H2		0.249	0.238	0.243	0.029	0.223	S
H3		0.071	0.07	0.08	0.034	-0.277	S
H4		0.086	0.085	0.101	0.052	-0.298	S
H1	Cu <i>µg/l</i>	0.061	0.43	0.453	0.16	-2.456	U
H2		0.01	0.408	0.502	0.414	-1.188	U
H3		0.01	0.154	0.211	0.161	-1.245	U
H4		0.01	0.128	0.196	0.208	-0.895	U
H1	Ni <i>µg/l</i>	0.225	0.258	0.277	0.079	-0.653	S
H2		0.124	0.17	0.186	0.072	-0.873	Q
H3		0.088	0.126	0.134	0.072	-0.636	Q
H4		0.28	0.159	0.166	0.057	1.988	U
H1	Pb <i>µg/l</i>	0.489	0.688	0.67	0.077	-2.358	Q
H2		0.257	0.442	0.444	0.076	-2.461	Q
H3		0.156	0.35	0.358	0.053	-3.788	U
H4		0.2	0.391	0.396	0.052	-3.776	Q
H1	Zn <i>µg/l</i>	2.91	2.15	2.158	0.598	1.257	Q
H2		2.72	2.04	2.374	0.542	0.638	Q
H3		2.28	1.68	1.824	0.577	0.79	Q
H4		2.47	1.87	1.962	0.466	1.09	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.596	0.301	0.314	0.028	9.993	U
H2		< 0.200	0.17	0.18	0.027		B
H3		< 0.200	0.084	0.09	0.02		B
H4		< 0.200	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.050	0.034	0.038	0.022		B
H2		< 0.050	0.02	0.024	0.013		B
H3		< 0.050	0.011	0.014	0.008		B
H4		< 0.050	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.421	0.387	0.382	0.059	0.671	S
H2		< 0.250	0.238	0.243	0.029		B
H3		< 0.250	0.07	0.08	0.034		B
H4		< 0.250	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.444	0.43	0.453	0.16	-0.059	S
H2		0.447	0.408	0.502	0.414	-0.132	S
H3		< 0.200	0.154	0.211	0.161		B
H4		< 0.200	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.323	0.258	0.277	0.079	0.583	Q
H2		0.174	0.17	0.186	0.072	-0.174	S
H3		< 0.150	0.126	0.134	0.072		B
H4		0.162	0.159	0.166	0.057	-0.079	S
H1	Pb <i>µg/l</i>	0.596	0.688	0.67	0.077	-0.962	S
H2		0.367	0.442	0.444	0.076	-1.014	S
H3		0.291	0.35	0.358	0.053	-1.261	S
H4		0.328	0.391	0.396	0.052	-1.308	S
H1	Zn <i>µg/l</i>	1.73	2.15	2.158	0.598	-0.716	S
H2		1.54	2.04	2.374	0.542	-1.54	S
H3		1.12	1.68	1.824	0.577	-1.221	Q
H4		1.32	1.87	1.962	0.466	-1.375	Q

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 125, Bayerisches Landesamt für Umwelt, Augsburg (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 <i>µg/l</i>	0.333	0.301	0.314	0.028	0.661	S
H2		0.19	0.17	0.18	0.027	0.386	S
H3		0.1	0.084	0.09	0.02	0.472	S
H4		0.124	0.085	0.092	0.02	1.616	Q
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.13	S
H2		0.019	0.02	0.024	0.013	-0.381	S
H3		0.011	0.011	0.014	0.008	-0.365	S
H4		0.011	0.01	0.014	0.01	-0.233	S
H1	Cr <i>µg/l</i>	0.391	0.387	0.382	0.059	0.159	S
H2		0.242	0.238	0.243	0.029	-0.021	S
H3		0.072	0.07	0.08	0.034	-0.25	S
H4		0.084	0.085	0.101	0.052	-0.339	S
H1	Cu <i>µg/l</i>	0.447	0.43	0.453	0.16	-0.04	S
H2		0.409	0.408	0.502	0.414	-0.224	S
H3		0.161	0.154	0.211	0.161	-0.309	S
H4		0.128	0.128	0.196	0.208	-0.326	S
H1	Ni <i>µg/l</i>	0.266	0.258	0.277	0.079	-0.136	S
H2		0.179	0.17	0.186	0.072	-0.104	S
H3		0.123	0.126	0.134	0.072	-0.148	S
H4		0.136	0.159	0.166	0.057	-0.534	S
H1	Pb <i>µg/l</i>	0.718	0.688	0.67	0.077	0.63	S
H2		0.452	0.442	0.444	0.076	0.103	S
H3		0.373	0.35	0.358	0.053	0.273	S
H4		0.424	0.391	0.396	0.052	0.543	S
H1	Zn <i>µg/l</i>	2.32	2.15	2.158	0.598	0.27	S
H2		2.16	2.04	2.374	0.542	-0.396	S
H3		2.17	1.68	1.824	0.577	0.599	Q
H4		1.94	1.87	1.962	0.466	-0.046	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	13.6	0.034	0.038	0.022	608.753	U
H2		14.7	0.02	0.024	0.013	1106.224	U
H3		14.7	0.011	0.014	0.008	1886.881	U
H4		15.2	0.01	0.014	0.01	1487.651	U
H1	Cr <i>µg/l</i>	7.6	0.387	0.382	0.059	123.387	U
H2		25.5	0.238	0.243	0.029	881.048	U
H3		22.3	0.07	0.08	0.034	649.315	U
H4		24	0.085	0.101	0.052	461.545	U
H1	Cu <i>µg/l</i>	28.8	0.43	0.453	0.16	177.392	U
H2		27	0.408	0.502	0.414	64.046	U
H3		13.2	0.154	0.211	0.161	80.455	U
H4		20.6	0.128	0.196	0.208	98.302	U
H1	Ni <i>µg/l</i>	20.2	0.258	0.277	0.079	251.307	U
H2		6	0.17	0.186	0.072	81.283	U
H3		3.6	0.126	0.134	0.072	48.293	U
H4		< 1.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 5.000	0.688	0.67	0.077		B
H2		< 5.000	0.442	0.444	0.076		B
H3		< 5.000	0.35	0.358	0.053		B
H4		< 5.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	< 8.000	2.15	2.158	0.598		B
H2		< 8.000	2.04	2.374	0.542		B
H3		< 8.000	1.68	1.824	0.577		B
H4		< 8.000	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 145, Estonian Environmental Research Centre, Tartu laboratory (Estonia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm [†]
H1	As <i>µg/l</i>	0.303	0.301	0.314	0.028	-0.404	S
H2		0.182	0.17	0.18	0.027	0.088	S
H3		0.09	0.084	0.09	0.02	-0.009	S
H4		0.091	0.085	0.092	0.02	-0.007	S
H1	Cd <i>µg/l</i>	0.038	0.034	0.038	0.022	-0.014	S
H2		0.021	0.02	0.024	0.013	-0.253	S
H3		0.012	0.011	0.014	0.008	-0.288	S
H4		0.011	0.01	0.014	0.01	-0.301	S
H1	Cr <i>µg/l</i>	0.389	0.387	0.382	0.059	0.124	S
H2		0.244	0.238	0.243	0.029	0.049	S
H3		0.079	0.07	0.08	0.034	-0.04	S
H4		0.091	0.085	0.101	0.052	-0.196	S
H1	Cu <i>µg/l</i>	0.464	0.43	0.453	0.16	0.066	S
H2		0.428	0.408	0.502	0.414	-0.178	S
H3		0.161	0.154	0.211	0.161	-0.309	S
H4		0.145	0.128	0.196	0.208	-0.244	S
H1	Ni <i>µg/l</i>	0.263	0.258	0.277	0.079	-0.174	S
H2		0.18	0.17	0.186	0.072	-0.09	S
H3		0.137	0.126	0.134	0.072	0.047	S
H4		0.146	0.159	0.166	0.057	-0.359	S
H1	Pb <i>µg/l</i>	0.665	0.688	0.67	0.077	-0.062	S
H2		0.437	0.442	0.444	0.076	-0.094	S
H3		0.357	0.35	0.358	0.053	-0.026	S
H4		0.384	0.391	0.396	0.052	-0.228	S
H1	Zn <i>µg/l</i>	2.1	2.15	2.158	0.598	-0.097	S
H2		1.97	2.04	2.374	0.542	-0.746	S
H3		1.61	1.68	1.824	0.577	-0.372	S
H4		1.81	1.87	1.962	0.466	-0.325	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.294	0.301	0.314	0.028	-0.723	S
H2		< 0.251	0.17	0.18	0.027		B
H3		< 0.251	0.084	0.09	0.02		B
H4		< 0.251	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.036	0.034	0.038	0.022	-0.086	S
H2		< 0.026	0.02	0.024	0.013		B
H3		< 0.026	0.011	0.014	0.008		B
H4		< 0.026	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.367	0.387	0.382	0.059	-0.252	S
H2		0.226	0.238	0.243	0.029	-0.579	S
H3		< 0.101	0.07	0.08	0.034		B
H4		< 0.101	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.33	0.43	0.453	0.16	-0.772	S
H2		0.304	0.408	0.502	0.414	-0.478	Q
H3		< 0.101	0.154	0.211	0.161	-0.994	U
H4		< 0.101	0.128	0.196	0.208	-0.7	U
H1	Ni <i>µg/l</i>	0.261	0.258	0.277	0.079	-0.199	S
H2		0.155	0.17	0.186	0.072	-0.44	S
H3		0.129	0.126	0.134	0.072	-0.065	S
H4		0.381	0.159	0.166	0.057	3.757	U
H1	Pb <i>µg/l</i>	0.68	0.688	0.67	0.077	0.134	S
H2		0.433	0.442	0.444	0.076	-0.147	S
H3		0.346	0.35	0.358	0.053	-0.232	S
H4		0.378	0.391	0.396	0.052	-0.344	S
H1	Zn <i>µg/l</i>	2.16	2.15	2.158	0.598	0.003	S
H2		2.032	2.04	2.374	0.542	-0.632	S
H3		1.885	1.68	1.824	0.577	0.105	S
H4		1.889	1.87	1.962	0.466	-0.155	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.500	0.034	0.038	0.022		B
H2		< 0.500	0.02	0.024	0.013		B
H3		< 0.500	0.011	0.014	0.008		B
H4		< 0.500	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		< 9.000	0.408	0.502	0.414		B
H3		< 9.000	0.154	0.211	0.161		B
H4		< 9.000	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	-999	0.258	0.277	0.079		B
H2		-999	0.17	0.186	0.072		B
H3		-999	0.126	0.134	0.072		B
H4		-999	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 10.000	0.688	0.67	0.077		B
H2		< 10.000	0.442	0.444	0.076		B
H3		< 10.000	0.35	0.358	0.053		B
H4		< 10.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	2.331	2.15	2.158	0.598	0.289	S
H2		2.26	2.04	2.374	0.542	-0.211	S
H3		1.902	1.68	1.824	0.577	0.134	S
H4		2.192	1.87	1.962	0.466	0.494	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.301	0.301	0.314	0.028	-0.475	S
H2		0.151	0.17	0.18	0.027	-1.066	S
H3		0.072	0.084	0.09	0.02	-0.915	S
H4		0.074	0.085	0.092	0.02	-0.88	S
H1	Cd <i>µg/l</i>	0.035	0.034	0.038	0.022	-0.13	S
H2		0.02	0.02	0.024	0.013	-0.328	S
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.01	0.01	0.014	0.01	-0.35	S
H1	Cr <i>µg/l</i>	0.379	0.387	0.382	0.059	-0.046	S
H2		0.265	0.238	0.243	0.029	0.781	S
H3		< 0.105	0.07	0.08	0.034		B
H4		0.127	0.085	0.101	0.052	0.494	Q
H1	Cu <i>µg/l</i>	0.435	0.43	0.453	0.16	-0.115	S
H2		0.394	0.408	0.502	0.414	-0.26	S
H3		< 0.232	0.154	0.211	0.161		B
H4		< 0.232	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	0.249	0.258	0.277	0.079	-0.351	S
H2		0.158	0.17	0.186	0.072	-0.398	S
H3		0.126	0.126	0.134	0.072	-0.107	S
H4		0.124	0.159	0.166	0.057	-0.744	S
H1	Pb <i>µg/l</i>	0.677	0.688	0.67	0.077	0.095	S
H2		0.424	0.442	0.444	0.076	-0.265	S
H3		0.335	0.35	0.358	0.053	-0.438	S
H4		0.379	0.391	0.396	0.052	-0.325	S
H1	Zn <i>µg/l</i>	2.05	2.15	2.158	0.598	-0.181	S
H2		2.11	2.04	2.374	0.542	-0.488	S
H3		1.55	1.68	1.824	0.577	-0.476	S
H4		1.7	1.87	1.962	0.466	-0.561	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.294	0.301	0.314	0.028	-0.731	S
H2		0.163	0.17	0.18	0.027	-0.634	S
H3		0.082	0.084	0.09	0.02	-0.43	S
H4		0.081	0.085	0.092	0.02	-0.536	S
H1	Cd <i>µg/l</i>	0.032	0.034	0.038	0.022	-0.261	S
H2		0.019	0.02	0.024	0.013	-0.366	S
H3		0.01	0.011	0.014	0.008	-0.597	S
H4		0.009	0.01	0.014	0.01	-0.497	S
H1	Cr <i>µg/l</i>	0.372	0.387	0.382	0.059	-0.159	S
H2		0.23	0.238	0.243	0.029	-0.457	S
H3		0.071	0.07	0.08	0.034	-0.271	S
H4		0.084	0.085	0.101	0.052	-0.335	S
H1	Cu <i>µg/l</i>	0.411	0.43	0.453	0.16	-0.265	S
H2		0.386	0.408	0.502	0.414	-0.279	S
H3		0.141	0.154	0.211	0.161	-0.436	S
H4		0.122	0.128	0.196	0.208	-0.353	S
H1	Ni <i>µg/l</i>	0.274	0.258	0.277	0.079	-0.033	S
H2		0.165	0.17	0.186	0.072	-0.297	S
H3		0.128	0.126	0.134	0.072	-0.086	S
H4		0.131	0.159	0.166	0.057	-0.625	S
H1	Pb <i>µg/l</i>	0.659	0.688	0.67	0.077	-0.145	S
H2		0.42	0.442	0.444	0.076	-0.322	S
H3		0.338	0.35	0.358	0.053	-0.38	S
H4		0.373	0.391	0.396	0.052	-0.435	S
H1	Zn <i>µg/l</i>	2.142	2.15	2.158	0.598	-0.026	S
H2		2.008	2.04	2.374	0.542	-0.677	S
H3		1.666	1.68	1.824	0.577	-0.274	S
H4		1.867	1.87	1.962	0.466	-0.203	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 178, Laboratory of Hydrochemistry and Atmospheric Chemistry an EANET Monitoring
Laboratory (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 <i>µg/l</i>	0.192	0.301	0.314	0.028	-4.343	Q
H2		0.195	0.17	0.18	0.027	0.572	S
H3		0.079	0.084	0.09	0.02	-0.569	S
H4		0.086	0.085	0.092	0.02	-0.281	S
H1	Cd <i>µg/l</i>	0.019	0.034	0.038	0.022	-0.849	Q
H2		0.03	0.02	0.024	0.013	0.425	Q
H3		0.011	0.011	0.014	0.008	-0.417	S
H4		0.014	0.01	0.014	0.01	0.042	Q
H1	Cr <i>µg/l</i>	0.278	0.387	0.382	0.059	-1.773	Q
H2		0.251	0.238	0.243	0.029	0.293	S
H3		0.122	0.07	0.08	0.034	1.214	U
H4		0.144	0.085	0.101	0.052	0.822	U
H1	Cu <i>µg/l</i>	0.358	0.43	0.453	0.16	-0.597	S
H2		0.481	0.408	0.502	0.414	-0.05	S
H3		0.247	0.154	0.211	0.161	0.223	U
H4		0.216	0.128	0.196	0.208	0.098	U
H1	Ni <i>µg/l</i>	0.179	0.258	0.277	0.079	-1.233	Q
H2		0.203	0.17	0.186	0.072	0.231	S
H3		0.141	0.126	0.134	0.072	0.102	S
H4		0.159	0.159	0.166	0.057	-0.131	S
H1	Pb <i>µg/l</i>	0.453	0.688	0.67	0.077	-2.828	Q
H2		0.469	0.442	0.444	0.076	0.327	S
H3		0.349	0.35	0.358	0.053	-0.176	S
H4		0.392	0.391	0.396	0.052	-0.074	S
H1	Zn <i>µg/l</i>	1.48	2.15	2.158	0.598	-1.134	Q
H2		2.49	2.04	2.374	0.542	0.214	S
H3		1.8	1.68	1.824	0.577	-0.042	S
H4		2.03	1.87	1.962	0.466	0.147	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	0.036	0.034	0.038	0.022	-0.086	S
H2		0.019	0.02	0.024	0.013	-0.404	S
H3		0.013	0.011	0.014	0.008	-0.16	S
H4		0.007	0.01	0.014	0.01	-0.644	Q
H1	Cr <i>µg/l</i>	0.416	0.387	0.382	0.059	0.586	S
H2		0.275	0.238	0.243	0.029	1.13	S
H3		0.083	0.07	0.08	0.034	0.074	S
H4		0.097	0.085	0.101	0.052	-0.086	S
H1	Cu <i>µg/l</i>	0.499	0.43	0.453	0.16	0.285	S
H2		0.477	0.408	0.502	0.414	-0.06	S
H3		0.202	0.154	0.211	0.161	-0.055	Q
H4		0.152	0.128	0.196	0.208	-0.211	S
H1	Ni <i>µg/l</i>	0.258	0.258	0.277	0.079	-0.237	S
H2		0.167	0.17	0.186	0.072	-0.272	S
H3		0.106	0.126	0.134	0.072	-0.385	S
H4		0.16	0.159	0.166	0.057	-0.114	S
H1	Pb <i>µg/l</i>	0.825	0.688	0.67	0.077	2.026	S
H2		0.483	0.442	0.444	0.076	0.511	S
H3		0.443	0.35	0.358	0.053	1.583	Q
H4		0.501	0.391	0.396	0.052	2.027	Q
H1	Zn <i>µg/l</i>	2.23	2.15	2.158	0.598	0.12	S
H2		2.16	2.04	2.374	0.542	-0.396	S
H3		1.82	1.68	1.824	0.577	-0.008	S
H4		1.95	1.87	1.962	0.466	-0.025	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 185, Public Health Centre - Cacak, Department for Sanitary Chemistry and Ecotoxicology (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 <i>µg/l</i>	< 1.000	0.301	0.314	0.028		B
H2		< 1.000	0.17	0.18	0.027		B
H3		< 1.000	0.084	0.09	0.02		B
H4		< 1.000	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.100	0.034	0.038	0.022		B
H2		< 0.100	0.02	0.024	0.013		B
H3		< 0.100	0.011	0.014	0.008		B
H4		< 0.100	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	-999	0.387	0.382	0.059		B
H2		-999	0.238	0.243	0.029		B
H3		-999	0.07	0.08	0.034		B
H4		-999	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 2.000	0.258	0.277	0.079		B
H2		< 2.000	0.17	0.186	0.072		B
H3		< 2.000	0.126	0.134	0.072		B
H4		< 2.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 2.000	0.688	0.67	0.077		B
H2		< 2.000	0.442	0.444	0.076		B
H3		< 2.000	0.35	0.358	0.053		B
H4		< 2.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	-999	2.15	2.158	0.598		B
H2		-999	2.04	2.374	0.542		B
H3		-999	1.68	1.824	0.577		B
H4		-999	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

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 *	E MEP quality norm *
H1	As <i>µg/l</i>	0.304	0.301	0.314	0.028	-0.351	S
H2		0.188	0.17	0.18	0.027	0.311	S
H3		< 0.100	0.084	0.09	0.02		B
H4		< 0.100	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.100	0.034	0.038	0.022		B
H2		< 0.100	0.02	0.024	0.013		B
H3		< 0.100	0.011	0.014	0.008		B
H4		< 0.100	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.42	0.387	0.382	0.059	0.654	S
H2		< 0.300	0.238	0.243	0.029		B
H3		< 0.300	0.07	0.08	0.034		B
H4		< 0.300	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.5	0.43	0.453	0.16	0.292	S
H2		0.4	0.408	0.502	0.414	-0.246	S
H3		< 0.500	0.154	0.211	0.161		B
H4		< 0.500	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 1.000	0.258	0.277	0.079		B
H2		< 1.000	0.17	0.186	0.072		B
H3		< 1.000	0.126	0.134	0.072		B
H4		< 1.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 1.000	0.688	0.67	0.077		B
H2		< 1.000	0.442	0.444	0.076		B
H3		< 1.000	0.35	0.358	0.053		B
H4		< 1.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	< 3.000	2.15	2.158	0.598		B
H2		< 3.000	2.04	2.374	0.542		B
H3		< 3.000	1.68	1.824	0.577		B
H4		< 3.000	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 189, Institute of Public Health - Kikinda (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 <i>µg/l</i>	-999	0.301	0.314	0.028		B
H2		-999	0.17	0.18	0.027		B
H3		-999	0.084	0.09	0.02		B
H4		-999	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.400	0.034	0.038	0.022		B
H2		< 0.400	0.02	0.024	0.013		B
H3		< 0.400	0.011	0.014	0.008		B
H4		< 0.400	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	< 2.000	0.387	0.382	0.059		B
H2		< 2.000	0.238	0.243	0.029		B
H3		< 2.000	0.07	0.08	0.034		B
H4		< 2.000	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	-999	0.43	0.453	0.16		B
H2		-999	0.408	0.502	0.414		B
H3		-999	0.154	0.211	0.161		B
H4		-999	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 2.000	0.258	0.277	0.079		B
H2		< 2.000	0.17	0.186	0.072		B
H3		< 2.000	0.126	0.134	0.072		B
H4		< 2.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 5.000	0.688	0.67	0.077		B
H2		< 5.000	0.442	0.444	0.076		B
H3		< 5.000	0.35	0.358	0.053		B
H4		< 5.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	< 4.000	2.15	2.158	0.598		B
H2		< 4.000	2.04	2.374	0.542		B
H3		< 4.000	1.68	1.824	0.577		B
H4		< 4.000	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 193, Institute of Public Health of Vojvodina (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 <i>µg/l</i>	0.315	0.301	0.314	0.028	0.022	S
H2		0.183	0.17	0.18	0.027	0.125	S
H3		< 0.100	0.084	0.09	0.02		B
H4		< 0.100	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.100	0.034	0.038	0.022		B
H2		< 0.100	0.02	0.024	0.013		B
H3		< 0.100	0.011	0.014	0.008		B
H4		< 0.100	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.392	0.387	0.382	0.059	0.176	S
H2		< 0.400	0.238	0.243	0.029		B
H3		< 0.400	0.07	0.08	0.034		B
H4		< 0.400	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	0.503	0.43	0.453	0.16	0.31	S
H2		2.133	0.408	0.502	0.414	3.943	U
H3		0.329	0.154	0.211	0.161	0.731	U
H4		1	0.128	0.196	0.208	3.875	U
H1	Ni <i>µg/l</i>	< 2.000	0.258	0.277	0.079		B
H2		< 2.000	0.17	0.186	0.072		B
H3		< 2.000	0.126	0.134	0.072		B
H4		< 2.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 1.000	0.688	0.67	0.077		B
H2		< 1.000	0.442	0.444	0.076		B
H3		< 1.000	0.35	0.358	0.053		B
H4		< 1.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	< 3.000	2.15	2.158	0.598		B
H2		< 3.000	2.04	2.374	0.542		B
H3		< 3.000	1.68	1.824	0.577		B
H4		< 3.000	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	< 1.000	0.301	0.314	0.028		B
H2		< 1.000	0.17	0.18	0.027		B
H3		< 1.000	0.084	0.09	0.02		B
H4		< 1.000	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.200	0.034	0.038	0.022		B
H2		< 0.200	0.02	0.024	0.013		B
H3		< 0.200	0.011	0.014	0.008		B
H4		< 0.200	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	< 1.000	0.387	0.382	0.059		B
H2		< 1.000	0.238	0.243	0.029		B
H3		< 1.000	0.07	0.08	0.034		B
H4		< 1.000	0.085	0.101	0.052		B
H1	Cu <i>µg/l</i>	< 2.000	0.43	0.453	0.16		B
H2		< 2.000	0.408	0.502	0.414		B
H3		< 2.000	0.154	0.211	0.161		B
H4		< 2.000	0.128	0.196	0.208		B
H1	Ni <i>µg/l</i>	< 2.000	0.258	0.277	0.079		B
H2		< 2.000	0.17	0.186	0.072		B
H3		< 2.000	0.126	0.134	0.072		B
H4		< 2.000	0.159	0.166	0.057		B
H1	Pb <i>µg/l</i>	< 1.000	0.688	0.67	0.077		B
H2		< 1.000	0.442	0.444	0.076		B
H3		< 1.000	0.35	0.358	0.053		B
H4		< 1.000	0.391	0.396	0.052		B
H1	Zn <i>µg/l</i>	< 10.000	2.15	2.158	0.598		B
H2		< 10.000	2.04	2.374	0.542		B
H3		< 10.000	1.68	1.824	0.577		B
H4		< 10.000	1.87	1.962	0.466		B

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 207, IRMB - Institute of Mining and Metallurgy Bor (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 <i>µg/l</i>	0.268	0.301	0.314	0.028	-1.646	S
H2		0.155	0.17	0.18	0.027	-0.917	S
H3		0.058	0.084	0.09	0.02	-1.609	Q
H4		0.07	0.085	0.092	0.02	-1.08	S
H1	Cd <i>µg/l</i>	0.037	0.034	0.038	0.022	-0.041	S
H2		0.024	0.02	0.024	0.013	-0.027	S
H3		0.012	0.011	0.014	0.008	-0.288	S
H4		0.014	0.01	0.014	0.01	0.042	Q
H1	Cr <i>µg/l</i>	0.355	0.387	0.382	0.059	-0.457	S
H2		0.222	0.238	0.243	0.029	-0.718	S
H3		0.06	0.07	0.08	0.034	-0.598	S
H4		0.073	0.085	0.101	0.052	-0.549	S
H1	Cu <i>µg/l</i>	0.526	0.43	0.453	0.16	0.454	S
H2		0.327	0.408	0.502	0.414	-0.422	S
H3		0.048	0.154	0.211	0.161	-1.009	U
H4		0.026	0.128	0.196	0.208	-0.818	U
H1	Ni <i>µg/l</i>	0.257	0.258	0.277	0.079	-0.25	S
H2		0.165	0.17	0.186	0.072	-0.3	S
H3		0.106	0.126	0.134	0.072	-0.385	S
H4		0.102	0.159	0.166	0.057	-1.13	Q
H1	Pb <i>µg/l</i>	0.71	0.688	0.67	0.077	0.525	S
H2		0.476	0.442	0.444	0.076	0.419	S
H3		0.389	0.35	0.358	0.053	0.572	S
H4		0.418	0.391	0.396	0.052	0.427	S
H1	Zn <i>µg/l</i>	0.619	2.15	2.158	0.598	-2.573	U
H2		0.637	2.04	2.374	0.542	-3.207	U
H3		0.911	1.68	1.824	0.577	-1.583	Q
H4		0.526	1.87	1.962	0.466	-3.077	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

E MEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 208, VINCA - Vinca Institute of Nuclear Sciences (Republic of Serbia)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	E MEP quality norm *
H1	As <i>µg/l</i>	0.402	0.301	0.314	0.028	3.109	Q
H2		0.298	0.17	0.18	0.027	4.405	U
H3		0.141	0.084	0.09	0.02	2.503	U
H4		0.134	0.085	0.092	0.02	2.115	U
H1	Cd <i>µg/l</i>	0.164	0.034	0.038	0.022	5.66	U
H2		0.041	0.02	0.024	0.013	1.254	U
H3		0.045	0.011	0.014	0.008	3.952	U
H4		0.057	0.01	0.014	0.01	4.254	U
H1	Cr <i>µg/l</i>	0.638	0.387	0.382	0.059	4.381	U
H2		0.299	0.238	0.243	0.029	1.967	Q
H3		0.132	0.07	0.08	0.034	1.506	U
H4		0.171	0.085	0.101	0.052	1.344	U
H1	Cu <i>µg/l</i>	1.216	0.43	0.453	0.16	4.772	U
H2		0.997	0.408	0.502	0.414	1.197	U
H3		0.666	0.154	0.211	0.161	2.819	U
H4		0.765	0.128	0.196	0.208	2.743	U
H1	Ni <i>µg/l</i>	0.601	0.258	0.277	0.079	4.09	U
H2		0.266	0.17	0.186	0.072	1.112	U
H3		0.193	0.126	0.134	0.072	0.827	U
H4		0.232	0.159	0.166	0.057	1.147	Q
H1	Pb <i>µg/l</i>	0.985	0.688	0.67	0.077	4.114	Q
H2		0.754	0.442	0.444	0.076	4.074	U
H3		0.491	0.35	0.358	0.053	2.481	Q
H4		0.517	0.391	0.396	0.052	2.336	Q
H1	Zn <i>µg/l</i>	6.517	2.15	2.158	0.598	7.287	U
H2		3.675	2.04	2.374	0.542	2.401	U
H3		5.752	1.68	1.824	0.577	6.808	U
H4		4.15	1.87	1.962	0.466	4.692	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

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 <i>µg/l</i>	0.309	0.301	0.314	0.028	-0.191	S
H2		0.18	0.17	0.18	0.027	0.01	S
H3		0.104	0.084	0.09	0.02	0.65	S
H4		0.106	0.085	0.092	0.02	0.707	S
H1	Cd <i>µg/l</i>	0.034	0.034	0.038	0.022	-0.167	S
H2		0.018	0.02	0.024	0.013	-0.487	S
H3		0.019	0.011	0.014	0.008	0.579	U
H4		0.008	0.01	0.014	0.01	-0.585	Q
H1	Cr <i>µg/l</i>	0.367	0.387	0.382	0.059	-0.257	S
H2		0.215	0.238	0.243	0.029	-0.977	S
H3		0.074	0.07	0.08	0.034	-0.198	S
H4		0.07	0.085	0.101	0.052	-0.599	S
H1	Cu <i>µg/l</i>	0.441	0.43	0.453	0.16	-0.08	S
H2		0.391	0.408	0.502	0.414	-0.268	S
H3		0.15	0.154	0.211	0.161	-0.38	S
H4		0.105	0.128	0.196	0.208	-0.438	S
H1	Ni <i>µg/l</i>	0.143	0.258	0.277	0.079	-1.685	Q
H2		0.103	0.17	0.186	0.072	-1.163	Q
H3		0.012	0.126	0.134	0.072	-1.7	U
H4		0.056	0.159	0.166	0.057	-1.929	U
H1	Pb <i>µg/l</i>	0.665	0.688	0.67	0.077	-0.055	S
H2		0.451	0.442	0.444	0.076	0.087	S
H3		0.366	0.35	0.358	0.053	0.146	S
H4		0.42	0.391	0.396	0.052	0.464	S
H1	Zn <i>µg/l</i>	1.962	2.15	2.158	0.598	-0.328	S
H2		1.798	2.04	2.374	0.542	-1.064	S
H3		1.516	1.68	1.824	0.577	-0.535	S
H4		1.698	1.87	1.962	0.466	-0.565	S

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>

EMEP – Analytical intercomparison of heavy metals in precipitation 2023

Laboratory 212, Institute of Environmental Assessment and Water Research (Spain)

Heavy metals in precipitation (H-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm [†]
H1	As <i>µg/l</i>	0.31	0.301	0.314	0.028	-0.156	S
H2		< 0.110	0.17	0.18	0.027	-4.639	U
H3		< 0.110	0.084	0.09	0.02		B
H4		< 0.110	0.085	0.092	0.02		B
H1	Cd <i>µg/l</i>	< 0.150	0.034	0.038	0.022		B
H2		< 0.150	0.02	0.024	0.013		B
H3		< 0.150	0.011	0.014	0.008		B
H4		< 0.150	0.01	0.014	0.01		B
H1	Cr <i>µg/l</i>	0.31	0.387	0.382	0.059	-1.226	S
H2		0.23	0.238	0.243	0.029	-0.439	S
H3		< 0.010	0.07	0.08	0.034	-2.205	U
H4		< 0.010	0.085	0.101	0.052	-1.862	U
H1	Cu <i>µg/l</i>	0.44	0.43	0.453	0.16	-0.084	S
H2		0.41	0.408	0.502	0.414	-0.222	S
H3		0.19	0.154	0.211	0.161	-0.13	S
H4		0.12	0.128	0.196	0.208	-0.365	S
H1	Ni <i>µg/l</i>	0.27	0.258	0.277	0.079	-0.086	S
H2		< 0.020	0.17	0.186	0.072	-2.467	U
H3		< 0.020	0.126	0.134	0.072	-1.723	U
H4		< 0.020	0.159	0.166	0.057	-2.741	U
H1	Pb <i>µg/l</i>	0.89	0.688	0.67	0.077	2.874	Q
H2		0.61	0.442	0.444	0.076	2.181	Q
H3		0.51	0.35	0.358	0.053	2.837	Q
H4		0.52	0.391	0.396	0.052	2.394	Q
H1	Zn <i>µg/l</i>	3.59	2.15	2.158	0.598	2.394	U
H2		3.6	2.04	2.374	0.542	2.263	U
H3		3.4	1.68	1.824	0.577	2.731	U
H4		3.56	1.87	1.962	0.466	3.427	U

If your laboratory reported values as less than the detection limit, and your detection limit equal or is lower than the expected value, $\frac{1}{2}$ 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 $\pm 25\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and less than $\pm 15\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

Q – Questionable: Your result deviates between $\pm 25-50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and between $\pm 15-30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

U – Unsatisfactory: Your result deviates more than $\pm 50\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $< 1 \mu\text{g/l}$, Cd $< 0,5 \mu\text{g/l}$, Zn $< 10 \mu\text{g/l}$ and Cu $< 2 \mu\text{g/l}$ and more than $\pm 30\%$ of the expected value for theoretical values of Pb, Ni, Cr and As $> 1 \mu\text{g/l}$, Cd $> 0,5 \mu\text{g/l}$, Zn $> 10 \mu\text{g/l}$ and Cu $> 2 \mu\text{g/l}$

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://projects.nilu.no/ccc/intercomparison/>