

Appendix 3 - HVAS filter analysis results

Appendix 3 contains a summary of the laboratory HVAS results for PM₁₀, metals and silica.

Notes:

- The practical quantitation limit (PQL, also known as the limit of detection) for each substance is listed for reference and '<PQL' is recorded for concentrations less than the PQL (i.e. the substance was not detected in the sample). For these samples, half of the PQL value was used for calculating the campaign average.
- There were small variations in the PQLs of the samples. The PQLs displayed in this appendix are the average of the minimum and maximum PQLs for each substance.
- Results are blank corrected, using the nearest field blank after the sample date. Where the blank value is <PQL, half the PQL was used for the calculation.
- Field blank results used for blank correction are DWE219, DWE230, DWE242 and DWE244. Analysis results are available in Appendix 4.
- Sample air volumes for each sample filter analysis that were used to calculate concentrations are shown in the final column of the summary table.
- Elemental aluminium results are converted to alumina (Al₂O₃) by multiplying by a factor of 1.889 and elemental iron results are converted to iron oxide (Fe₂O₃) by multiplying by a factor of 1.430.
- On Department of Health advice, a screening method for silica was adopted where x-ray diffraction (XRD) analysis determined the mass of respirable crystalline silica (RCS) as quartz/cristobalite on the PM₁₀ filter samples. The PM₁₀ fraction will overestimate the quantity of RCS because the respirable fraction is defined as particles up to 4 µm in size rather than 10 µm. However, no data exonerate the larger particles in the 4 – 10 µm range. A fraction of these particles can enter the bronchioles and alveoli.

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Substance	PM ₁₀	Aluminium (as Al ₂ O ₃)	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Gallium	Iron (as Fe ₂ O ₃)
Annual guideline	25		0.03	0.003		0.0002					0.10			
Daily guideline	50	10.00		0.03						0.50	0.10	1.00		120.00
PQL	0.066	0.0063	0.0066	0.0013	0.0013	0.00013	0.013	0.00033	0.033	0.0013	0.0013	0.0013	0.0027	0.0047
Campaign average	18.9	0.59	0.0033	0.0007	0.0010	0.00007	0.008	0.00017	0.24	0.0020	0.0007	0.0009	0.0013	0.65
02/11/2024	11.8	0.08	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.17	0.0023	<PQL	<PQL	<PQL	0.05
08/11/2024	12.4	0.26	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.11	0.0019	<PQL	<PQL	<PQL	0.25
14/11/2024	26.1	0.88	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.27	0.0022	<PQL	<PQL	<PQL	1.05
20/11/2024	14.0	0.07	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.16	<PQL	<PQL	<PQL	<PQL	0.09
26/11/2024	16.9	0.32	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.17	0.0018	<PQL	<PQL	<PQL	0.30
02/12/2024	16.5	0.07	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.19	0.0015	<PQL	<PQL	<PQL	0.07
08/12/2024	21.0	0.92	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.21	0.0051	<PQL	<PQL	<PQL	1.15
14/12/2024	13.4	0.25	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.17	0.0044	<PQL	<PQL	<PQL	0.22
20/12/2024	23.4	0.77	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.26	0.0027	<PQL	0.0015	<PQL	0.73
26/12/2024	19.6	0.16	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.20	<PQL	<PQL	<PQL	<PQL	0.16
01/01/2025	35.4	2.05	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.50	0.0034	<PQL	<PQL	<PQL	3.20
07/01/2025	25.7	1.13	<PQL	<PQL	0.0018	<PQL	<PQL	<PQL	0.47	<PQL	<PQL	0.0015	<PQL	0.95
13/01/2025	3.1	0.32	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.15	0.0034	<PQL	<PQL	<PQL	0.28
19/01/2025	26.5	1.53	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.31	0.0054	<PQL	0.0020	<PQL	1.83
25/01/2025	6.5	0.04	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.04
31/01/2025	31.2	0.54	<PQL	<PQL	0.0018	<PQL	<PQL	<PQL	0.52	<PQL	<PQL	<PQL	<PQL	0.53
06/02/2025	34.3	1.27	<PQL	<PQL	0.0018	<PQL	<PQL	<PQL	0.42	0.0027	<PQL	<PQL	<PQL	1.36
12/02/2025	19.1	0.30	<PQL	<PQL	<PQL	<PQL	0.026	<PQL	0.24	<PQL	<PQL	0.0013	<PQL	0.30
18/02/2025	21.3	0.81	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.22	<PQL	<PQL	<PQL	<PQL	0.94
24/02/2025	26.0	0.66	<PQL	<PQL	0.0017	<PQL	<PQL	<PQL	0.56	<PQL	<PQL	0.0013	<PQL	0.60
02/03/2025	22.3	1.15	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.29	0.0037	<PQL	<PQL	<PQL	1.43
08/03/2025	19.3	0.39	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.22	0.0022	<PQL	<PQL	<PQL	0.30
14/03/2025	7.3	0.06	<PQL	<PQL	<PQL	<PQL	0.014	<PQL	0.09	0.0013	<PQL	<PQL	<PQL	0.07
20/03/2025	17.8	0.36	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.19	<PQL	<PQL	<PQL	<PQL	0.32
26/03/2025	25.8	0.90	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.35	0.0014	<PQL	<PQL	<PQL	1.05
01/04/2025	22.9	0.77	<PQL	<PQL	0.0020	<PQL	<PQL	<PQL	0.37	0.0015	<PQL	<PQL	<PQL	0.74
07/04/2025	16.6	0.54	<PQL	<PQL	0.0020	<PQL	0.014	<PQL	0.20	<PQL	<PQL	<PQL	<PQL	0.44
13/04/2025	12.0	0.46	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.12	<PQL	<PQL	<PQL	<PQL	0.38
19/04/2025	9.7	0.30	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.08	0.0013	<PQL	<PQL	<PQL	0.28
25/04/2025	9.0	0.26	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.09	<PQL	<PQL	<PQL	<PQL	0.28

Table A3 HVAS filter analysis results, all values in µg/m³

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Substance	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silver	Sodium	Strontium	Sulfur
Annual guideline	0.50			0.15	0.20		0.02							
Daily guideline				0.15		12.00	0.14							
PQL	0.0033	0.0013	0.033	0.0013	0.00013	0.0033	0.0013	0.013	0.033	0.0027	0.0033	0.066	0.0013	0.033
Campaign average	0.0017	0.0007	0.22	0.0014	0.00007	0.0017	0.0007	0.008	0.097	0.0013	0.0024	1.72	0.0017	0.32
02/11/2024	<PQL	<PQL	0.19	<PQL	<PQL	<PQL	<PQL	<PQL	0.095	<PQL	<PQL	1.61	<PQL	0.19
08/11/2024	<PQL	<PQL	0.09	<PQL	<PQL	<PQL	<PQL	<PQL	0.045	<PQL	<PQL	0.82	<PQL	0.12
14/11/2024	<PQL	<PQL	0.16	<PQL	<PQL	<PQL	<PQL	<PQL	0.084	<PQL	<PQL	1.38	<PQL	0.22
20/11/2024	<PQL	<PQL	0.19	<PQL	<PQL	<PQL	<PQL	<PQL	0.090	<PQL	<PQL	1.57	<PQL	0.54
26/11/2024	<PQL	<PQL	0.25	<PQL	<PQL	<PQL	<PQL	<PQL	0.082	<PQL	<PQL	2.12	<PQL	0.24
02/12/2024	<PQL	<PQL	0.29	<PQL	<PQL	<PQL	<PQL	<PQL	0.089	<PQL	<PQL	2.35	0.0014	0.28
08/12/2024	<PQL	<PQL	0.19	0.0014	<PQL	<PQL	<PQL	<PQL	0.098	<PQL	<PQL	1.52	<PQL	0.34
14/12/2024	<PQL	<PQL	0.19	<PQL	<PQL	<PQL	<PQL	<PQL	0.077	<PQL	<PQL	1.58	<PQL	0.58
20/12/2024	<PQL	<PQL	0.33	0.0019	<PQL	<PQL	<PQL	<PQL	0.151	<PQL	<PQL	2.45	0.0021	0.46
26/12/2024	<PQL	<PQL	0.37	<PQL	<PQL	<PQL	<PQL	<PQL	0.140	<PQL	<PQL	2.84	0.0022	0.37
01/01/2025	<PQL	<PQL	0.30	0.0027	<PQL	<PQL	<PQL	0.015	0.147	<PQL	<PQL	2.97	0.0029	0.45
07/01/2025	<PQL	<PQL	0.26	0.0036	<PQL	<PQL	<PQL	0.016	0.146	<PQL	0.0085	1.93	0.0028	0.37
13/01/2025	<PQL	<PQL	0.12	<PQL	<PQL	<PQL	<PQL	<PQL	0.057	<PQL	0.0097	1.04	<PQL	0.30
19/01/2025	<PQL	<PQL	0.33	0.0022	<PQL	<PQL	<PQL	<PQL	0.140	<PQL	0.0072	2.83	0.0023	0.47
25/01/2025	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.18	<PQL	<PQL
31/01/2025	<PQL	<PQL	0.46	0.0022	<PQL	<PQL	0.0018	<PQL	0.166	<PQL	<PQL	3.43	0.0036	0.55
06/02/2025	<PQL	<PQL	0.50	0.0040	<PQL	<PQL	<PQL	0.016	0.196	<PQL	<PQL	3.74	0.0038	0.57
12/02/2025	<PQL	<PQL	0.27	<PQL	<PQL	<PQL	<PQL	<PQL	0.109	<PQL	<PQL	2.14	0.0017	0.31
18/02/2025	<PQL	<PQL	0.20	0.0013	<PQL	<PQL	<PQL	<PQL	0.083	<PQL	<PQL	1.63	<PQL	0.28
24/02/2025	<PQL	<PQL	0.29	0.0021	<PQL	<PQL	<PQL	<PQL	0.164	<PQL	<PQL	2.24	0.0029	0.48
02/03/2025	<PQL	<PQL	0.12	0.0015	<PQL	<PQL	<PQL	<PQL	0.064	<PQL	<PQL	1.05	<PQL	0.28
08/03/2025	<PQL	<PQL	0.28	<PQL	<PQL	<PQL	<PQL	<PQL	0.137	<PQL	<PQL	2.04	0.0018	0.44
14/03/2025	<PQL	<PQL	0.10	<PQL	<PQL	<PQL	<PQL	<PQL	0.044	<PQL	<PQL	0.77	<PQL	0.14
20/03/2025	<PQL	<PQL	0.23	<PQL	<PQL	<PQL	<PQL	<PQL	0.082	<PQL	<PQL	1.94	<PQL	0.24
26/03/2025	<PQL	<PQL	0.18	0.0023	<PQL	<PQL	<PQL	<PQL	0.078	<PQL	<PQL	1.60	0.0014	0.26
01/04/2025	<PQL	<PQL	0.18	0.0035	<PQL	<PQL	<PQL	<PQL	0.104	<PQL	<PQL	1.04	0.0074	0.31
07/04/2025	<PQL	<PQL	0.10	0.0019	<PQL	<PQL	<PQL	<PQL	0.063	<PQL	<PQL	0.70	<PQL	0.39
13/04/2025	<PQL	<PQL	0.10	<PQL	<PQL	<PQL	<PQL	<PQL	0.063	<PQL	<PQL	0.77	<PQL	0.30
19/04/2025	<PQL	<PQL	0.09	<PQL	<PQL	<PQL	<PQL	<PQL	0.047	<PQL	<PQL	0.68	<PQL	0.15
25/04/2025	<PQL	<PQL	0.08	<PQL	<PQL	<PQL	<PQL	<PQL	0.044	<PQL	<PQL	0.67	<PQL	0.10

Table A3 HVAS filter analysis results, all values in $\mu\text{g}/\text{m}^3$

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Substance	Thallium	Thorium	Tin	Titanium	Uranium	Vanadium	Zinc	RCS (alpha-quartz)	Sample volume (m ³)
Annual guideline					0.04	1.00			
Daily guideline						1.00	50.00	10.00	
PQL	0.0027	0.0027	0.0066	0.0013	0.0027	0.0013	0.0033	0.033	
Campaign average	0.0013	0.0013	0.0033	0.010	0.0013	0.0011	0.0025	0.32	
02/11/2024	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.09	1521.8
08/11/2024	<PQL	<PQL	<PQL	0.002	<PQL	<PQL	<PQL	0.33	1526.6
14/11/2024	<PQL	<PQL	<PQL	0.015	<PQL	<PQL	<PQL	0.10	1490.5
20/11/2024	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.05	1495.3
26/11/2024	<PQL	<PQL	<PQL	0.002	<PQL	<PQL	<PQL	0.17	1531.2
02/12/2024	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.05	1510.6
08/12/2024	<PQL	<PQL	<PQL	0.017	<PQL	0.0015	<PQL	0.28	1477.2
14/12/2024	<PQL	<PQL	<PQL	0.002	<PQL	<PQL	<PQL	0.10	1483.9
20/12/2024	<PQL	<PQL	<PQL	0.011	<PQL	<PQL	<PQL	0.38	1491.4
26/12/2024	<PQL	<PQL	<PQL	0.003	<PQL	<PQL	0.0055	0.09	1531.6
01/01/2025	<PQL	<PQL	<PQL	0.074	<PQL	0.0058	<PQL	0.49	1466.3
07/01/2025	<PQL	<PQL	<PQL	0.013	<PQL	<PQL	0.0044	0.65	1475.3
13/01/2025	<PQL	<PQL	<PQL	0.004	<PQL	<PQL	<PQL	0.23	1489.9
19/01/2025	<PQL	<PQL	<PQL	0.035	<PQL	0.0029	<PQL	0.45	1468.3
25/01/2025	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.11	1475.4
31/01/2025	<PQL	<PQL	<PQL	0.005	<PQL	<PQL	0.0037	0.36	1473.8
06/02/2025	<PQL	<PQL	<PQL	0.011	<PQL	0.0020	0.0040	0.57	1457.7
12/02/2025	<PQL	<PQL	<PQL	0.004	<PQL	<PQL	<PQL	0.43	1517.4
18/02/2025	<PQL	<PQL	<PQL	0.018	<PQL	<PQL	<PQL	0.65	1500.9
24/02/2025	<PQL	<PQL	<PQL	0.007	<PQL	<PQL	<PQL	0.43	1498.2
02/03/2025	<PQL	<PQL	<PQL	0.027	<PQL	0.0021	<PQL	0.59	1477.8
08/03/2025	<PQL	<PQL	<PQL	0.003	<PQL	<PQL	<PQL	0.30	1498.0
14/03/2025	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	1500.1
20/03/2025	<PQL	<PQL	<PQL	0.003	<PQL	<PQL	<PQL	0.29	1517.3
26/03/2025	<PQL	<PQL	<PQL	0.017	<PQL	0.0015	<PQL	0.45	1469.7
01/04/2025	<PQL	<PQL	<PQL	0.006	<PQL	<PQL	0.0040	0.58	1485.7
07/04/2025	<PQL	<PQL	<PQL	0.006	<PQL	<PQL	0.0050	0.49	1504.6
13/04/2025	<PQL	<PQL	<PQL	0.005	<PQL	<PQL	<PQL	0.30	1499.6
19/04/2025	<PQL	<PQL	<PQL	0.003	<PQL	<PQL	<PQL	0.24	1540.2
25/04/2025	<PQL	<PQL	<PQL	0.002	<PQL	<PQL	<PQL	0.20	1556.7

Table A3 HVAS filter analysis results, all values in µg/m³