

EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 5, Finnish Meteorological Institute, Atmospheric Composition, Air Quality (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 [‡]
B2	SO ₂ <i>µg S/filter</i>	12.76	14	12.507	2.22	0.114	S
B3		14.11	15.2	14.999	1.893	-0.47	S
B5		16.35	19.2	18.436	2.172	-0.96	S
B6		18.3	21.2	19.216	3.166	-0.289	S
B2	HNO ₃ <i>µg N/filter</i>	10.365	11.5	10.147	0.574	0.381	S
B3		12.155	12.4	11.914	0.562	0.429	S
B5		15.485	15.7	15.602	1.122	-0.104	S
B6		17.415	17.3	17.017	1.068	0.373	S

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

^{*} Z score is unitless

[‡] EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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

EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 6, SGS France - EHS (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 ‡
B2	SO ₂ <i>µg S/filter</i>	9.405	14	12.507	2.22	-1.397	Q
B3		12.205	15.2	14.999	1.893	-1.476	S
B5		14.255	19.2	18.436	2.172	-1.925	Q
B6		16.815	21.2	19.216	3.166	-0.758	Q
B2	HNO ₃ <i>µg N/filter</i>	10.05	11.5	10.147	0.574	-0.168	S
B3		11.68	12.4	11.914	0.562	-0.417	S
B5		16.86	15.7	15.602	1.122	1.122	S
B6		16.86	17.3	17.017	1.068	-0.147	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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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 ‡
B2	SO ₂ <i>µg S/filter</i>	12.635	14	12.507	2.22	0.058	S
B3		15.335	15.2	14.999	1.893	0.178	S
B5		18.035	19.2	18.436	2.172	-0.185	S
B6		21.235	21.2	19.216	3.166	0.638	S
B2	HNO ₃ <i>µg N/filter</i>	10.29	11.5	10.147	0.574	0.25	S
B3		12.39	12.4	11.914	0.562	0.847	S
B5		15.49	15.7	15.602	1.122	-0.1	S
B6		17.09	17.3	17.017	1.068	0.069	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 10, Air Quality Reference Centre (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 ‡
B2	SO ₂ <i>µg S/filter</i>	11.672	14	12.507	2.22	-0.376	S
B3		13.79	15.2	14.999	1.893	-0.639	S
B5		17.517	19.2	18.436	2.172	-0.423	S
B6		18.447	21.2	19.216	3.166	-0.243	S
B2	HNO ₃ <i>µg N/filter</i>	8.731	11.5	10.147	0.574	-2.467	Q
B3		10.646	12.4	11.914	0.562	-2.257	S
B5		14.101	15.7	15.602	1.122	-1.338	S
B6		15.167	17.3	17.017	1.068	-1.732	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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Laboratory 13, C.N.R. Istituto Inquinamento Atmosferico (Italy)

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 ‡
B2	SO ₂ <i>µg S/filter</i>	2.41	14	12.507	2.22	-4.548	U
B3		22.76	15.2	14.999	1.893	4.1	U
B5		30.56	19.2	18.436	2.172	5.583	U
B6		32.56	21.2	19.216	3.166	4.215	U
B2	HNO ₃ <i>µg N/filter</i>	13.075	11.5	10.147	0.574	5.103	S
B3		11.795	12.4	11.914	0.562	-0.212	S
B5		11.305	15.7	15.602	1.122	-3.831	Q
B6		15.385	17.3	17.017	1.068	-1.528	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 15, 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 ‡
B2	SO ₂ <i>µg S/filter</i>	12.395	14	12.507	2.22	-0.051	S
B3		14.995	15.2	14.999	1.893	-0.002	S
B5		18.695	19.2	18.436	2.172	0.119	S
B6		16.494	21.2	19.216	3.166	-0.86	Q
B2	HNO ₃ <i>µg N/filter</i>	10.694	11.5	10.147	0.574	0.953	S
B3		12.694	12.4	11.914	0.562	1.388	S
B5		16.093	15.7	15.602	1.122	0.439	S
B6		16.694	17.3	17.017	1.068	-0.303	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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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 ‡
B2	SO ₂ <i>µg S/filter</i>	11.19	14	12.507	2.22	-0.593	Q
B3		14.72	15.2	14.999	1.893	-0.147	S
B5		18.02	19.2	18.436	2.172	-0.191	S
B6		19.88	21.2	19.216	3.166	0.21	S
B2	HNO ₃ <i>µg N/filter</i>	10.29	11.5	10.147	0.574	0.25	S
B3		12.43	12.4	11.914	0.562	0.919	S
B5		16.03	15.7	15.602	1.122	0.382	S
B6		17.65	17.3	17.017	1.068	0.593	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

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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 [‡]
B2	SO ₂ <i>µg S/filter</i>	13.05	14	12.507	2.22	0.245	S
B3		15.15	15.2	14.999	1.893	0.08	S
B5		18.85	19.2	18.436	2.172	0.191	S
B6		19.15	21.2	19.216	3.166	-0.021	S
B2	HNO ₃ <i>µg N/filter</i>	7.34	11.5	10.147	0.574	-4.89	Q
B3		8.72	12.4	11.914	0.562	-5.686	Q
B5		11.35	15.7	15.602	1.122	-3.791	Q
B6		12.15	17.3	17.017	1.068	-4.556	Q

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

^{*} Z score is unitless

[‡] EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

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

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 [‡]
B2	SO ₂ <i>µg S/filter</i>	2.418	14	12.507	2.22	-4.544	U
B3		4.919	15.2	14.999	1.893	-5.325	U
B5		9.02	19.2	18.436	2.172	-4.336	U
B6		11.36	21.2	19.216	3.166	-2.481	U
B2	HNO ₃ <i>µg N/filter</i>	11.407	11.5	10.147	0.574	2.196	S
B3		14.906	12.4	11.914	0.562	5.327	Q
B5		18.281	15.7	15.602	1.122	2.389	S
B6		19.543	17.3	17.017	1.068	2.365	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

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EMEP – 43rd intercomparison of analytical methods - 2025

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 [¤]
B2	SO ₂ <i>µg S/filter</i>	13.03	14	12.507	2.22	0.235	S
B3		15.088	15.2	14.999	1.893	0.047	S
B5		19.998	19.2	18.436	2.172	0.72	S
B6		20.131	21.2	19.216	3.166	0.289	S
B2	HNO ₃ <i>µg N/filter</i>	10.498	11.5	10.147	0.574	0.613	S
B3		12.357	12.4	11.914	0.562	0.788	S
B5		16.082	15.7	15.602	1.122	0.429	S
B6		17.683	17.3	17.017	1.068	0.624	S

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

* Z score is unitless

¤ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 33, Latvian Environment, Geology and Meteorology 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 ‡
B2	SO ₂	16.32	14	12.507	2.22	1.717	S
B3		19.03	15.2	14.999	1.893	2.13	Q
B5	µg S/filter	22.12	19.2	18.436	2.172	1.696	S
B6		24.8	21.2	19.216	3.166	1.764	S
B2	HNO ₃	9.95	11.5	10.147	0.574	-0.343	S
B3		12.33	12.4	11.914	0.562	0.741	S
B5	µg N/filter	15.75	15.7	15.602	1.122	0.132	S
B6		18.12	17.3	17.017	1.068	1.033	S

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* Z score is unitless

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

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

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

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EMEP – 43rd intercomparison of analytical methods - 2025

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 [‡]
B2	SO ₂ <i>µg S/filter</i>	9.593	14	12.507	2.22	-1.312	Q
B3		13.157	15.2	14.999	1.893	-0.973	S
B5		18.464	19.2	18.436	2.172	0.013	S
B6		17.433	21.2	19.216	3.166	-0.563	S
B2	HNO ₃ <i>µg N/filter</i>	9.88	11.5	10.147	0.574	-0.465	S
B3		12.284	12.4	11.914	0.562	0.66	S
B5		15.383	15.7	15.602	1.122	-0.195	S
B6		17.102	17.3	17.017	1.068	0.08	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

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 [¤]
B2	SO ₂	17.96	14	12.507	2.22	2.456	Q
B3		18.96	15.2	14.999	1.893	2.093	Q
B5	<i>µg S/filter</i>	22.87	19.2	18.436	2.172	2.042	S
B6		24.59	21.2	19.216	3.166	1.697	S
B2	HNO ₃	9.65	11.5	10.147	0.574	-0.865	S
B3		10.96	12.4	11.914	0.562	-1.698	S
B5	<i>µg N/filter</i>	14.22	15.7	15.602	1.122	-1.232	S
B6		15.65	17.3	17.017	1.068	-1.28	S

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

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

Laboratory 39, Central Environmental Analysis Laboratory - CentLab (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 [¤]
B2	SO ₂ <i>µg S/filter</i>	11.755	14	12.507	2.22	-0.339	S
B3		14.765	15.2	14.999	1.893	-0.124	S
B5		16.945	19.2	18.436	2.172	-0.686	S
B6		18.765	21.2	19.216	3.166	-0.142	S
B2	HNO ₃ <i>µg N/filter</i>	10.18	11.5	10.147	0.574	0.058	S
B3		11.81	12.4	11.914	0.562	-0.185	S
B5		15.92	15.7	15.602	1.122	0.284	S
B6		17.22	17.3	17.017	1.068	0.19	S

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

* Z score is unitless

¤ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

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 [¤]
B2	SO ₂ <i>µg S/filter</i>	10.965	14	12.507	2.22	-0.694	Q
B3		13.095	15.2	14.999	1.893	-1.006	S
B5		16.755	19.2	18.436	2.172	-0.774	S
B6		19.165	21.2	19.216	3.166	-0.016	S
B2	HNO ₃ <i>µg N/filter</i>	9.79	11.5	10.147	0.574	-0.621	S
B3		11.61	12.4	11.914	0.562	-0.541	S
B5		14.32	15.7	15.602	1.122	-1.143	S
B6		16.61	17.3	17.017	1.068	-0.381	S

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

* Z score is unitless

¤ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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EMEP – 43rd intercomparison of analytical methods - 2025

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

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 [‡]
B2	SO ₂ <i>µg S/filter</i>	11.899	14	12.507	2.22	-0.274	S
B3		14.698	15.2	14.999	1.893	-0.159	S
B5		17.898	19.2	18.436	2.172	-0.247	S
B6		19.398	21.2	19.216	3.166	0.058	S
B2	HNO ₃ <i>µg N/filter</i>	10.169	11.5	10.147	0.574	0.039	S
B3		11.664	12.4	11.914	0.562	-0.445	S
B5		15.864	15.7	15.602	1.122	0.234	S
B6		17.364	17.3	17.017	1.068	0.325	S

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

^{*} Z score is unitless

[‡] EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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

EMEP – 43rd intercomparison of analytical methods - 2025

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 [‡]
B2	SO ₂ <i>µg S/filter</i>	12.975	14	12.507	2.22	0.211	S
B3		15.885	15.2	14.999	1.893	0.468	S
B5		19.765	19.2	18.436	2.172	0.612	S
B6		21.495	21.2	19.216	3.166	0.72	S
B2	HNO ₃ <i>µg N/filter</i>	10.255	11.5	10.147	0.574	0.189	S
B3		11.905	12.4	11.914	0.562	-0.016	S
B5		14.145	15.7	15.602	1.122	-1.299	S
B6		16.715	17.3	17.017	1.068	-0.283	S

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

* Z score is unitless

‡ EMEP quality norm; letters indicate:

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

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

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

B – Blank: No value reported

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