

EMEP – 37th 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>	8.01	8.42	7.37	2.612	0.245	S
B2		9.79	10.4	8.604	3.642	0.326	S
B3		18.55	20.4	17.235	6.092	0.216	S
B4		15.39	16.4	14.227	5.026	0.231	S
B1	HNO ₃ <i>µg N/filter</i>	6.96	7.53	7.475	0.511	-1.008	S
B2		6.21	6.87	6.308	1.412	-0.069	S
B3		14.45	15.71	15.075	0.641	-0.974	S
B4		11.98	12.76	12.406	0.547	-0.778	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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PO Box 100
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Phone: +47 63 89 80 00/Fax: +47 63 89 80 50
Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
Bank: 5102.05.19030
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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>	8.705	8.42	7.37	2.612	0.511	S
B2		11.222	10.4	8.604	3.642	0.719	S
B3		20.448	20.4	17.235	6.092	0.527	S
B4		16.905	16.4	14.227	5.026	0.533	S
B1	HNO ₃ <i>µg N/filter</i>	7.852	7.53	7.475	0.511	0.738	S
B2		7.067	6.87	6.308	1.412	0.538	S
B3		15.431	15.71	15.075	0.641	0.556	S
B4		12.897	12.76	12.406	0.547	0.898	S

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NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

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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>	7.68	8.42	7.37	2.612	0.119	S
B2		10.05	10.4	8.604	3.642	0.397	S
B3		18.98	20.4	17.235	6.092	0.286	S
B4		15.66	16.4	14.227	5.026	0.285	S
B1	HNO ₃ <i>µg N/filter</i>	7.87	7.53	7.475	0.511	0.774	S
B2		7.23	6.87	6.308	1.412	0.653	S
B3		15.66	15.71	15.075	0.641	0.913	S
B4		13.06	12.76	12.406	0.547	1.196	S

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NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
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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>	7.85	8.42	7.37	2.612	0.184	S
B2		10.55	10.4	8.604	3.642	0.534	S
B3		20.05	20.4	17.235	6.092	0.462	S
B4		16.45	16.4	14.227	5.026	0.442	S
B1	HNO ₃ <i>µg N/filter</i>	7.5	7.53	7.475	0.511	0.049	S
B2		6.8	6.87	6.308	1.412	0.349	S
B3		15.2	15.71	15.075	0.641	0.196	S
B4		12.5	12.76	12.406	0.547	0.172	S

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Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
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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>	1.239	8.42	7.37	2.612	-2.347	U
B2		1.031	10.4	8.604	3.642	-2.079	U
B3		1.91	20.4	17.235	6.092	-2.515	U
B4		1.612	16.4	14.227	5.026	-2.51	U
B1	HNO ₃ <i>µg N/filter</i>	0.674	7.53	7.475	0.511	-13.317	U
B2		0.624	6.87	6.308	1.412	-4.026	U
B3		1.406	15.71	15.075	0.641	-21.311	U
B4		1.168	12.76	12.406	0.547	-20.536	U

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
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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>	8.9	8.42	7.37	2.612	0.586	S
B2		10.5	10.4	8.604	3.642	0.521	S
B3		19.8	20.4	17.235	6.092	0.421	S
B4		16.3	16.4	14.227	5.026	0.412	S
B1	HNO ₃ <i>µg N/filter</i>	8	7.53	7.475	0.511	1.028	S
B2		6.9	6.87	6.308	1.412	0.419	S
B3		15.5	15.71	15.075	0.641	0.663	S
B4		12.8	12.76	12.406	0.547	0.72	S

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

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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>	8.06	8.42	7.37	2.612	0.264	S
B2		9.95	10.4	8.604	3.642	0.37	S
B3		19.02	20.4	17.235	6.092	0.293	S
B4		15.49	16.4	14.227	5.026	0.251	S
B1	HNO ₃ <i>µg N/filter</i>	7.73	7.53	7.475	0.511	0.5	S
B2		7.04	6.87	6.308	1.412	0.519	S
B3		15.38	15.71	15.075	0.641	0.476	S
B4		12.77	12.76	12.406	0.547	0.666	S

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
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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>	8.49	8.42	7.37	2.612	0.429	S
B2		10.5	10.4	8.604	3.642	0.521	S
B3		19.9	20.4	17.235	6.092	0.437	S
B4		16.3	16.4	14.227	5.026	0.412	S
B1	HNO ₃ <i>µg N/filter</i>	7.18	7.53	7.475	0.511	-0.577	S
B2		6.49	6.87	6.308	1.412	0.129	S
B3		13.9	15.71	15.075	0.641	-1.831	S
B4		12	12.76	12.406	0.547	-0.742	S

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
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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>	8.594	8.42	7.37	2.612	0.469	S
B2		10.345	10.4	8.604	3.642	0.478	S
B3		19.407	20.4	17.235	6.092	0.357	S
B4		16.235	16.4	14.227	5.026	0.4	S
B1	HNO ₃ <i>µg N/filter</i>	7.688	7.53	7.475	0.511	0.416	S
B2		6.728	6.87	6.308	1.412	0.297	S
B3		15.161	15.71	15.075	0.641	0.134	S
B4		12.066	12.76	12.406	0.547	-0.622	S

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

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nilu-tromso@nilu.no
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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>	9.345	8.42	7.37	2.612	0.756	S
B2		10.455	10.4	8.604	3.642	0.508	S
B3		18.725	20.4	17.235	6.092	0.245	S
B4		15.925	16.4	14.227	5.026	0.338	S
B1	HNO ₃ <i>µg N/filter</i>	7.535	7.53	7.475	0.511	0.118	S
B2		6.365	6.87	6.308	1.412	0.04	S
B3		14.125	15.71	15.075	0.641	-1.48	S
B4		11.555	12.76	12.406	0.547	-1.555	S

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NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
Bank: 5102.05.19030
Foretaksnr./Enterprise no. 941705561

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EMEP – 37th 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>	8.08	8.42	7.37	2.612	0.272	S
B2		10.055	10.4	8.604	3.642	0.398	S
B3		19.772	20.4	17.235	6.092	0.416	S
B4		16.242	16.4	14.227	5.026	0.401	S
B1	HNO ₃ <i>µg N/filter</i>	7.319	7.53	7.475	0.511	-0.305	S
B2		6.518	6.87	6.308	1.412	0.149	S
B3		15.491	15.71	15.075	0.641	0.649	S
B4		12.979	12.76	12.406	0.547	1.048	S

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* Z score is unitless

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

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NILU – Norsk institutt for luftforskning
PO Box 100
NO-2027 KJELLER, Norway
Phone: +47 63 89 80 00/Fax: +47 63 89 80 50
Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
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EMEP – 37th 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>	8.655	8.42	7.37	2.612	0.492	S
B2		10.815	10.4	8.604	3.642	0.607	S
B3		20.225	20.4	17.235	6.092	0.491	S
B4		16.795	16.4	14.227	5.026	0.511	S
B1	HNO ₃ <i>µg N/filter</i>	7.845	7.53	7.475	0.511	0.725	S
B2		6.895	6.87	6.308	1.412	0.416	S
B3		15.565	15.71	15.075	0.641	0.765	S
B4		12.825	12.76	12.406	0.547	0.766	S

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PO Box 100
NO-2027 KJELLER, Norway
Phone: +47 63 89 80 00/Fax: +47 63 89 80 50
Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
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EMEP – 37th 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>	7.28	8.42	7.37	2.612	-0.034	S
B2		9.31	10.4	8.604	3.642	0.194	S
B3		18.78	20.4	17.235	6.092	0.254	S
B4		15.17	16.4	14.227	5.026	0.188	S
B1	HNO ₃ <i>µg N/filter</i>	5.93	7.53	7.475	0.511	-3.025	Q
B2		5.29	6.87	6.308	1.412	-0.721	Q
B3		13.93	15.71	15.075	0.641	-1.784	S
B4		11.2	12.76	12.406	0.547	-2.203	S

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NO-2027 KJELLER, Norway
Phone: +47 63 89 80 00/Fax: +47 63 89 80 50
Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
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EMEP – 37th intercomparison of analytical methods

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>	8.543	8.42	7.37	2.612	0.449	S
B2		2.453	10.4	8.604	3.642	-1.689	U
B3		19.493	20.4	17.235	6.092	0.371	S
B4		16.093	16.4	14.227	5.026	0.371	S
B1	HNO ₃ <i>µg N/filter</i>	7.68	7.53	7.475	0.511	0.402	S
B2		1.49	6.87	6.308	1.412	-3.412	U
B3		15.49	15.71	15.075	0.641	0.648	S
B4		12.69	12.76	12.406	0.547	0.519	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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NO-2027 KJELLER, Norway
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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
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EMEP – 37th intercomparison of analytical methods

Laboratory 174, Background Monitoring Department, Institute of Global Climate and Ecology (IGCE),
Moscow (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 [¤]
B1	SO ₂ <i>µg S/filter</i>	0.392	8.42	7.37	2.612	-2.671	U
B2		0.568	10.4	8.604	3.642	-2.206	U
B3		1.478	20.4	17.235	6.092	-2.586	U
B4		1.207	16.4	14.227	5.026	-2.59	U
B1	HNO ₃ <i>µg N/filter</i>	0.782	7.53	7.475	0.511	-13.105	U
B2		0.218	6.87	6.308	1.412	-4.313	U
B3		0.985	15.71	15.075	0.641	-21.967	U
B4		1.299	12.76	12.406	0.547	-20.297	U

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NILU – Norsk institutt for luftforskning
PO Box 100
NO-2027 KJELLER, Norway
Phone: +47 63 89 80 00/Fax: +47 63 89 80 50
Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
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EMEP – 37th intercomparison of analytical methods

Laboratory 178, Environmental Chemistry and EANET Monitoring Laboratory, Limnological Institute RAS/SB, Irkutsk (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 [¤]
B1	SO ₂ <i>µg S/filter</i>	54.06	8.42	7.37	2.612	17.876	U
B2		58.68	10.4	8.604	3.642	13.748	U
B3		243.43	20.4	17.235	6.092	37.127	U
B4		154.17	16.4	14.227	5.026	27.841	U
B1	HNO ₃ <i>µg N/filter</i>	7.425	7.53	7.475	0.511	-0.098	S
B2		6.875	6.87	6.308	1.412	0.402	S
B3		15.725	15.71	15.075	0.641	1.014	S
B4		12.395	12.76	12.406	0.547	-0.02	S

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PO Box 100
NO-2027 KJELLER, Norway
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Besøk/visit: Instituttveien 18, 2007 Kjeller

NILU – Norsk institutt for luftforskning
Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
Phone: +47 77 75 03 75/Fax: +47 77 75 03 76
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e-mail: nilu@nilu.no
nilu-tromso@nilu.no
Internet: www.nilu.no
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EMEP – 37th intercomparison of analytical methods

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>	8.09	8.42	7.37	2.612	0.276	S
B2		10.07	10.4	8.604	3.642	0.402	S
B3		19.22	20.4	17.235	6.092	0.326	S
B4		15.86	16.4	14.227	5.026	0.325	S
B1	HNO ₃ <i>µg N/filter</i>	7.61	7.53	7.475	0.511	0.265	S
B2		6.72	6.87	6.308	1.412	0.292	S
B3		15.11	15.71	15.075	0.641	0.055	S
B4		12.37	12.76	12.406	0.547	-0.065	S

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Framsenteret / The Fram Centre
NO-9296 TROMSØ, Norway
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Besøk/visit: Hjalmar Johansens gt. 14, 9007 Tromsø

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