

EMEP – 36th intercomparison of analytical methods

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

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	8.66	11.2	11.497	2.392	-1.186	Q
B2		27.11	31.3	30.609	3.342	-1.047	S
B4		12.2	15.2	15.755	2.882	-1.234	S
B6		7.68	10	9.591	3.03	-0.631	Q
B1	HNO ₃ <i>µg N/filter</i>	7.9	9.16	8.868	0.546	-1.772	S
B2		22.36	25.5	23.484	1.821	-0.617	S
B4		11.08	12.4	12.513	1.409	-1.017	S
B6		7.08	8.18	8.004	0.514	-1.799	S

¥ Reported values are blank corrected. Corrections are done by subtracting the blank value when a value was reported or 1/2MDL when MDL was reported.

* Z score is unitless

¤ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than ±20% of the expected value for SO₂ and HNO₃

Q – Questionable: Your result deviates between ±20-40% of the expected value for SO₂ and HNO₃

U – Unsatisfactory: Your result deviates more than ±40% of the expected value for SO₂ and for HNO₃

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect: <http://www.nilu.no/projects/ccc/intercomparison.html>

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Laboratory 5, Finnish Meteorological Institute. Air Quality Department (Finland)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	13.106	11.2	11.497	2.392	0.673	S
B2		34.186	31.3	30.609	3.342	1.07	S
B4		17.016	15.2	15.755	2.882	0.438	S
B6		12.136	10	9.591	3.03	0.84	Q
B1	HNO ₃ <i>µg N/filter</i>	9.674	9.16	8.868	0.546	1.475	S
B2		26.284	25.5	23.484	1.821	1.537	S
B4		12.889	12.4	12.513	1.409	0.267	S
B6		8.787	8.18	8.004	0.514	1.524	S

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Laboratory 6, SGS Multilab (France)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	9.84	11.2	11.497	2.392	-0.693	S
B2		28.06	31.3	30.609	3.342	-0.763	S
B4		14.97	15.2	15.755	2.882	-0.272	S
B6		8.73	10	9.591	3.03	-0.284	S
B1	HNO ₃ <i>µg N/filter</i>	8.7	9.16	8.868	0.546	-0.307	S
B2		24.39	25.5	23.484	1.821	0.497	S
B4		12	12.4	12.513	1.409	-0.364	S
B6		7.73	8.18	8.004	0.514	-0.534	S

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Laboratory 8, Umweltbundesamt, Langen (Germany)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	10.75	11.2	11.497	2.392	-0.313	S
B2		30.75	31.3	30.609	3.342	0.042	S
B4		14.75	15.2	15.755	2.882	-0.349	S
B6		9.45	10	9.591	3.03	-0.047	S
B1	HNO ₃ <i>µg N/filter</i>	9.1	9.16	8.868	0.546	0.425	S
B2		24.6	25.5	23.484	1.821	0.613	S
B4		12.4	12.4	12.513	1.409	-0.08	S
B6		8.2	8.18	8.004	0.514	0.381	S

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Laboratory 10, Institute for Atmospheric Physics (Hungary)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	14.314	11.2	11.497	2.392	1.178	Q
B2		34.204	31.3	30.609	3.342	1.076	S
B4		18.251	15.2	15.755	2.882	0.866	Q
B6		12.102	10	9.591	3.03	0.829	Q
B1	HNO ₃ <i>µg N/filter</i>	9.655	9.16	8.868	0.546	1.442	S
B2		23.256	25.5	23.484	1.821	-0.125	S
B4		12.925	12.4	12.513	1.409	0.292	S
B6		8.414	8.18	8.004	0.514	0.797	S

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Laboratory 15, Norwegian Institute for Air Research NILU (Norway)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	10.6	11.2	11.497	2.392	-0.375	S
B2		28.6	31.3	30.609	3.342	-0.601	S
B4		13.8	15.2	15.755	2.882	-0.678	S
B6		8.7	10	9.591	3.03	-0.294	S
B1	HNO ₃ <i>µg N/filter</i>	9.4	9.16	8.868	0.546	0.975	S
B2		22.2	25.5	23.484	1.821	-0.705	S
B4		12.3	12.4	12.513	1.409	-0.151	S
B6		8	8.18	8.004	0.514	-0.008	S

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

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	12.14	11.2	11.497	2.392	0.269	S
B2		30.02	31.3	30.609	3.342	-0.176	S
B4		15.52	15.2	15.755	2.882	-0.082	S
B6		10.93	10	9.591	3.03	0.442	S
B1	HNO ₃ <i>µg N/filter</i>	9.04	9.16	8.868	0.546	0.315	S
B2		21.21	25.5	23.484	1.821	-1.248	S
B4		12.17	12.4	12.513	1.409	-0.244	S
B6		8.38	8.18	8.004	0.514	0.731	S

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

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	10.981	11.2	11.497	2.392	-0.216	S
B2		29.615	31.3	30.609	3.342	-0.298	S
B4		14.932	15.2	15.755	2.882	-0.286	S
B6		9.797	10	9.591	3.03	0.068	S
B1	HNO ₃ <i>µg N/filter</i>	9.031	9.16	8.868	0.546	0.299	S
B2		25.273	25.5	23.484	1.821	0.982	S
B4		12.241	12.4	12.513	1.409	-0.193	S
B6		8.192	8.18	8.004	0.514	0.365	S

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Laboratory 31, Slovak Hydrometeorological Institute (Slovakia)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	14.418	11.2	11.497	2.392	1.221	Q
B2		33.765	31.3	30.609	3.342	0.944	S
B4		22.58	15.2	15.755	2.882	2.368	U
B6		15.036	10	9.591	3.03	1.797	U
B1	HNO ₃ <i>µg N/filter</i>	8.318	9.16	8.868	0.546	-1.007	S
B2		23.946	25.5	23.484	1.821	0.254	S
B4		13.338	12.4	12.513	1.409	0.586	S
B6		7.798	8.18	8.004	0.514	-0.401	S

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Laboratory 32, Atmospheric Pollution Research Laboratory, Institute of Physics, Vilnius (Lithuania)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	15.105	11.2	11.497	2.392	1.509	Q
B2		34.485	31.3	30.609	3.342	1.16	S
B4		18.765	15.2	15.755	2.882	1.044	Q
B6		14.425	10	9.591	3.03	1.595	U
B1	HNO ₃ <i>µg N/filter</i>	8.11	9.16	8.868	0.546	-1.388	S
B2		22.25	25.5	23.484	1.821	-0.677	S
B4		11.29	12.4	12.513	1.409	-0.868	S
B6		7.41	8.18	8.004	0.514	-1.157	S

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EMEP – 36th intercomparison of analytical methods

Laboratory 33, Environmental Pollution Observ. Centre (Latvia)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	9.489	11.2	11.497	2.392	-0.84	S
B2		31.371	31.3	30.609	3.342	0.228	S
B4		14.771	15.2	15.755	2.882	-0.341	S
B6		9.324	10	9.591	3.03	-0.088	S
B1	HNO ₃ <i>µg N/filter</i>	8.858	9.16	8.868	0.546	-0.018	S
B2		25.233	25.5	23.484	1.821	0.96	S
B4		12.073	12.4	12.513	1.409	-0.312	S
B6		8.127	8.18	8.004	0.514	0.239	S

¥ Reported values are blank corrected. Corrections are done by subtracting the blank value when a value was reported or 1/2MDL when MDL was reported.

* Z score is unitless

¤ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than ±20% of the expected value for SO₂ and HNO₃

Q – Questionable: Your result deviates between ±20-40% of the expected value for SO₂ and HNO₃

U – Unsatisfactory: Your result deviates more than ±40% of the expected value for SO₂ and for HNO₃

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EMEP – 36th intercomparison of analytical methods

Laboratory 34, Ministry of Environment and Urbanisation (Turkey)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	0.22	11.2	11.497	2.392	-4.716	U
B2		0.49	31.3	30.609	3.342	-9.013	U
B4		0.24	15.2	15.755	2.882	-5.383	U
B6		0.2	10	9.591	3.03	-3.1	U
B1	HNO ₃ <i>µg N/filter</i>	0.08	9.16	8.868	0.546	-16.094	U
B2		0.24	25.5	23.484	1.821	-12.762	U
B4		0.11	12.4	12.513	1.409	-8.805	U
B6		0.07	8.18	8.004	0.514	-15.44	U

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EMEP – 36th intercomparison of analytical methods

Laboratory 38, Estonian Environmental Research Centre, Tallinn (Estonia)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	7.285	11.2	11.497	2.392	-1.761	Q
B2		24.455	31.3	30.609	3.342	-1.842	Q
B4		11.615	15.2	15.755	2.882	-1.437	Q
B6		6.225	10	9.591	3.03	-1.111	Q
B1	HNO ₃ <i>µg N/filter</i>	8.065	9.16	8.868	0.546	-1.47	S
B2		22.625	25.5	23.484	1.821	-0.472	S
B4		11.595	12.4	12.513	1.409	-0.652	S
B6		7.155	8.18	8.004	0.514	-1.653	S

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EMEP – 36th intercomparison of analytical methods

Laboratory 39, Environmental Monitoring Laboratory, Institute of Environmental Protection (Poland)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	12.44	11.2	11.497	2.392	0.394	S
B2		28.19	31.3	30.609	3.342	-0.724	S
B4		16.32	15.2	15.755	2.882	0.196	S
B6		10.21	10	9.591	3.03	0.204	S
B1	HNO ₃ <i>µg N/filter</i>	8.64	9.16	8.868	0.546	-0.417	S
B2		18.76	25.5	23.484	1.821	-2.594	Q
B4		11.98	12.4	12.513	1.409	-0.378	S
B6		7.82	8.18	8.004	0.514	-0.359	S

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U – Unsatisfactory: Your result deviates more than ±40% of the expected value for SO₂ and for HNO₃

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Laboratory 158, Asia Center for Air Pollution Research (ACAP) (Japan)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	9	11.2	11.497	2.392	-1.044	S
B2		27.5	31.3	30.609	3.342	-0.93	S
B4		12.59	15.2	15.755	2.882	-1.098	S
B6		8.08	10	9.591	3.03	-0.499	S
B1	HNO ₃ <i>µg N/filter</i>	8.985	9.16	8.868	0.546	0.215	S
B2		25.105	25.5	23.484	1.821	0.89	S
B4		12.405	12.4	12.513	1.409	-0.077	S
B6		8.245	8.18	8.004	0.514	0.468	S

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EMEP – 36th intercomparison of analytical methods

Laboratory 182, Research Institute for Analytical Instrumentation, ICIA (Romania)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	< 2.000	11.2	11.497	2.392	-4.389	U
B2		0.84	31.3	30.609	3.342	-8.908	U
B4		1.09	15.2	15.755	2.882	-5.088	U
B6		1.92	10	9.591	3.03	-2.532	U
B1	HNO ₃ <i>µg N/filter</i>	< 1.000	9.16	8.868	0.546	-15.324	U
B2		23.235	25.5	23.484	1.821	-0.137	S
B4		17.535	12.4	12.513	1.409	3.565	U
B6		8.955	8.18	8.004	0.514	1.85	S

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Laboratory 200, FUB AG (Switzerland)

Sulphur dioxide and nitric acid on impregnated filters (B-samples)

Sample name	Determinand	Reported value [¥]	Expected value	Mean value	Standard deviation	Z score [*]	EMEP quality norm [¤]
B1	SO ₂ <i>µg S/filter</i>	10.92	11.2	11.497	2.392	-0.241	S
B2		30.61	31.3	30.609	3.342	0	S
B4		14.68	15.2	15.755	2.882	-0.373	S
B6		9.76	10	9.591	3.03	0.056	S
B1	HNO ₃ <i>µg N/filter</i>	9.08	9.16	8.868	0.546	0.389	S
B2		24.5	25.5	23.484	1.821	0.558	S
B4		12.27	12.4	12.513	1.409	-0.173	S
B6		8.16	8.18	8.004	0.514	0.303	S

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